SIPHA
Saudi International Pharmaceutical Sciences Meeting & Workshops

The Annual Meeting of SPS
Prince Sultan Hall - Al Faisaliyah, Riyadh
22 - 24, January 2024

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The Saudi Pharmaceutical Society (SPS) is a non-profit professional organization that represents all pharmacists in Saudi Arabia. It was founded in 1988 and it contributes to the planning and development of the pharmacy profession. The Honorary President in his Royal Highness Prince Fahad Bin Sultan bin Abdul-Aziz.

Saudi Pharmaceutical Society
الجمعية الصيدلية السعودية

The Saudi Pharmaceutical Society

The SPS was able to achieve several accomplishments including the establishment of the Saudi Board under the umbrella of the Saudi Commission for Health Specialties (SCFHS) as well as the Saudi Clinical Pharmacy and Hospital Pharmacy Clubs. Saudi Commission for Health Specialties & American Council for Pharmacy Education (ACPE) recognizes the SPS educational program.

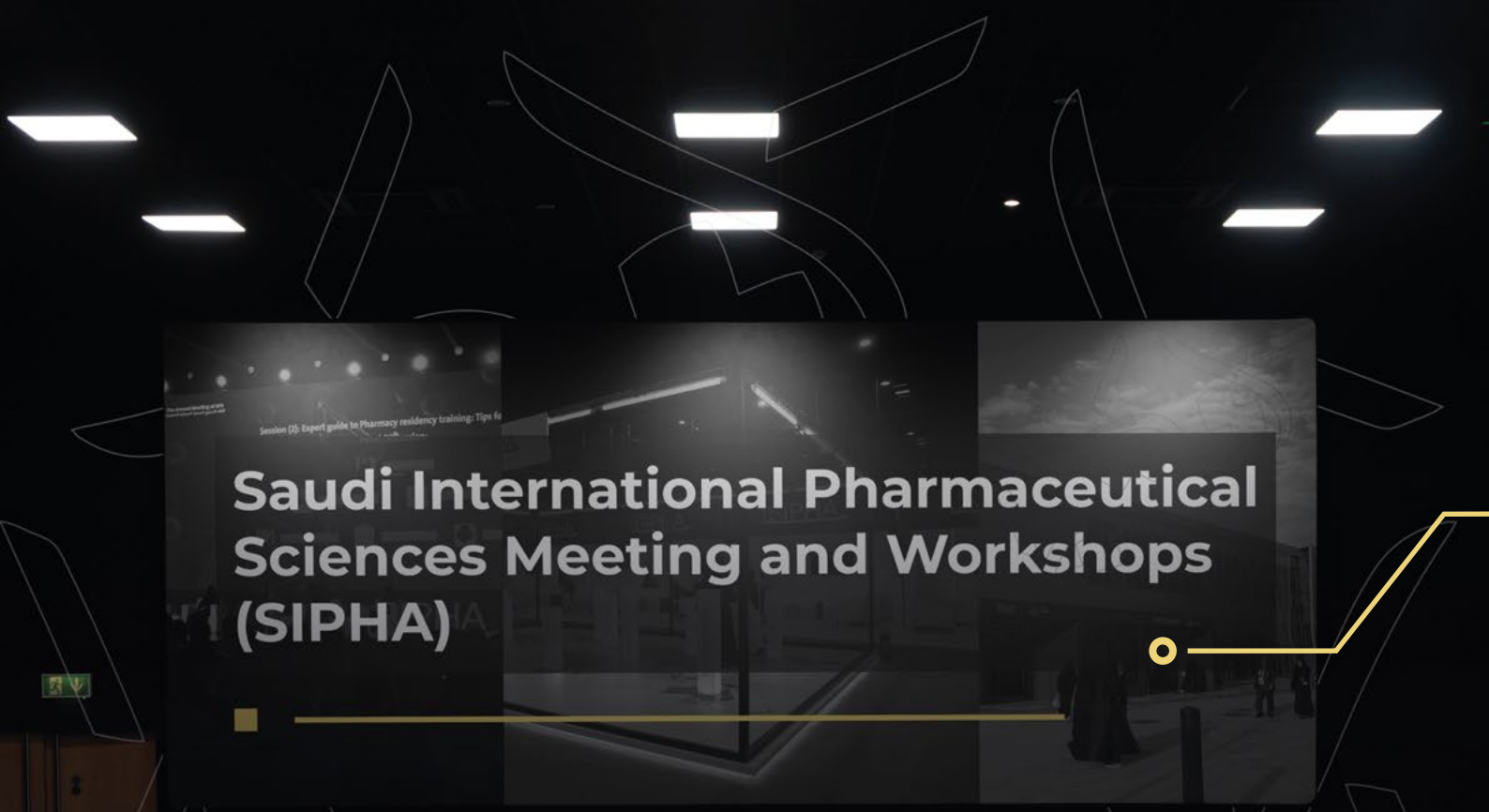
Our Vision

Leadership in the development of pharmaceutical care, scientific research, and medical education in the field of pharmacy in the Kingdom of Saudi Arabia.

Our Mission

The development, the increased awareness, and the education of medical practitioners of pharmacy and health professions and the wider community.

The Annual Meeting of SPS
SIPHA 2023



02

Saudi International Pharmaceutical Sciences Meeting and Workshops (SIPHA) is a project aimed at bringing experts and those interested in the field pf pharmacy together for sharing and improving pharmaceutical and health-related practices.

SIPHA
سيفا
Saudi International Pharmaceutical Sciences Meeting & Workshops

Saudi International Pharmaceutical Sciences Meeting and Workshops

Our Vision

To be the pioneer in the field of continues pharmacy education and pharmacists' professional development.

Our Mission

Advance the different pharmaceutical sectors, by discussing and evaluating our current practices, and developing new recommendations.

The Annual Meeting of SPS
SIPHA 2023

03

Dr. Moreq Alotaibi

President of The Saudi Pharmaceutical Society

Welcome to the Annual Meeting of the Saudi Pharmaceutical Society (SIPHA2024)!

On behalf of the board members, it is my great pleasure to extend a warm welcome to all attendees, distinguished hospital and community pharmacists, researchers and academicians, industry professionals, and pharmaceutical enthusiasts from around the globe. SIPHA 2024 marks a significant milestone in our journey of advancing pharmaceutical

knowledge and innovation. This conference brings together leading experts, practitioners, and thought leaders in the field of pharmacy to exchange ideas, discuss ground-breaking research, and foster collaborations that will shape the future of healthcare.

Over the course of the conference, we have curated an exceptional program that includes keynote speeches, panel discussions, interactive workshops, and poster presentations encompassing a wide range of topics. From the latest advancements in drug development to emerging trends in pharmacy practice, SIPHA 2024 offers a platform for sharing knowledge, best practices, and transformative ideas. In addition to the enlightening scientific sessions, the conference also provides ample opportunities for networking and building connections with colleagues in several sectors. Engage in insightful conversations, forge new partnerships, and explore possibilities that will drive the pharmaceutical landscape forward.

I would like to express my gratitude to all the sponsors, exhibitors, and partners whose support has been instrumental in making this event possible. Your commitment to advancing pharmaceutical research and practice is truly commendable.

Lastly, I encourage all participants to make the most of this exceptional gathering. Share your insights, challenge existing paradigms, and contribute to the collective effort of shaping the future of pharmacy. Together, we can make a lasting impact on pharmacy practice and improve the well-being.

Once again, welcome to the annual meeting of Saudi Pharmaceutical Society - SIPHA 2024 in Riyadh, Saudi Arabia on 22nd -24th January, 2024!

Sincerely,

04

Dr. Faisal Gonayah

Chairman, Organizing Committee

It is with great pleasure and enthusiasm that I extend a warm welcome to each and every one of you to the much-anticipated seventh edition of SIPHA! As we embark on this exciting journey, I am filled with pride and anticipation for the remarkable experiences and accomplishments that lie ahead.

Since the inception of SIPHA, our commitment to pushing boundaries and surpassing expectations has been unwavering. This year, we stand on the shoulders of the achievements of the past and stride confidently towards new horizons, both in terms of quality and quantity. Our goal, inspired by the visionary founders of SIPHA in 2013, is nothing short of creating an international exhibition that transcends borders.

In 2024, SIPHA aspires to be a global hub where the brilliance of Saudi Pharmacists takes center stage. We envision an event where minds converge, knowledge is shared, and deals are sealed. Picture a gathering where students from diverse backgrounds engage in healthy competition, visitors revel in an enriching experience, and the entire SIPHA journey becomes an indelible memory.

Reflecting on the early days of preparing for this version, it becomes evident that our goals were perceived as ambitious and, to some, even unattainable. However, it is precisely within the spirit of SIPHA that the word «impossible» is transformed into «I›m-Possible.» What unfolds in the seventh version is a testament to the dedication, relentless hard work, and visionary spirit of a team that stops at nothing but the absolute best.

As we stand at the threshold of SIPHA 2024, let us embrace the challenges and opportunities that lie ahead with the same vigor and determination that have defined us from the beginning. Together, let›s make this edition a beacon of excellence, fostering knowledge, connections, and lasting memories.

Welcome to SIPHA 2024, where the extraordinary becomes the norm!

05

Dr. Mohammed Alshennawi

Chariman, Scientific Committee

Dear Esteemed Colleagues and Friends,

It is my distinct honor and privilege to extend a warm welcome to all participants of the SIPHA24 “the annual meeting for the Saudi Pharmaceutical Society”. As the Chairman of the Scientific Committee, I am thrilled to address you in this esteemed gathering of pharmaceutical professionals, researchers, and experts.

SIPHA24 Conference represents an invaluable opportunity for us to come together and engage in the exchange of knowledge, insights, and innovations that are shaping the future of pharmaceutical science and healthcare. Our collective dedication to advancing the pharmaceutical industry continues to drive progress and transform the way we approach patient care and well-being to achieve together our Saudi vision 2030 goals.

Throughout this conference, we will delve into a diverse array of topics, from cutting-edge research and development to regulatory trends, policy making, most advanced clinical outcomes, community pharmacies, medicinal industries, and the transformative potential of emerging technologies. With a robust program featuring keynote presentations, panel discussions, and interactive workshops, we are poised to explore the forefront of pharmaceutical innovation and drive meaningful conversations that will inspire and propel our collective efforts forward.

I encourage each and every one of you to seize this opportunity to connect, collaborate, and learn from the wealth of expertise present at this conference. Together, let us foster an environment of open dialogue, interdisciplinary collaboration, and the pursuit of excellence that will shape the future of pharmaceutical science and practice.

I extend my deepest gratitude to my colleagues in the scientific committee, sponsors, all SIPHA24 committees and groups, and for sure all participants for their unwavering commitment to advancing pharmaceutical research and practice. Your dedication and contributions have been instrumental in making this conference a reality, and I have no doubt that our collective efforts over the next few days will yield lasting impacts on the industry as a whole.

In closing, I wish you all a fulfilling and enriching experience at the SIPHA24 “the annual meeting for the Saudi Pharmaceutical Society”. May our time together be marked by insightful discussions, meaningful connections, and the generation of ideas that will drive positive change in the field of pharmaceutical science.

Thank you, and I eagerly anticipate the remarkable conversations and collaborations that await us.

Warm regards,

06

SIPHA24

Organizing Committee is a dynamic team of pharmacy professionals dedicated to curating an extraordinary experience for you. Their meticulous planning has shaped the conference, orchestrating flawless logistics to make your participation both informative and rewarding.

ORGANIZING COMMITTEE

Drawing from diverse expertise, the committee ensures a comprehensive and insightful event, fostering unmatched opportunities for networking, collaboration, and knowledge exchange. Our sincere gratitude goes to the committee for their tireless dedication in ensuring SIPHA24 is a tremendous success.

Dr. Faisal Bin Gonayah
Chairman,
Organzing Committee

Dr. Turki Bin Duhaim
Co-Chairman,
Organzing Committee

Dr. Mona Bin Anzan
SIPHA Project Manager

Dr. Mostafa Aljasser
SIPHA Project Advisor

ORGANIZING COMMITTEE

Dr. Shahd Alnasser
Coordinator,
Research Affairs Team

Dr. Wejdan Alyousef
Coordinator,
Event Management Team

Dr. Abdullah Alanazi
Coordinator, Logistic Team

Dr. Maha Alosaimi
Coordinator, SIPHA's
Networking Hub Team

Dr. Abdullah Alghamdi
Coordinator, Media Team

Dr. Ibrahim Alfaqih
Coordinator,
Public Relation Team

Dr. Turki Helabi
Coordinator,
Scientific Affairs Team

Dr. Hala Alkhalaf
Coordinator,
Registration Team

ORGANIZING COMMITTEE

Dr. Aisha Alrajeh
Coordinator,
1:1 Meeting Team

Dr. Abdulrahman Almadi
Coordinator, Design Team

Dr. Lama Bamunif
Coordinator, Marketing Team

Dr. Nouf Alyousef
Coordinator,
Residency Showcase Team

Dr. Reema Alfehaid
Coordinator, Student Clinical
skills Competition Team

Dr. Moath Aldafasr
Coordinator,
Interactive Platform Team

Dr. Lujain Alhumaid
Coordinator, Exhibition Team

07

Scientific Committee

SCIENTIFIC COMMITTEE

Dr. Mohammed Alshennawi
Chariman,
Scientific Committee

Dr. Ali Altebainawi
Co-Chariman,
Scientific Committee

Dr. Alia Alshammari
Member,
cientific Committee

Dr. Hala Joharji
Member,
Scientific Committee

Dr. Mai Alsaqaaby
Member,
Scientific Committee

Dr. Faisal Altlasi
Member,
Scientific Committee

Dr. Nasser Alqahtani
Member,
Scientific Committee

Dr. Bandar Alharbi
Member,
Scientific Committee

Dr. Ohoud Almalki
Member,
Scientific Committee

Dr. Mussad Alshammari
Member,
Scientific Committee

Dr. Shaymaa Alenazi
Coordinator,
Scientific Affairs Team

Dr. Raneem Alalawi
Member,
Scientific Committee

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Workshop Scientific Committee

WORKSHOP SCIENTIFIC COMMITTEE

Dr. Abdulrahman Alshaya
Chariman, WorkShop Scientific Committee

Dr. Jubran Harthi
Member, WorkShop Scientific Committee

Dr. Alfarooq Alghamdi
Member, WorkShop Scientific Committee

Dr. Abdualmajeed binjumayah
Member, WorkShop Scientific Committee

Dr. Hasan Ashmawi
Member, WorkShop Scientific Committee

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SIPHA
Activities & Statistics

SIPHA 2024 ACTIVITIES

- **Lectures**
- **Poster Presentations**
- **SIPHA's Networking Hub**
- **Workshops**
- **Residency Showcase**
- **The Market Masters Competition**
- **The Stage**
- **Top Candidate**
- **Student Clinical Skills Competition**
- **1:1 Meetings**
- **Exhibition**

SIPHA 2024 STATISTICS

- **4000** Attendees
- **90** Lectures & Worksops
- **315** Research Posters
- **140** Speakers & Moderators
- **36** Universities
- **41** Hospitals
- **90** Sponsors & Exhibitors
- **400** Volunteers

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Scientific Program

Scientific Program

DAY 1 | MONDAY, 22 JANUARY, 2024

Session 1

Building capabilities in Pharma Industry.

	Topic	Speakers
11:00 - 12:00	Panel Discussion Building capabilities in Pharma Industry Moderator Dr. Alabbas Alghamdi	Prof. Aws Alshamsan Dr. Raed Al Swayed Prof. Amer Alanazi Dr. Yasser Alobaida Dr. Ahmed Al-hussain Dr. Sara Algeelani

Session 2

Clinical Trials: its importance for localizing of pharmaceutical products.

Moderator
Dr. Maha Aleid

	Topic	Speakers
13:00 - 13:15	Boundaries in Conducting Clinical Trials in Saudi Arabia	Dr. Saleh Alghamdi
13:15 - 13:30	Challenges and Opportunities for Pharmaceutical Journals	Dr. Sary Alsanea
13:30 - 13:45	Clinical Trial Requirements, Regulations, Compliance	Dr. Hadeel Alkofide
13:45 - 13:55	Q&A	All
13:55 - 15:10	Panel Discussion Invest in the development of new drugs and biologics Moderator Dr. Majed Aljuraisi	Panelists Dr. Naif Alharbi Dr. Hadeel Alkofide Dr. Ibrahim Alsubaihi

Scientific Program

DAY 2 | Tuesday, 23 JANUARY, 2024

Session 3

Local manufacturing enabling tools: A leap towards sustainability.

Moderator
Dr. Nasser Alqahtani

	Topic	Speakers
09:00 - 09:15	Research & development (Clinical Trials)	Dr. Ahmed Shaman
09:15 - 09:30	Intellectual property	Dr. Ali Alshanqeeti
09:30 - 09:45	Economic Participation Program (EPP): An Emerging Track to Augment Localization	Dr. Ashraf Alqurain
09:45 - 10:00	Insurance Drug Formulary: What Pharma Companies Need to Know?	Dr. Razan Aljasser
10:00 - 10:10	Q&A	All

Session 4

Adaptation between Academia & Pharmacy market needs.

10:10 - 11:10	Panel Discussion Shaping the future of pharmacy education Moderator Dr. Alia Alshammari	Panelists Prof. Abdulkareem M. Albekairy Prof.Ahmed Alalaiwe Prof. Ziad Naqshabandi Dr. Ibrahim Aljuffali
11:10 - 12:10	Panel Discussion Skills vs. Knowledge: the hiring dilemma of the clinical faculty in academia Moderator Dr. Ohoud Almalki	Panelists Dr.Ahmed Aljabri Dr. Ahmed Alafnan Dr. Omimah Alhajj Dr. Thamer Almanghour

Scientific Program

DAY 2 | Tuesday, 23 JANUARY, 2024

Session 5

Economics & Research: Challenges Vs. Needs

Moderator
Dr. Mai Alsaqaaby

	Topic	Speakers
13:10 - 13:25	Real-world evidence in KSA: emerging RWD and its impact on health economics research	Prof. Yazed Alruthia
13:25 - 13:40	Health technology assessment: current status and future needs	Dr. Abdulaziz Alrabiah
13:40 - 13:55	Economic burden of top most prevalent diseases in the kingdom: best approach	Dr. Thamer Alshammari
13:55 - 14:10	Estimating health services costs and reimbursement models	Dr. Abdulrahman Alshehri
14:10 - 14:20	Q&A	All
14:20 - 15:20	Panel Discussion Careers in health economics Moderator Dr. Shatha Almuhaideeb	Panelists Dr. Yasser Almogbel Dr. Ahmed Alghamdi Dr. Hana Alabulkarim Dr. Saleh Abahussien Dr. Yazeed Alkhnizan

Scientific Program

DAY 2 | Tuesday, 23 JANUARY, 2024

Session 6

Community Pharmacy: time to drive the pharmaceutical profession.

Moderator
Dr. Shaymaa Alenezi

	Topic	Speakers
15:20 - 15:35	Community Pharmacy practice in Academic intern Training programs	Dr. Ahmed Alsinid
15:35 - 15:50	Pharmacist Vs. Other duties	Dr. Abdullah Al-Dhilan
15:50 - 16:05	Developing Residency program for Community Pharmacists	Dr. Roaa Khinkar
16:05 - 16:20	Narcotic & Controlled Medications Process in Community Pharmacies	Dr. Marwan Alsaab Dr. Malak Alasqah
16:20 - 16:30	Q&A	All
16:30 - 17:30	Panel Discussion Community Pharmacy Future Moderator Dr. Mead Abdullah	Panelists Dr. Najla Altawijry Dr. Ahmed bahatheq Dr. Abdullah Al-Dhilan Mr. Wail Alqasim Mr. Khalid Yassin

Scientific Program

DAY 3 | Wednesday, 24 JANUARY, 2024

Session 7

Potential opportunities in Pharmacotherapy & digital health.

Moderator
Dr. Hala Joharji

	Topic	Speakers
09:00 - 09:15	National drug information centre (NDIC): is it a mandate?	Dr. Maram Alenazi
09:15 - 09:30	Novel pharmacotherapy management of rare diseases	Dr. Hajer Almudaiheem
09:30 - 09:45	Obesity and weight management strategies: trends and updates on pharmacotherapeutic options	Dr. Mohammed Ahmed
09:45 - 10:00	Alignment of pharmacy profession with the evolution of digital health	Dr. Abdullah Alomran
10:00 - 10:15	Value of pharmacist in public health	Dr. Yazeed Alswaida
10:15 - 10:25	Q&A	All
10:25 - 11:25	Panel Discussion Status of clinical pharmacy services in private sectors Moderator Dr. Hala Joharji	Panelists Prof. Ahmed Aljedai Dr. Hisham Momattam Dr. Talal Alzahrani Dr. Abdulmajeed Aljumaiah Dr. Alaa Mutlaq

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Workshop Program

Workshop Program

DAY 1 | MONDAY, 22 JANUARY, 2024

Topic	Speakers
ADA 2024 updates and practical applications. Case-based workshop 13:00 - 15:00 Omsiat I Hall	Dr. Aisha Bader Dr. Ibrahim Alhomoud
Overview of the center of national health insurance 13:00 - 15:00 Yanbu Hall	Dr. Ibrahim Aljaffali
Antibiotics Stewardship Workshop: Building Sustainable Practices for Responsible Antibiotic Use 13:00 - 17:00 Najd Hall	Dr. Khalid bin Saleh Dr. Abrar Thabit Dr. Haytham Wali Dr. Hibah Alruwaisan Dr. Wafa Alfahad
Navigating the Future: Mastering Soft Skills for Lifelong Success 15:30 - 18:30 Omsiat I Hall	Dr. Mohammed Mamdouh
AI-Powered Research Journey: Unleashing the Potential 15:30 - 17:30 Omsiat II Hall	Dr. Majid Ali

Workshop Program

DAY 2 | TUESDAY, 23 JANUARY, 2024

Topic	Speakers
ABC in Simulation Education Pharmacy-based Scenarios) 08:00 - 16:00 The Simulation and Skills Development Center - PNU	Ms. Asmaa Alharbi Mr. Ibrahim Alslamah Ms. Ghadah Mujli Ms. Rowayda Alhusaini
Budget Impact Analysis in Health Care 09:00 - 12:00 Omsiat I Hall	Dr. Hajer Almudaiheem
Bioequivalence studies: How to Streamline Generic Drug Approval Process 09:00 - 16:00 Yanbu Hall	Dr. Loice Kikwai
Future Convergence of Revenue Cycle Management and Pharmaceutical industries 10:00 - 12:00 Najd Hall	Dr. Amir Elsherif Mr. Nasser Albalawi
Enhancing Pharmacy Practice Education and Training with Online Simulation Platforms 13:00 - 15:00 Omsiat I Hall	Dr. Majid Ali Dr. Ghadah Bawazeer

Workshop Program

Revolutionizing Treatment in Hematological Malignancies: Unveiling the Latest Breakthroughs in CAR-T Therapy and Their Impact on Pharmacy Practice

13:00 - 16:00 Omsiat II Hall

Moderator
Dr. Nora Alkhudair

Speakers
Dr. Hasan AlShehri
Dr. Hadeel Samarkandi
Dr. Abdullah Alrajhi

Teaching Methods in Pharmacy Education and Reflective Practice

15:30 - 17:30 Omsiat I Hall

Dr. Lina Alnajjar
Dr. Reem Bin Suwaidan

DAY 3 | WEDNESDAY, 22 JANUARY, 2024

Topic

Speakers

Pharmacovigilance: Background, Concepts, and Practices.

09:00 - 11:00 Omsiat I Hall

Moderator
Dr. Fawaz Alharbi

Speakers
Dr. Mohammed Alsultan
Dr. Yassir Alahmari
Dr. Hajar Alsaleh
Dr. Waad Alghamdi

Introduction to Market Access and HTA

09:00 - 12:00 Omsiat II Hall

Dr. Hussain Alomar
Dr. Asma Almuhsin

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SIPHA's Networking Hub

A curated space where national and international organizations converge to foster meaningful interactions, where industry leaders exchange insights, share expertise, and embark on transformative partnerships.

Networking Hub Participants

Abdulrahman Alshagawi
General Manager IQVIA RDS Saudi Arabia

IQVIA RDS Saudi Arabia

Nouf Bin tayash
Consultant Business Development Health Solutions at Elm Company

Elm

Dr. Majed Aljeraisy
Chairman, Research Office at King Abdullah International Medical Research Center (KAIMRC)

KAIMRC

Salman Alotaibi
Daman Officer - Council of Health Insurance

Council of Health Insurance

Mada Basyouni
Business Development Expert at Monshaat

Monshaat

Mohammed Almousa
Pharmaceutical Patent Examination Specialist, at Saudi Authority for Intellectual Property (SAIP)

Saudi Authority for Intellectual Property (SAIP)

Dr. Mohammed Alhamali
Chairman of the National Innovation & Regulatory Sandbox, Chief Innovation Officer at Seha Virtual Hospital & Innovation Enablement Center, Cofounder/General Manager, Society of Artificial Intelligence in Healthcare

Society of Artificail Intelligence in Healthcare

Yahya Alshehri
Senior Marketing Specialist, Saudi Commission for Health Specialties (SCFHS)

Saudi Commission for Health Specialties (SCFHS)

Fahad Albuthi
Chief Operating Officer (COO) at National Unified Procurement Company (NUPCO)

Nupco

Waleed Qattan
Senior Account Manager, at Lean Business Services

Lean Business Services

Ashraf Al Grain
Health care & Pharma Director at Local Content And Government Procurement Authority

Local Content And Government Procurement Authority

Dr. Mohammad Algahtani
Assistant Professor of Pharmacology and Toxicology, Vice President of Business Unit, College of Pharmacy, King Saud University

King Abdullah Institute for Research and Consulting Studies

Dr. Homood As Sobeai
Associate Professor of Pharmacogenomics and Molecular Medicine, Vice Dean for Graduate Studies and Scientific Research, College of Pharmacy, King Saud University

King Abdullah Institute for Research and Consulting Studies

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1:1 Meeting

Virtual individual meetings, with experts in the pharmaceutical field, that aims to provide a consultation service to those who need guidance in their current or future career

1:1 Meeting Experts

Prof. Hisham Aljadhey
Executive President of Saudi Food & Drug (SFDA)

Prof. Ahmed Al-jedai
SSCP Founding President, Professor, Colleges of Medicine and Pharmacy, Alfaisal University

Dr.Ibrahim Aljuffali
Chief Strategic Purchasing Officer at Center of National Health Insurance

Dr.Abdulrazaq Aljazairi
Director of Clinical Trials Transformation Initiative Division at KFSHRC

Dr.Ahmed Alshamrani
Chief Executive Officer of Health Academy at SCFHS

Dr.Ashraf AlGrain
Healthcare and Pharma Director on Business Development at LCGPA

Dr.Abdualmajeed binjumayah
Director of Pharmaceutical Rules at Tawuniya

Dr.Abdulmohsen Alsaleh
Pharmaceutical Senior Manager at LCGPA

Dr.Hisham Badreldin
Director of the Saudi Biobank at KAIMRC, SSCP Vice President, Associate Professor at KSAU-HS

Dr.Faisal Albugami
Senior Lab Research Expert

Dr.Sarah Alyousef
Head of Scientific Affairs

Dr.Najla Altwaijry
Dean of the College of Pharmacy at PNU

1:1 Meeting Experts

Dr.Ahmed Aldemerdash
Chairman of Clinical Pharmacy Scientific Council at SCFHS

Dr.Abrar Thabit
Associate Professor of Infectious Diseases Pharmacotherapy at KAU

Dr.Ziyad Almalki
Executive VP of Applied College and Associate Professor of Health Economics and Policy at PSAU

Dr.Amani Albraiki
Director of Pharmaceutical Services Administration at KSMC

Dr.Amal Al-Najjar
Director of Clinical Benefit Department, Center of Health Technology Assessment at MOH

Dr.Hana Alabdulkarim
Director of Policy and Economic Center at MNGHA

Dr.Ahmed Hattan
Consultant Drug Information Clinical Pharmacist at KAAUH

Dr.Mustafa Aljasser
Chief Business Officer at Sudair Pharma

Dr.Fahad Alhonaini
Executive Director for Government Business at SPIMACO

Dr.Sattam Alghodyyr
Communication Government Affairs Director

Dr.Saleh Abahussain
Market Access Head

Dr.Nouf Alzoghaibi
Procurement and contract excutive Manger

1:1 Meeting Experts

Dr.Jubran Harthi
Deputy Director of Technical and Facility Operations at SAUDIBIO

Dr.Alfarooq Alghamdi
Gene Therapies (GTx) Head at Novartis

Dr.Nuha Al Gain
Marketing Manager

Dr.Hasan Linjawi
Pharmacovigilance and Regulatory Compliance Lead at Organon

Dr. Hajer Alsaleh
Patient safety manager at Novartis

Dr.Mohammed AlBaradi
Direct Purchase Section Head at NUPCO

Dr.Majed Almajed
Pharmaceutical Tenders Section Head

Dr. Abdullah Alreshaidan
Regulatory Affairs and Scientific Office Director

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Interactive Platform

Top Candidate, The Stage

Interactive platform

Top candidate

Top candidate is a comprehensive program designed to equip participants with essential skills for career advancement. Through workshops on crafting effective CVs and insights into interview expectations, we prepare individuals to excel. Participants engage in simulated real-life interviews, providing a platform to showcase their talents and abilities, fostering a confident path towards professional success.

Top candidate online lecture

Title

How to prepare for your interview; CV preparation and more.

6th
of January 2024

Online
(Zoom)

By

Dr. Mohammed Albatie.

- Pharm.D graduate.
- Experienced with CV and interview preparation.
- 4 years of experience in international pharmaceutical companies. He is the founder of the MedrepKsa account and a content creator.

Interactive platform

Top candidate interviewers

Mr. Majdi Al barrak

Mr. Mishari Alkhuwaiter

Ms. Asma Alzahrani

Dr. Abdullah Almutlaq

Interactive platform

The Stage

The Stage is a platform dedicated to undergraduates and postgraduates with focused topics on developing skills and experiences towards practice in their specialty before and after graduation and during higher education. It also revolves around practical solutions to common challenges and issues faced by undergraduates and postgraduates during their practice and higher education in their respective fields

The Stage online lecture

Title

How to present your topic in an interactive way.

14th
of January 2024

Online
(Zoom)

By

Dr. Turki Aldakheel

- Pharm.D graduate.
- Master›s in Pharmacology
- American Board of Infectious Diseases
- Author and Certified Trainer.

Interactive platform

DAY 1 | MONDAY, 22 JANUARY, 2024

Speaker	Topic	Time
Dr. Noura Alrukban	Pharmacists working in community pharmacy, challenges and opportunities	12:00 - 12:20
Dr. Abdullah Alghamdi	Unleash Your Extraordinary Potential: How to Break Free from Being a 'Normal'!	12:20 - 12:40
Dr. Turki Alsagoor	Quality control of Marketed Pharmaceutical products	12:40 - 1:00
Dr. Rayan Alsaadi	Pharmacy Vision 2030	1:00 - 1:40
Prof. Sara Alrashood	Artificial Intelligence's role in drug designing and Development	1:40 - 2:00
Dr. Alanoud Alshammari	Behind the scene	2:00 - 2:20
Dr. Assem Amer	Market Access in Saudi Healthcare: Navigating Today, Shaping Tomorrow	2:20 - 2:40
Dr. Rafia Jamil	Pharmacist-led clinics; opportunities, enablers, and challenges	2:40 - 3:00
Dr. Abdullah alghamdi	How to Attend a Conference as a CEO	3:00 - 3:20

DAY 2 | TUESDAY, 23 JANUARY, 2024

Speaker	Topic	Time
Dr. Nada Alotibi	Don't wait .. Make your opportunities	10:00 - 10:20
Dr. Mohammed AlQuifil	Business Analysis from Pharmacist perspective	10:20 - 10:40
Dr. Krishna Prasad	Global Regulatory trends; Biomanufacturing challenges	11:10 - 11:30

Interactive platform

Dr. Laila Alzahrani	Benefits of Social media in pharmacy settings	11:30 - 11:50
Dr. Sally Ellethy	Children's Cancer Hospital - Egypt; Experience in residency accreditation	11:50 - 12:10
Dr. Sharaf E. Sharaf	Structured problem-solving for Healthcare development	1:00 - 1:20
Dr. Samaher Alghamdi	Navigating the Pharmacy Maze: A Journey to Design Your Career Pathway	1:20 - 1:40
Rouyan Alharbi	Talent exploitation vs emotional skills	1:40 - 2:00
Dr. Areej Alshehri	What is the root of procrastination?	2:00 - 2:20
Dr. Ahmed Ouardirhi	Overcoming Introversion and Achieving Success in Pharmacy School	2:20 - 2:40

DAY 3 | WEDNESDAY, 22 JANUARY, 2024

Speaker	Topic	Time
Dr. Areej Abumostafa	The transition life after graduation: Reality Vs Myths	10:00 - 10:20
Dr. Nader AlSheraim	Challenges Make Inspired Pharmacist	10:20 - 10:40
Shahad Nazel	Infinite Possibilities Beyond the Student Role!	10:40 - 11:10
Samar A. Alqarni	How can we discover the business pioneer inside a pharmacist?	11:10 - 11:30
Dr. Rawan Alaqeel	The initial stage of taking part in conducting research	11:30 - 11:50

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SPECIALISTS GET TOGETHER

A unique platform that offers an opportunity to explore specialties, bridge the gap between experts and enthusiasts, and engage in vibrant and interactive discussions on challenges and opportunities that exist in different pharmacy fields

The Annual Meeting of SPS
SIPHA 2024

SPECIALISTS GET TOGETHER EXPERTS

Specialty
Intellectual property

Dr. Abrar Alsaleem
Intellectual property Expert

Dr. Mohammed Almousa
Patent Examination Specialist

Specialty
Supply chain

Eng. Jamil Samara
Supply Chain Manager

Mr. Ali Alhussien
Logistics Director

Specialty
Economics

Dr. Hana Alabdulkarim
Director/Policy and Economic Center

Dr. Yazed AlRuthia
Professor of Health Policy and Pharmacoeconomics

Specialty
Regulatory Affairs

Dr. Abdullah Alreshaidan
Regulatory Affairs and Scientific Office Director

Dr. Khalid AlQahtani
Regulatory Affairs Head

Specialty
Forensic pharmacy

Dr. Maha Almazroua
Director of the Forensic Toxicology Services Centre Eastern Province

Specialty
Insurance

Dr. Badr Ammar
Claim Manager

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THE MARKET MASTER COMPETITION

This competition will provide a platform for experts and professionals to demonstrate their knowledge, skills, and approaches to real-world challenges faced by the industry.

THE MARKET MASTER COMPETITION

The Judging Panel

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Immunology National Sales Manager

Dr. Tariq Alwadei
Country Therapy Area Lead

Dr. Abdulrahman Alzahrani
Neuroscience Therapy Area Lead

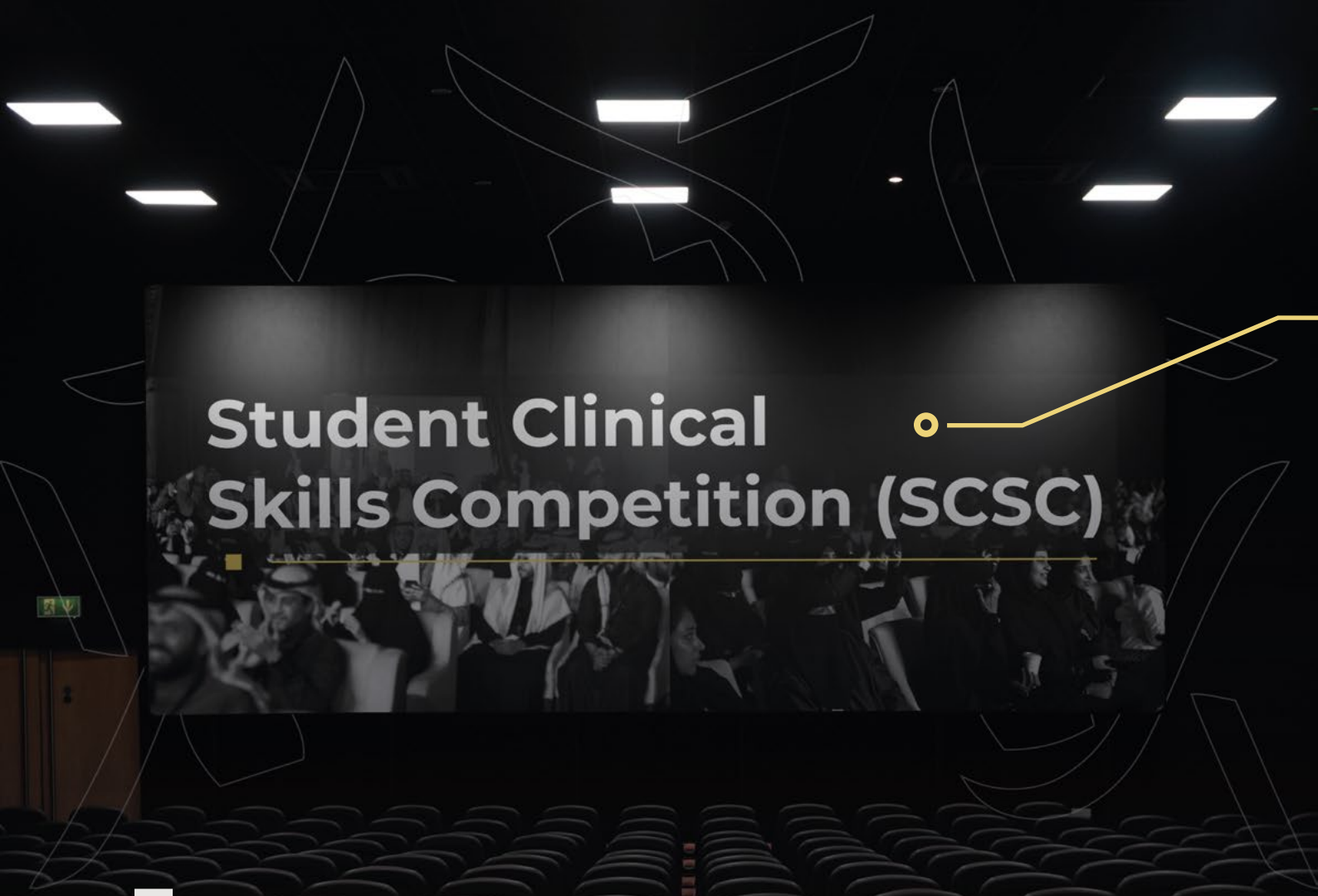
Dr. Faisal Altlasi
Chief Commercial Officer

The Guiding Committee

Dr. Alfarooq Alghamdi
Gene Therapies (GTx) Head

Dr. Ahmed Abdelsamad
Marketing Manager

Dr. Nada Alfudhaili
Market Access Manager



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Student Clinical Skills Competition

The SIPHA Student Clinical Skills Competition (SCSC) aims to establish a student forum in pharmacy meetings, as well as to support and advocate clinical critical thinking and team-based collaboration in providing direct patient care.

STUDENT CLINICAL SKILLS COMPETITION

The competition consists of three stages where universities from various parts of the Arab world compete to assess their pharmaceutical clinical skills.

In the first stage:
A case of a patient with multiple comorbidities will be presented to the teams and they must write a detailed treatment plan.
At this stage, the students' abilities to critically analyze, prioritize, and effectively utilize various references to extract the correct therapeutic information will be put to the test.

In the second stage:
A simulation of a patient presenting to a clinic will take place and the team must perform the appropriate procedure to acquire the patient's medical history, understand their condition, and then present the case to the jury while proposing an appropriate treatment plan.
At this level, the skills of presenting, communicating, perceptiveness, and ability to recall information are measured.

Ultimately, four universities will be nominated to proceed to the next round which will be a live performance on stage.

In the third and final stage:
The team gets tested with various categories of questions that range in difficulty and; hence different point values. Contestants have the option of choosing the questions based on the value it carries and the subject category. Whichever team gathers the highest number of points wins.

5th SCSC, SIHPA23

STUDENT CLINICAL SKILLS COMPETITION PARTICIPANTS

Hail University

University of Tabuk

AlFaisal University

King Saud University

Princess Nora bint Abdulrahman University

Shaqra University

Imam Abdulrahman Bin Faisal University

King Faisal University

Ibn Sina University

Taibah University

AlBaha University

King Khalid University

Jouf University

Al-Rayan Colleges

University of Hafr Al batin

Faculty of Pharmacy of Monastir (Tunisia)

Kuwait University

University of Bahrain

STUDENT CLINICAL SKILLS COMPETITION PARTICIPANTS

The Mohammed VI University of Health Sciences (Morocco)

AlMaarefa University

King Saud bin Abdulaziz University for Health Sciences

The University of Jordan

Qassim University (Burydah)

Qassim University (Onizah)

Oman college of health sciences (Oman)

Taif University

Umm Al-Qura University

National University of Science and Technology (Oman)

Najran University

Jazan University

University of Technology and Applied Sciences (Oman)

Riyadh Elm University

Northern Borders University

Fakeeh College for Medical Sciences

Qatar University

Nizwa University (Oman)

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Posters Evaluation Committee Members

Posters Evaluation Committee Members

Dr. Khalid Bin Saleh
BSc. Pharm, PharmD, BCPS

Dr. Zaid AlAnazi
BSc, PPRP, SCSCP

Dr. Bashayer AlShehail
PharmD, BCIDP

Dr. Sondus Ata
BSc, MSc

Dr. Reem Bahmaid
MSc, BCPS, AQCD,
Cardiovascular Pharmacotherapy Specialist

Dr. Saeed AlQahtani
PharmD, Ph.D

Dr. Tariq AlQahtani
BSc, MSc, PhD

Dr. Fatemah AlHerz
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BSc, MSc, PhD

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Pharm.D, PhD

Dr. Abdulaali AlMutairi
BSc, PharmD, PhD

Dr. Ahmed AlShehri
B.Pharm, MSc, PhD

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SIPHA24 Research Abstracts

Clinical Pharmacy Research,
Social & Behavioral Sciences Research,
and Pharmaceutical Sciences Research.

The Annual Meeting of SPS
SIPHA 2024

Clinical Pharmacy Professionals

201916
Gentamicin Pharmacokinetics in pediatric with and without Congenital Heart Disease

Aliyah A. Alorayyidh,Yousif S. AlaKeel, Aiman A. Obaidat, Abdullah S. Alsultan

Background
It has been well established that certain diseases may affect aminoglycosides drug disposition. Physiologic changes due to congenital heart disease (CHD) and its complications theoretically alter medication pharmacokinetics. For instance, patients with patent ductus arteriosus (PDA), and low cardiac output syndrome (LCOS) have reduced renal blood flow, resulting in changed drug distribution, reduced clearance, and decreases elimination half-life. In addition, medications such as diuretic and angiotensin-converting enzyme (ACE) inhibitors that are commonly used for the management of a patient with cardiac disease may potentially affect renal function, resulting in alteration of Gentamicin clearance. These changes should always be accounted for, particularly when using a medication with a narrow therapeutic index such as aminoglycoside.

Several studies reported different pharmacokinetic characteristics among patients with cardiac disease compared to healthy volunteers. However, studies investigating aminoglycoside pharmacokinetics in patients with congenital heart disease (CHD) are lacking. In this study, we aim to compare the pharmacokinetics of Gentamicin between pediatric with or without CHD.

Method
This retrospective cohort study included pediatrics receiving Gentamicin from January 2016 ,1, to January 2022 ,1. Children 1 month - 14 years who received conventional dosing (7- 5 mg/kg divided q8 hour) of Gentamicin were included. We excluded preterm patients who were ≤ 2 years old at the time of receiving Gentamicin, patients with pre-existing elevated serum creatinine (SrCr), have uncorrected cardiac lesion, received gentamicin doses that were different from that existing in our institutional guide or if the serum levels were not appropriately obtained.
The primary objective is to compare the volume of distribution (Vd) and the clearance (Cl) of Gentamicin in cardiac pediatric patients and controls. Population pharmacokinetics analysis was conducted using Monolix software. For the covariate analysis, we tested the effect of age, weight, gender, serum creatinine and presence of CHD on Cl and Vd.

Result
In total, 125 patients were included. Of the total number of the cohort, 82 patients were in the non-CHD group and 43 patients were in the CHD group. Approximately %60 (n=74) of the patients were males, with a median age of 3.4 years (13.6-0.13), and weight of 12.56 kg (51-3.5). The average BUN and SrCr were 3.4 mmol/L and 40 micromol/L, respectively. The total average (SD) estimate for Cl was 0.1 L/kg/hr (0.021)

and for the Vd was 0.3 L/kg (0.081). CHD patients tended to be younger and have a lower body weight.
The estimate gentamicin Cl in the CHD group was 0.1 L/kg/hr and for non-CHD group was 0.11 L/kg/hr, with a p-value = 0.6. the estimate Gentamicin Vd in the CHD group was 0.31 L/kg and for non-CHD was 0.30 L/Kg, with a p-value = 0.5. For the effect of covariates on Cl, only weight and age were significant, and on the Vd only weight was significant.

Conclusion
e did not find a significant difference in pharmacokinetic parameters between congenital heart disease and non-congenital heart disease patients. Clinicians should consider using standard Gentamicin dosing for pediatric with CHD and monitor renal function, since they may have greater AKI risk factors.

201928
Brucellar, Pyogenic, and Tuberculous Spondylodiscitis at Tertiary Hospitals in Saudi Arabia: A Comparative Retrospective Cohort Study

Ghaida Abalkhail, Hessa Bin Hithlayn, Fatimah Alzahrani, Hajar AlQahtani, Husam I Ardah, Abdulrahman Alsaedy

Background
Spondylodiscitis is rare yet the most common form of spinal infection. It is characterized by inflammation of the intervertebral disk space and adjacent vertebral body. Spondylodiscitis has non-specific signs and symptoms including pain, fever, and some neurological manifestations. In Western countries, the incidence of spondylodiscitis is increasing. Clinical outcomes most commonly reported in the literature are the 1-year mortality rate (range, %12–%6) and neurologic deficits.

Method
This multicenter retrospective cohort study assessed patients diagnosed with infectious spondylodiscitis who received treatment at King Abdulaziz Medical City in Riyadh and Jeddah, Saudi Arabia. All enrolled patients were ≥18 years old and were diagnosed per radiologic and microbiological findings and clinical manifestations between January 2017 and November 2021.

Result
This study enrolled 76 patients with infectious spondylodiscitis, with a median age of 61 years. Diabetes mellitus and hypertension were the most frequently observed comorbidities. All patients were presented with back pain for a median of 30 days. Patients were stratified into 3 groups based on the causative pathogen: brucellar spondylodiscitis (n = 52), tuberculous spondylodiscitis (n = 13), and pyogenic spondylodiscitis (n = 11). All laboratory data and biochemical markers were not significantly different. However, C-reactive protein, erythrocyte sedimentation rate, and white blood

cells were significantly different in the pyogenic spondylodiscitis group, with medians of 121 mg/dL (P = .03), 82 mmol/h (P = .04), and 109 × 11.2/L (P = .014), respectively.

Conclusion

Back pain is a common clinical feature associated with infectious spondylodiscitis. The immense value of microbiological investigations accompanied with histologic studies in determining the causative pathogen cannot be emphasized enough. Treatment with prolonged intravenous antimicrobial therapy with surgical intervention in some cases produced a cure rate exceeding %60.

202010

Assessing the Accuracy of Vancomycin Dosing in Elderly Patients: A Methodological Study Comparing the Use of Actual versus Rounded Serum Creatinine Values in Creatinine Clearance Calculations

Rawan Bukhari, Hani Hasan, Doaa Aljefri, Rawan Rambo, Ghusun Al-Senani, Abdullah Alzahrani

Background

An appropriate assessment of kidney function in elderly patients is crucial to determine the appropriate medication dosage and to predict the likelihood of developing acute kidney injury. Prescribers often face the challenge of predicting creatinine clearance (CrCl) in elderly patients (65 years or older) who have serum creatinine (SCr) below 1mg/dL. Studies have shown that utilizing rounded-SCr would underestimate CrCl which could lead to under-dosing of some medications. The aim of this study was to compare the accuracy of dosing vancomycin using actual-SCr versus rounded-SCr to 1mg/dL in elderly patients

Method

A retrospective cohort study conducted in a tertiary hospital. Admitted patients to medicine and surgery units, who received intravenous vancomycin, between January1st,2019, and December31st,2022

Result

A total of 245 patients were included. The therapeutic trough level (-10 20mg/L) was achieved in (%56.3)138 patients using actual-SCr in vancomycin dosing. Sub-therapeutic and supra-therapeutic trough levels were observed in (%13.1)32 and (%30.6)75 patients, respectively. The predictive performance of different vancomycin doses based on actual-SCr and rounded-SCr compared to the targeted maintenance dose (TMD) showed a stronger correlation of actual-SCr dosing with TMD (r=0.55 vs 0.31) compared to rounded-SCr dosing, Furthermore, the actual-SCr dosing showed a lower error

percentage (%34) and higher accuracy rate (%57.6) within±%10 of the TMD compared to the rounded-SCr dosing, which had error percentage of (%48) and accuracy rate of (%40). The prevalence of vancomycin-associated nephrotoxicity (VAN) was seen in (%18)44 patients. The logistic regression model was used to analyze predictors of VAN, the results showed that patients between 84-75 years old, bedridden, and had troughs higher than 20mg/L at higher risk of VAN

Conclusion

In elderly patients, estimating vancomycin dosing based on actual-SCr was more accurate compared to rounded-SCr to 1mg/dL. The efficacy of vancomycin could be negatively affected by rounding up SCr, which could underestimate CrCl and under-dosing of vancomycin

202054

Scores predicting postoperative atrial fibrillation after mitral valve surgery: do we need a more specific score?

Elham Almathami, Muneera Albabtian

Background

Postoperative atrial fibrillation (POAF) after cardiac surgery is associated with early and late complications. Several scores were used to predict POAF, with variable results. Thus, this study assessed the performance of several scoring systems to predict POAF after mitral valve surgery. Additionally, we identified the risk factors for POAF in those patients

Method

This retrospective cohort included 1381 patients who underwent mitral valve surgery from 2009 to 2021. POAF occurred in (%16.87) 233 patients. The performance of CHADS2, CHA2DS2-VASc, POAF, EuroSCORE II, and HATCH scores was evaluated

Result

The median age was higher in patients who developed POAF (60 vs. 54 years; p<0.001). CHA2-DS2-VASc, POAF, EuroSCORE II, and HATCH scores significantly predicted POAF, with the area under the curve of the Receiver Operator Curve (AUCROC) of 0.58 ,0.61 ,0.56 and 0.54, respectively. We identified age> 58 years, body mass index> 28 kg/m2, creatinine clearance< 90 ml/min, re-operative surgery, and preoperative inotropic and intra-aortic balloon pump use as predictors of POAF. We constructed a score from these variables based on their odds ratio. A score > 4 significantly predicted POAF (p= 0.009). The AUCROC of this score was 0.66, which was significantly higher than the AUCROC of the POAF score

Conclusion

POAF after mitral valve surgery can be predicted based on preoperative patients' characteristics. Patients at

high risk of POAF could benefit from preoperative prophylactic therapy. Further studies to validate the score externally and evaluate the use of prophylactic antiarrhythmics in those patients are required

202055

Incidence of Adverse Drug Reactions of Key Potentially Inappropriate Drugs (The KIDs List) in Pediatrics Population: A Retrospective Multicenter Study in Tertiary Care Hospital

Jwael Alhamoud, Abeer Baageel, Murooj Shukri, Naif Althomali, Fatmah Ghandourah

Background

In 2020, the pediatric pharmacy association develop a list of potentially inappropriate drugs (PIDs) in pediatrics called the KIDs List, which includes 67 drugs. The KID's List provides an evidence-based guide to healthcare providers to recognize medications with high risk for adverse drug reactions (ADRs). Studies of ADRs in pediatrics has not been widely explored locally with limitations including the small sample size, short duration, single-centered, and limited settings.

Method

We conducted a retrospective, multicenter observational study in which ADRs were identified through extensive chart review that use medical record data. Pediatric patients (≤ 18 years old) who were hospitalized and received at least one dose of KIDs list drugs in 2021 were included. Prescriptions are identified as potentially inappropriate if it is classified as avoided in the KID's List. The objective of this study is to assess the incidence of sever-ADRs of PIDs among pediatrics.

Result

A total of 922 patients receiving at least one of 26 medications of the KIDs list were evaluated. The incidence of all identified ADRs was (922/10) %1.1, which represented 4.5 per 10,000 patient days and 12.5 per 10,000 doses. Approximately (10/3) %30 of ADRs were severe, and almost (10/6) %60 of ADRs were definitely preventable. Out of 624,219 pediatric prescriptions in 129,495 ,2021 (%20.8) were KIDs list prescriptions and approximately (%4) 36 of the prescriptions were classified as avoid according to the KIDs list recommendations.

Conclusion

To the best of our knowledge, this is the first study in Saudi Arabia that utilized the KIDs list as a trigger in pediatrics. Our findings provide a more accurate estimate of potential ADRs in addition to the prescribing frequency of the KIDs list drugs and the prescriber's compliance with the KIDs list recommendations which

will raise awareness for healthcare providers about safe medication prescribing and monitoring.

202060

Investigating Neutrophil-to-Lymphocyte and C- Reactive Protein-to-Albumin Ratios in Type 2 Diabetic Patients with Dry Eye Disease

Hala bamallem, Amani Y. Alhalwani, Rawan Baqar, Rawan Algadaani, Rwzan Alamoudi, Shatha Jambi, Wessam Abd El Razek Mady, Naif S. Sannan, Muhammed Anwar Khan

Background

Patients with Diabetes mellitus (DM) are at risk of developing dry eye disease (DED). We investigated routine laboratory parameters in patients with type 2 DM (T2D) and T2D-DED to identify potential inflammatory markers.

Method

A retrospective study of 241 randomly selected patients (30 DED non-diabetic, 120 T2D, and 91 with T2D-DED). The neutrophil-to-lymphocyte ratios (NLR), CRP-to-albumin ratios (CAR), and the glyco- sylated haemoglobin A1c (HbA1c) results were correlated between groups.

Result

The NLR and HbA1c were significantly higher in the T2D-DED group ($p \leq 0.001$ and 0.0001, respectively) when compared with T2D and DED non-diabetic groups. CAR was insignificantly high in the three groups ($p=0.192$). A positive correlation was identified between CAR and NLR in T2D-DED patients ($p= 0.008$).

Conclusion

T2D-DED patients, NLR was significantly high and positively correlate with CAR. These results predicate diabetes with dry eye complications, and biomarker-mediated inflammation may have important roles in DED pathogenesis.

202093

Precision dosing of venlafaxine during pregnancy: a pharmacokinetics modelling approach

Mona Alenezi, Raj K. S. Badhan

Background

Venlafaxine exposure through gestation is affected by the longitudinal changes in maternal physiology. Confounding treatment is also the impact of CYP2D6 polymorphisms affecting plasma concentrations of venlafaxine.

Method

A pharmacokinetic modelling approach was employed to assess variations in maternal and fetal cord venlafaxine levels throughout gestation and to identify appropriate doses to maintain venlafaxine levels within the therapeutic range.

Result

Throughout gestation, there was a significant decrease in simulated venlafaxine trough plasma concentrations in both extensive metaboliser (EM) and ultra-rapid metaboliser (UM) phenotypes. Approximately %87-70 of EM and UM phenotypes exhibited trough venlafaxine plasma concentrations below the therapeutic level (< 25 ng/mL), which increased to %96 at week 30. While for poor metaboliser (PM) phenotypes, the percentage was approximately 4 %.

Conclusion

The standard daily dose of 75 mg required adjustment for all phenotypes examined during gestation. A daily dose of 112.5-37.5 mg is appropriate for PM throughout pregnancy. For EM, a dose of 225 mg daily in the first trimester, 262.5 mg daily in the second trimester, and 375 mg daily in the third trimester is suggested to be optimal. For UM, a dose of 375 mg daily throughout gestation is suggested to be optimal.

202101

Comparison of Amitriptyline and US Food and Drug Administration-Approved Treatments for Fibromyalgia: A Systematic Review and Network Meta-analysis

Hussein Farag, Ismaeel Yunusa, Hardik Goswami, Ihtisham Sultan, Joanne A. Doucette, Tewodros Eguale

Background

Amitriptyline is an established medication used off-label for the treatment of fibromyalgia, but pregabalin, duloxetine, and milnacipran are the only pharmacological agents approved by the US Food and Drug Administration (FDA) to treat fibromyalgia. For that, we investigated the comparative effectiveness and acceptability associated with pharmacological treatment options for fibromyalgia.

Method

Searches of PubMed/MEDLINE, Cochrane Library, Embase, and Clinicaltrials.gov were conducted on November 2018 ,20, and updated on July 2020 ,29. Randomized clinical trials (RCTs) comparing amitriptyline or any FDA-approved doses of investigated drugs. Comparative effectiveness and acceptability (definedas discontinuation of treatment owing to adverse drug reactions) associated with

amitriptyline (off-label), pregabalin, duloxetine, and milnacipran (on-label) in reducing fibromyalgia symptoms. The following doses were compared: 60-mg and 120-mg duloxetine; 150-mg, 300-mg, 450-mg, and 600-mg pregabalin; 100-mg and 200-mg milnacipran; and amitriptyline. Effect sizes are reported as standardized mean differences (SMDs) for continuous outcomes and odds ratios (ORs) for dichotomous outcomes with %95 credible intervals (%95 CrIs). Findings were considered statistically significant when the %95 CrI did not include the null value (0 for SMD and 1 for OR). Relative treatment ranking using the surface under the cumulative ranking curve (SUCRA) was also evaluated.

Result

A total of 36 studies (11930 patients) were included.The mean (SD) age of patients was (10.4) 48.4 years, and 261 11 patients (%94.4) were women. Compared with placebo, amitriptyline was associated with reduced sleep disturbances (SMD, −%95 ;0.97 CrI, −1.10 to −0.83), fatigue (SMD, −;0.64 %95 CrI, −0.75 to −0.53), and improved quality of life (SMD, −%95 ;0.80 CrI, −0.94 to −0.65). Duloxetine 120 mg was associated with the highest improvement in pain (SMD, −%95 ;0.33 CrI, −0.36 to −0.30) and depression (SMD, −%95 ;0.25 CrI, −0.32 to −0.17) vs placebo. All treatments were associated with inferior acceptability (higher dropout rate) than placebo, except amitriptyline (OR, %95 ;0.78 CrI, 0.31 to 1.66). According to the SUCRA-based relative ranking of treatments, duloxetine 120 mg was associated with higher efficacy for treating pain and depression, while amitriptyline was associated with higher efficacy for improving sleep, fatigue, and overall quality of life.

Conclusion

These findings suggest that clinicians should consider how treatments could be tailored to individual symptoms, weighing the benefits and acceptability, when prescribing medications to patients with fibromyalgia.

202102

Off-label Use of Amitriptyline and FDA-approved Treatments for Moderate-to-Severe Fibromyalgia: A Cost-effectiveness Analysis

Hussein Farag, Ismaeel O. Yunusa, Brian Rittenhouse, Tewodros Eguale

Background

Fibromyalgia (FM) is a debilitating chronic pain disorder associated with reduced quality of life and increased economic burden. Evidence on the differential clinical benefit of the off-label use of amitriptyline and the three US Food and Drug Administration (FDA)-approved pharmacological treatments (pregabalin, duloxetine, and

milnacipran) has been established. However, no study evaluated the cost-effectiveness (CE) of all relevant treatments for moderate-to-severe FM. Hence, the study aims to evaluate the CE of the off-label use of amitriptyline and FDA-approved drugs in treating moderate-to-severe FM.

Method

A state-transition Markov model to evaluate the CE of amitriptyline (doses, 100-25mg per day), pregabalin (150mg; 300mg; 450mg; and 600mg), duloxetine (60mg and 120mg), and milnacipran (100mg and 200mg) for the treatment of FM. Model inputs for clinical effectiveness, such as transition probabilities were obtained from a network meta-analysis and patient preferences measured as utilities were obtained from the literature. Acquisition cost inputs for drugs were obtained from the Red Book and that of healthcare utilization from the literature. All costs were inflation-adjusted to USA 2019-dollar value, using the medical component of the consumer price index. In the Markov model, CE was examined for patients aged 48 years, at a one-year cycle length from the US societal and health care sector perspectives. Total expected cost and quality-adjusted life-years (QALYs) were estimated over a lifetime horizon. Incremental cost-effectiveness ratio [ICER] and net monetary benefits were also estimated. Cost-effectiveness was determined at a willingness-to-pay threshold (WTP) of $100,000 per QALY. Deterministic and probabilistic sensitivity analyses (PSA) were performed for all model input variables to characterize uncertainty and determine the robustness of findings.

Result

From the US health care sector and societal perspectives, duloxetine 120mg was the most cost-effective intervention compared to amitriptyline. The model was sensitive to the costs of moderate and severe FM. PSA showed that duloxetine 120mg was cost-effective compared to other interventions %51.9 and %43.1 of the time for healthcare and societal perspectives, respectively.

Conclusion

This CEA suggests that among the current interventions for FM, duloxetine 120mg is the CE treatment at a WTP threshold from $100,000 per QALY over a lifetime horizon. These findings can guide patients, physicians, and healthcare policymakers when deciding on the optimal intervention among treatments for FM.

202119

"Limb Saving Project" Clinical Pharmacist Led Medication Management in Diabetic Foot Multidisciplinary Team in Saudi Arabia: A Single Institution Study

Aisha H. Alshehri, Abeer K. Alorabi, Arwa A. Allugmani, Nesreen A. Altowairqi, Manal A. Alotaibi, Maryam S. Eid, Ahmed A. Afandi

Background

Diabetic foot is a major public health issue in Saudi Arabia, resulting in 3970 amputations annually. Clinical pharmacists can play a crucial role in managing medication and educating diabetic foot patients. However, research on the role of clinical pharmacists in the care of diabetic foot patients is limited, studies suggest their interventions can significantly reduce complications. As per our knowledge, this is the first Diabetic Foot Clinic covered by a clinical pharmacist in Saudi Arabia.

The primary aim is to evaluate the effectiveness and role of a clinical pharmacist within a multidisciplinary diabetic foot team. The secondary outcomes include measuring the difference in amputation, LDL and A1C reduction, re-infection, readmission rate, mortality rate, and medication adherence using the direct questioning method, and the 8-item Morisky Medication Adherence Scale (MMAS-8).

Method

At DM-Foot Clinic, Patients first see a vascular surgeon and wound care team, then visit the clinical pharmacist clinic. The clinical pharmacist reviews the patient's medication regimen, optimizes medications and dosages, detects drug interactions, and monitors possible side effects. The study was a comparative and historically controlled study. The study compared patients seen by the pharmacist (intervention group) with those not seen (control group) under similar conditions. Data were analyzed using (SPSS), using unpaired t-test.

Result

The study had 200 patients, equally divided between two groups - control group P0 with no previous clinical pharmacist visits and intervention group P1 with multiple visits to the clinical pharmacist clinic.
The two groups had similar basic characteristics.
Regarding the outcomes, there were no statistically significant between both groups in the mortality rate, readmission rate, major and minor amputations, and the Morisky Scale (MMAS-8).
However, there were statistically significant in the A1C reduction, Reinfection rate, LDL reduction, and medication adherence in the intervention group.

Conclusion
Clinical pharmacists play a significant role in the diabetic foot Multidisciplinary team.

202125
Efficacy and Safety of Luspatercept in the Treatment of β-Thalassemia: A Systematic Review

Ibrahim Dighriri, Khawlah Alrabghi, Afnan Alhamyani, Amal Hadadi, Abdulrahman Alruwaili

Background
Beta-thalassemia is characterized by defective hemoglobin production leading to an imbalance of alpha and beta globin chains and requiring lifelong red blood cell transfusions. Luspatercept inhibits TGF-β signaling to promote late-stage erythropoiesis.

Method
A literature review identified randomized controlled trials evaluating luspatercept's efficacy and safety in beta-thalassemia. Databases searched included PubMed, Google Scholar, and Cochrane from -2015 2022. Eligible studies were appraised for bias risk.

Result
Five trials with 1161 participants were included. Phase 2 involved 153 patients receiving 1.25-0.2 mg/kg luspatercept. Phase 3 involved 1008 patients receiving 1.25-1.0 mg/kg luspatercept or placebo. Primary outcomes were reduction in transfusions or increased hemoglobin. In beta-thalassemia patients, luspatercept showed superior clinical benefit over placebo. The higher dose demonstrated promising erythroid responses and fewer transfusions.

Conclusion
Luspatercept might reduce transfusion dependence and improve clinical outcomes and quality of life for beta-thalassemia patients. Adverse events like hyperuricemia and arthralgia were mainly mild-to-moderate. While limited data remain, luspatercept appears a promising treatment by downregulating ineffective erythropoiesis and its clinical complications. Further research should continue optimizing dosing and follow long-term safety and efficacy.

202153
AI-driven models for diagnosing and predicting outcomes in lung cancer: A systematic review and meta-analysis

Reem Alshammari, Mohammed Kanan Alshammari

Background

Lung cancer's high mortality due to late diagnosis prompts a need for 27 early detection strategies. Artificial Intelligence (AI) in healthcare, particularly for lung cancer, offers promise by analyzing medical data for early identification and personalized treatment. This systematic review evaluates AI's performance in early lung cancer detection, analyzing techniques, strengths, limitations, and its comparative edge over traditional methods.

Method

This systematic review and meta-analysis followed PRISMA guidelines rigorously, outlining a comprehensive protocol and employing tailored search strategies across diverse databases. Two reviewers independently screened studies based on predefined criteria, ensuring the selection of high-quality data relevant to AI's role in lung cancer detection. Extraction of key study details and performance metrics, followed by quality assessment, facilitated robust analysis using R software. The process, depicted via a PRISMA flow diagram, allowed for meticulous evaluation and synthesis of findings for this review.

Result

From 1024 records, 39 studies met inclusion criteria, showcasing diverse AI models' applications for lung cancer detection, emphasizing varying strengths among studies. These findings underscore AI's potential for early lung cancer diagnosis but highlight the need for standardization amidst study variations. Results demonstrated promising pooled sensitivity and 41 specificity of 0.87, signifying AI's accuracy in identifying true positives and negatives, despite observed heterogeneity attributed to diverse study parameters.

Conclusion

AI demonstrates a promising results in the early lung cancer detection, showing high accuracy levels in this systematic review. However, study variations underline the need for standardized protocols to fully leverage AI's potential in revolutionizing early diagnosis, ultimately benefiting patients and healthcare professionals. As the field progresses, validated AI models from large-scale perspective studies will greatly benefit clinical practice and patient care in the future.

202196

Assessment of Intermittent Boluses of Neuromuscular Blockade Agents Versus Continuous Infusion on Oxygenation in Moderate to Severe Acute Respiratory Distress Syndrome.

Yazeed Alharbi, Qoot almedainy, Rayd Al-mehizia, Razan Alghunaim, Zainab Al-Duhailib, Yousef Alotaibi, Edward De Vol, Lana Alzamil.

Background

Acute respiratory distress syndrome (ARDS) is a life-threatening condition that can be caused by various factors such as infections, aspiration, or severe trauma. ARDS severity is classified based on the ratio of arterial oxygen tension to fraction of inspired oxygen (PaO2/FiO2 ratio).
Continues infusion of neuromuscular blockade agents (NMBA) are commonly used in the practice for management of moderate to severe ARDS (PaO2/FiO2 ratio ≤ 200). However, there are limited data evaluated the use of NMBA intermittent boluses in those population.

Method

Single center, retrospective, cohort study conducted in King Faisal Specialist Hospital and Research Centre (KFSH&RC). We compared oxygenation improvement in patients received NMBAs intermittent boluses versus continuous infusion between 2017 and 2022.
We enrolled adult patients who were mechanically ventilated and had the following criteria: PaO2/FiO2 ratio ≤ 200 and received NMBA for ≥ 48 hours. Primary endpoint was PaO2/FiO2 ratio at 48 hours after starting NMBA.

Result

In this study, 111 patients were analyzed, with 74 receiving continuous infusion of neuromuscular blockade agents (NMBA) and 37 receiving intermittent boluses of NMBA. Patients in the continuous infusion group had higher SOFA scores and longer ICU stays, while those in the intermittent bolus group had higher mortality from cardiac arrest. No significant differences were found in oxygenation or overall mortality. Cumulative NMBA dose was higher in the continuous infusion group.

Conclusion

In moderate to severe ARDS patients, no significant differences were observed in PaO2/FiO2 levels at 48 hours, 72 hours, or 7-5 days between those receiving intermittent boluses and continuous infusion of NMBA. Additionally, there was no significant difference in mortality at day 21 and 28. Future randomized trials are required to determine the superiority of these strategies and validate these findings before widespread adoption in clinical practice.

202210

Comparative effectiveness of adding omega-3 and Manuka honey combination to conventional therapy in preventing and treating oxidative stress in pediatric β-thalassemia major – a randomized clinical trial

Shaimaa Abdelhalim, Mohamed Gamaleldin, Ivo Ibraham, Dania Waggas, Ahmed Berry

Background

β-thalassemia major is an inherited hematological disorder with significant oxidative stress and iron overload. Oxidative stress results in several pathological complications, including cell death, tissue injury, organ dysfunction, and thyroid dysfunction.
The present study examined the effectiveness of omega-3 and Manuka honey combination or Manuka honey alone to the conventional therapy (deferasirox, blood transfusion, and L-carnitine) used for preventing and managing oxidative stress or iron overload-induced oxidative stress conditions in pediatric β-thalassemic patients (type major).

Method

165 patients participated in this randomized, double-blind, standard therapy-controlled, parallel-design multisite trial. The patients were randomly allocated into three groups, receiving either 1,000 mg omega-3 fish oil [350 mg eicosapentaenoic acid (EPA) and 250 mg docosahexaenoic acid (DHA)] combined with Manuka honey lozenge (344 mg) daily or Manuka honey alone plus the conventional therapy for ten months. Plasma 8-iso-prostaglandin F2α (8-iso-PGF2α), Lactate dehydrogenase (LDH), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), CRP (C-reactive protein), ferritin level, and serum iron were determined at baseline and month 10.

Result

Omega-3 and Manuka honey combination were a significant add-on to conventional therapy of β-thalassemia in reducing the oxidative stress condition. The combination of Omega-3 and Manuka honey reduced the level of F2-isoprostane(8-iso-PGF2α) significantly compared to the Manuka alone and the control groups. Additionally, they showed an antihemolytic action measured by reduced LDH level. The combination restored the patient's lipid profile (LDL-C and HDL-C) significantly compared to the control group. Manuka honey enhanced the action of omega-3 in reducing oxidative stress by reducing serum iron significantly compared to the control group.

Conclusion

Results showed that omega-3 + Manuka honey was more effective than Manuka alone or the conventional treatment alone in managing oxidative stress of β-thalassemic patients.

202217

When antivirals backfire: An evaluation of favipiravir's clinical outcomes in critically ill patients with COVID-19: A multicenter cohort study

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Raghad Alhajaji, Reham Alharbi, Khawla Kahtani, Abeer A Alenazi, Aisha Alharbi, Sara M Alotaibi, Yazeed S Alghamdi, Samar Alotaibi, Shaden H Alonazi, Jumanah M Almutairi, Ramesh Vishwakarma

Background
Favipiravir is an oral antiviral, that might treat COVID-19 by enhancing viral eradication, particularly in patients with mild-to-moderate disease. Yet, the findings on the use of favipiravir in critically ill patients with COVID-19 are inconsistent. Therefore, this study aimed to assess the effectiveness and safety of favipiravir in critically ill patients with COVID-19.

Mehod
A multicenter retrospective cohort study includes critically ill adult patients with COVID-19 admitted to the intensive care units (ICUs) was conducted from March 2020 to July 2021. Patients were categorized based on favipiravir use (control vs. favipiravir). The primary outcome was in-hospital mortality. Secondary outcomes included mechanical ventilation (MV) duration, 30-day mortality, ICU length of stay (LOS), hospital LOS, and complications during the stay.

Result
After propensity score (PS) matching (1:1 ratio), 146 patients were included in the final analysis. A higher in-hospital and 30-day mortality were observed in patients receiving favipiravir compared to the control group at crude analysis (%65.3 vs. %43.8; P-value=0.009 and %56.3 vs. 40.3; P-value=0.06, respectively); however, no differences were observed using multivariable Cox proportional hazards regression analysis (HR ;1.17 %95 CI 1.87 ,0.73; P-value =0.51 and HR %95 ;0.86 CI 1.39 ,0.53; P-value=0.53, respectively). Conversely, the MV duration and ICU LOS were longer in patients who received favipiravir than the control group (β coefficient 0.51; CI 0.92 ,0.09; P-value = 0.02, β coefficient 0.41; CI 0.64 ,0.17; P-value = 0.0006, respectively). Complications during the stay were comparable between the two groups.

Conclusion
The use of favipiravir in critically ill patients with COVID-19 did not demonstrate a reduction in mortality; instead, it was linked with longer MV duration and ICU stay. This finding suggests limiting favipiravir use to infections where it is more effective, other than COVID-19. Further randomized clinical trials are needed to confirm these findings.

202225

Real-World Data Assessing the Safety of Rituximab Intravenous Biosimilar in the First Cycle and Second Cycle Subcutaneous Administration in B Cell Lymphoma.

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Background

Biosimilars have potential to offer cost savings with comparable efficacy and safety to innovator products and increase the access of treatment to more patients.
Biosimilar versions of Rituximab have the same safety profile and efficacy as the reference product across all indications for which it is approved.
Infusion-related reactions (IRR) are possible after Rituximab delivery and can be life threatening; thus it's recommended to give the patient one full dose intravenously (IV) before transitioning to the subcutaneous (SC) formulation.
However, P&T committee had replaced IV Rituximab (Mabthera) with IV Rituximab (Truxima-Biosimilar). Therefore, we decided to give first cycle of IV Rituximab (Truxima-Biosimilar) and if first cycle was completed without severe IRR then subsequent cycles were given with SC Rituximab as per institutional guidelines.
There is no evidence of the safety of this practice. Therefore, we decided to evaluate the safety of this practice in retrospective fashion
To our knowledge this the first real world evidence of safety of this practice.

Primary objective is to assess IRR after using Rituximab (Truxima-Biosimilar) instead of Rituximab (Mabthera) IV injection in the first cycle and second cycle SC Rituximab.

Method

We retrospectively reviewed 71 patient and 34 patients met the eligibility criteria.

Result

Only one out of 34 patients developed IRR. However, it was grade 1 IRR as per CTC.AE V5 and this patient was able to complete the rest of Rituximab infusion successfully. Hence all patients transitioned from IV Rituximab biosimilar to SC Rituximab and this transition was %100 successful. None of them developed any IRR while transitioning.

Conclusion

We conclude from our real-world evidence study that transition from IV Rituximab biosimilar to SC Rituximab Mabthera is well tolerated and safe practice and we recommend this to be done on large scale and to be implemented in other institutions.

202252

The concomitant use of Beta Blockers with vasopressors/ inotropes in critically ill patients with septic shock: A systematic review and meta-analysis

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Background

Septic shock is associated with systemic inflammatory response, hemodynamic instability, impaired sympathetic control, and the development of multiorgan dysfunction that requires vasopressor/inotropic support. Activating Beta-2 receptors and blocking Beta-1 receptors reduces the proinflammatory response by influencing cytokine production. Evidence that supports the concomitant use of beta-blockers with inotropes and vasopressors in septic shock patients is limited. This study aimed to evaluate this practice on the ICU related outcomes.

Method

A systematic review and meta-analysis of studies including critically ill patients with septic shock who received inotropes and vasopressors. Patients who received vasopressor/ inotropes without beta-blockers were compared to patients who used beta-blockers concomitantly with either epinephrine or norepinephrine. MEDLINE and Embase databases were utilized to systematically search for studies investigating the use of beta-blockers in critically ill patients on inotropes from inception to October 2023 ,10. The primary outcome was the 28-day mortality. Length of stay, heart rate control, and inotropes/ vasopressors requirement were considered secondary outcomes.

Result

Among 47 potentially relevant studies, nine were included in the analysis. The 28-day mortality risk was lower in patients with septic shock who used beta-blockers concomitantly with vasopressors/inotropes compared with the control group (RR (%95CI): (0.89 ,0.53) 0.69, I%26=2; P=0.24). In addition, heart rate (HR) was statistically significantly lower with a standardized mean difference (SMD) of -22.39 (%95 CI: -20.06– ,24.71) among the beta-blockers group than the control group. The SMD for hospital length of stay and the inotropes requirement were not statistically different between the two groups (SMD (%95CI): -(1.64 ,2.77-) 0.57, and SMD (%95CI): (0.19 ,0.02-) 0.08, respectively).

Conclusion

The use of beta-blockers concomitantly with either epinephrine or norepinephrine in critically ill patients with septic shock was associated with better heart rate

control and survival benefits without increment in the inotropes and vasopressors requirement.

202265

An evaluation of implementing a Pharmacist-led Antibiotic time-out tool (72-48 hours) for frequently prescribed antibiotics in a general hospital in Oman.

Wajida Alghafri

Background

Pharmacists are part of Antimicrobial Stewardship Programs which aim to enhance appropriate antibiotic use and combat antimicrobial resistance. One of the Pharmacy-driven interventions is the use of an antibiotic time-out tool (ATO) to re-assess antibiotics 72-48 after the first initiation of therapy.
Aim: to evaluate the implementation of a customized and validated pharmacist-led ATO in the utilization of frequently prescribed antibiotics in Rustaq Hospital, Oman.

Method

A pre-and post-intervention quantitative study was performed to compare the usual care provided regarding re-assessing antibiotic therapies before implementing ATO and after its implementation. This included using a customized and validated ATO for re-assessment of antibiotic therapy after 72-48 hours of the first antibiotic initiation. Antibiotic appropriateness was checked by the tool to provide recommendations regarding antibiotic need, choice, dose, and duration. Outcomes measured were Days of therapy, pharmacists' intervention types, acceptance rate and costs.

Result

Restricted antibiotics prescriptions comprise %55 of total antibiotics prescribed in Female and Male Medical wards and ICU. Switching to more selective antibiotic agents (%44) and converting antibiotics to oral route (%50) were the most recommended interventions by pharmacists. The results showed a significant statistical reduction in Days of Therapy of ceftazidime ($p<.001$) but none of the other tested antibiotics. In addition, antibiotic costs dropped after ATO implementation by a total percentage difference of %66.13 with the need for a longer duration of study for proper assessment.

Conclusion

Pharmacist-led ATO implementation was feasible and well accepted by doctors. The tool supported early conversion to oral therapy and switching to more selective antibiotics, but its impact on Days of Therapy and costs requires further investigation

202283

Evaluating the Microbiological Profile of Bacteremia in Pediatric Patients with Cancer: A Retrospective Cohort Study in Jordan

Tamara Seif, Dana Hassouneh, Razan Zatarah

Background

Bacteremia is recognized as a life-threatening complication in pediatric patients with cancer. However, there are limited studies evaluating the type of pathogens commonly encountered in this patient population. Such understanding is necessary to determine the most appropriate choices for empirical antibiotics and to optimize patient management. Therefore, we aimed to investigate the microbiological profile of pathogens causing bacteremia among pediatric cancer patients.

Method

A retrospective cohort study which included pediatric patients treated at a comprehensive cancer center in Jordan, between 2015 and 2022. We included patients with solid and hematologic malignancies who had positive blood cultures. Using the electronic medical records, patients' characteristics, the etiologic microorganisms, and antibiotic susceptibilities were recorded. Multidrug resistant organisms (MDROs) were defined as intrinsic or acquired non-susceptibility to at least one agent in ≥3 antimicrobial categories. Categorical data were presented as counts and percentages while continuous data were presented as means and standard deviation.

Result

Over the 8-year study period, 1600 cases of bacteremia were included for 902 patients. The mean age of the patients was 5±6 (SD) years, 538 (%60) were males, and (%63) 569 had hematologic malignancies while the remaining had solid organ tumors. Gram-positive bacteria were reported in most cases (n = %71 ,1134), the most common being Coagulase-negative staphylococci (n=%49 ,553), followed by Streptococcus species (n = %14 ,156). For gram-negative bacteremia, Escherichia coli was the most common (n = %25 ,117) followed by Klebsiella species (n = %19 ,90). MDROs were reported in 249 cultures (%16), with extended-spectrum-beta-lactamases being the most common, reported in (%49) 121 of the cultures.

Conclusion

In a relatively large cohort of pediatric patients with cancer, gram-positive bacteria constituted the dominating etiology of bacteremia. Further studies should identify predictors of the type of pathogens and resistance to guide the empiric antibiotic prescribing decisions.

202300

Efficacy and Safety of Half Dose Alteplase for the Treatment of Sub-massive Pulmonary Embolism, Retrospective cohort study.

Maha AlNakiyah, Turkiah AlKhaldi , Hala AlMarzouqi

Background

Pulmonary embolism (PE) is one of the leading causes of cardiovascular death. Two major trials were performed to resolve inconsistencies in the use of systemic thrombolysis in submassive PE. However, the full dose was associated with an increased risk of bleeding and hemorrhagic stroke. As a result, the full dose is not recommended. A recent study found that the half dose of alteplase compared to the full dose was associated with similar mortality and major bleeding rates. In addition, the literature focuses on major bleeding rates, but no study has assessed clinically relevant non-major bleeding (CRNMB). Thus, reducing alteplase dose hasn't been widely adopted in routine practice. This study aimed to complement the existing data on the half-dose thrombolysis in submassive PE patients.

Method

A retrospective cohort at a tertiary hospital in Saudi Arabia enrolled submassive PE patients from -2021 2023. The study evaluates the safety and efficacy of the half dose alteplase (50mg). The primary outcome of the study was defined as the 30-day in-hospital mortality. Secondary outcomes were safety outcomes, including major bleeding defined by ISTH and clinically relevant non-major bleeding (CRNMB).

Result

A total of 895 PE patients were screened. Only 18 patients fit the criteria of submassive PE and received alteplase. The median age was 57, while %72 of the patients were female. Overall, clinical results were promising, with %100 of patients alive within 30 days of admission. Although %56 of the patients had HAS-BLED ≥ 2 all the patients received a therapeutic dose of anticoagulation, ISTH major and CRNMB bleeding were observed in only %5 (n = 1) and %15 (n=3) of cases respectively.

Conclusion

This retrospective study showed that patients with submassive PE who receive half dose Alteplase combined with anticoagulant therapy prevented death/hemodynamic decompensation with no major bleeding in 30 days. . This work contributes to the growing body of research indicating that, in some circumstances, anticoagulation with half dose Alteplase improves patient outcomes and lowers mortality.

202381

Evaluating the Safety and Effectiveness of Nicotine Replacement Therapy in Critically Ill Smokers: Meta-analysis of Randomized Controlled Trials

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Background

The effectiveness of nicotine replacement therapy (NRT) in critically-ill patients remains uncertain, as conflicting research results have been reported. Despite potential side effects and inconsistent data on safety and efficacy, NRT is still prescribed in intensive care units (ICUs) to prevent withdrawal symptoms and manage agitation in patients who are smokers. The aim of this meta-analysis was to determine whether NRT reduces ICU length stay, as well as the durations of mechanical ventilation (MV), vasopressor use, and delirium in critically-ill smokers.

Method

The MEDLINE and Embase databases were searched from inception through 13 February 2023 using OVID. Randomized controlled trials of smokers admitted to ICUs who received NRT were included. The primary outcome was ICU length of stay (LOS) for this systematic review and meta-analysis. Meta-analysis was conducted using both random-effects and fixed-effect models, the latter recommended when meta-analysis is restricted to just a few studies.

Result

Of 214 studies initially identified, three, together having 67 patients on NRT and 72 controls, were deemed eligible for pooled analysis. Patients who received NRT experienced a briefer LOS (MD = -%95 ;3.06 CI = [-0.25- ,5.88]; p-value = 0.0; I^2 value of %0). The duration of MV also was shorter in the NRT group, but this difference was not statistically significant (MD = -%95 ;1.24 CI = [-0.72 ,3.21]; p-value=0.22; I%12.69=2). No significant differences were identified in either delirium or vasopressor use duration.

Conclusion

Critically- ill smokers who received NRT experienced a significantly-shorter ICU LOS, but no significant differences in the durations of MV, vasopressor use, or delirium.

202382

Evaluation of the safety and effectiveness of topical intrapleural application of tranexamic acid in thoracic surgery: A systematic review and meta-analysis of randomized controlled trials

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Background
Bleeding remains a common complication post-thoracic surgery. Although intravenous tranexamic acid (TXA) showed to decrease blood loss, its use has been associated with adverse effects. Accordingly, topical TXA has been proposed as an alternative to reduce bleeding with fewer systemic complications.

Method
We searched Medline, Embase, and Cochrane Central databases for randomized controlled trials (RCTs) comparing topical TXA versus control (i.e., placebo) in patients undergoing thoracic procedures. The primary outcome was total post-operative blood loss at 24 hours. Secondary outcomes included were the number of red blood cell (RBC) transfusions, and hospital length of stay (LOS). Meta-analyses were pooled using mean difference with inverse-variance weighting and random-effects.

Result
Of 575 unique records screened, three RCTs totaling 399 patients were included. Two studies (%67) were rated the low risk of bias. The primary outcome of 24-hour post-operative blood loss was significantly lower in patients who received TXA (mean difference [MD] –93.6 ml, %95 CI –121.8 to –65.4 ml, I%45=2). In addition, the need for RBC transfusion was significantly lower in the topical TXA group compared to control (MD –0.5 units, %95 CI –0.8 to –0.3 units, I%60=2). However, there was no significant difference in the hospital LOS (MD –0.3 days, %95 CI –0.9 to 0.4 days, I%0=2). These results remained consistent after several sensitivity analyses. The use of topical intrapleural TXA has not raised any significant safety concerns.

Conclusion
Topical intrapleural TXA reduces blood loss and the need for blood transfusions during thoracic surgery. However, there is no evidence of the increased safety concerns associated with its use. Larger trials are necessary to validate these findings and evaluate the safety and efficacy of different dosages.

202389
Assessing the Impact of Smart Infusion Pump on Medication Error Reduction in Neonatal Intensive Care Unit

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Background
Ensuring the safe and accurate administration of intravenous (IV) medication is crucial within neonatal intensive care unit (NICU). Despite

the advent of advanced technologies, medication administration errors remain a concern that can significantly impact neonatal patient outcomes. We assessed the efficacy of smart pump drug libraries and continuous quality improvement reports, two pivotal tools integrated into the NICU workflow.

Method

These libraries assist healthcare professionals in delivering accurate drug dosages and have been widely adopted, yet their use within NICU remains under-explored. Through the development and integration of a drug library into the Alaris Guardrails® infusion systems, our multidisciplinary team, consisting of clinical pharmacists, medication safety pharmacists, NICU physicians, and nurses, sought to assess the impact on medication error rates. Chi square test was used to assess rate and type of medication error before and after smart pump implementation.

Result

Our study demonstrated that smart pumps effectively reduced medication errors from (2021-2020) %66.8 to %33.2 (2023-2022). However, errors reporting for continuous infusion drugs and high alert medications significantly increased post-implementation ($P<0.001$). Additionally, smart infusion pump prevented 774 attempts to exceed the hard maximum limit, underlining its potential to enhance neonatal medication safety. Compliance with the drug library was high, with %78 of infused medications utilizing the drug library program. Alerts occurred in %6.4 of all infusions, with the majority being overridden (%44.6 of alerts). High alert drugs, including midazolam, morphine, epinephrine, total parenteral nutrition, and insulin, generated the highest number of alerts.

Conclusion

This study underlines the potential of smart pumps to improve neonatal medication safety. The role of clinical pharmacists in programming infusions with the drug library proved critical to successful implementation. By examining these advanced tools within NICU workflows, this research promotes safer and more effective IV medication administration, ultimately aiming to enhance neonatal patient outcomes.

202406

Efficacy of Off-label Use of Direct Acting Oral Anticoagulants Compared with Warfarin in Treatment of Left Ventricular Thrombus.

Khluod Alkhowailed, Salwa AlSuhaibani, Amr Hassan, Tawfeeq AlHarbi, Ibrahim Alredaini, Almaha Alhneshel

Background

Left ventricular (LV) thrombus

is usually seen in situations with reduced left ventricular (LV) function including dilated cardiomyopathy and LV aneurysms or after myocardial infarction (MI). 2023 European guideline suggests to use DOAC or VKA according to patients' clinical status, though there is very little data to support this use. Therefore, the aim of the current study is to examine the efficacy and safety of DOACs Compared with Warfarin for Left ventricular (LV) thrombus.

Method

A retrospective observational cohort study was conducted at a Prince Sultan cardiac center in Qassim, including 165 patients with confirmed LVT. Demographic characteristics, clot features, treatment modalities, and outcomes were analyzed. Primary outcomes included thrombus resolution, while secondary outcomes encompassed bleeding complications and strokes. Patients were stratified based on the anticoagulant used (apixaban or warfarin).

Result

The study cohort, with a mean age of 56.22 years and a predominance of males (%90.3), exhibited diverse cardiovascular profiles, with AWMI and IHD being prevalent conditions. Apical LVT (%78.2) was the most common presentation, with apixaban utilized in %66.1 of cases. At the 3-month follow-up, apixaban users demonstrated a lower rate of unresolved clots (%11.0) and a higher proportion without new LV clots (%7.3) compared to warfarin. Similar trends were observed at the 6-month follow-up, emphasizing the superior efficacy of apixaban. Adverse events did not significantly differ among anticoagulant groups, and the duration of anticoagulation was comparable.

Conclusion

The study provides compelling evidence supporting the efficacy of apixaban in the management of LVT. Apixaban demonstrated superior outcomes in terms of thrombus resolution and prevention of new LV clots compared to warfarin.

202467

Is age a risk factor associated with medication-related hospital admission in adults: A systematic review and meta-analysis.

Reema Munshi, Tamarind Grimes, Eimear Ni Sheachnasaigh, Monica Strugaru

Background

Medication-related hospital admission (MRA) are hospital episodes that are caused or contributed to by medication-related problems (MRPs) such as adverse drug event or reaction, medication error, or medication non-adherence. MRAs

are common and represent a public health concern, indicating challenges within healthcare. The evidence about the strength of age as a predictor of MRA is equivocal. Therefore, we sought to investigate the statistical association between age and MRA in adults.

Method

This systematic review and meta-analysis applied a comprehensive search for relevant studies across eight databases. Studies reporting on the frequency of MRA among adult patients aged >16 years, published in English since the year 2000 and reporting age data for the (non)/exposed groups were eligible for inclusion. Standard dual, independent study selection was applied at both title & abstract and full text review stages. Pooled data were narratively summarized, and where possible, meta-analysed. Quality of included studies was assessed using The Joanna Briggs Institute's tools.

Result

Fifty observational studies describing findings across183,612 patients, were narratively analysed and three meta-analyses were performed. We identified variation in the reporting of aggregate age and the statistical tests applied to explore the association between age and MRA, with only seven studies reporting a significant association. Meta-analysis findings suggest that age is an independent risk factor for MRA, but that younger adults rather than older adults are at an increased risk, Odds Ratio [%95 Confidence interval] [3.92 ,1.27] 2.24; I%97 = 2. The quality of the included studies was variable.

Conclusion

This review suggests caution against an overemphasis on old age in policy, practice, or research about managing MRA. Future research should explore the independent risk factors contributing to MRA, to inform associated policy and practice.

202494

Efficacy and Safety of Mepolizumab in the Management of Severe Eosinophilic Asthma: A Systematic Review

Ibrahim Dighriri, Jasmine Albukhari, Danya Alhuwaimel, Fatimah Almalki, Laila Alghowaidi, Tahani alshammari, Alanoud Alotaibi

Background

Severe eosinophilic asthma (SEA) is characterized by persistent airway inflammation and frequent exacerbations despite standard treatments. Mepolizumab, a monoclonal antibody targeting interleukin-5 to reduce eosinophil levels, has emerged as an add-on therapy for SEA patients. This

systematic review evaluated mepolizumab's efficacy and safety in treating SEA.

Method
A comprehensive literature search was conducted across major databases. Thirty-two studies with over 6,000 patients were included, comprising randomized controlled trials, open-label extensions, and real-world observational analyses. Study quality and risk of bias were assessed using standard tools.

Result
A narrative synthesis found mepolizumab significantly reduced exacerbation rates by around %50 and improved symptoms and lung function compared to placebo in pivotal trials. Long-term open-label studies showed sustained reductions in exacerbations and stable lung function for up to 4.5 years. Real-world data demonstrated consistent %90-50 exacerbation decreases across diverse patient populations over 24-6 months. Mepolizumab exhibited an acceptable safety profile, with mild injection site reactions and headaches as most common adverse events.

Conclusion
The extensive evidence provides robust support for mepolizumab as an efficacious and safe add-on treatment option for SEA patients. While specific subgroups may show enhanced responses, mepolizumab displayed broad efficacy regardless of patient demographics or phenotypes. Further high-quality comparative research is warranted to optimize patient selection among emerging biologics.

202517
Prevalence of Redundant Anti-Anaerobic Antibiotic Coverage: a cross-sectional study.

Fawaz Tawhari, Mohammad Zaitoun, Leen Alghoneem, Thamer Almangour

Background
Limited evidence is available about the prevalence of redundant anti-anaerobic bacterial coverage in Saudi clinical practice settings.This study aims at identifying the prevalence of redundant anti-anaerobic bacterial coverage in a Saudi academic tertiary hospital.

Method
Patients admitted to King Saud University medical city and received metronidazole between Jan 2018 and May 2019 were included in the study. Avoidable metronidazole days of therapy (DOT) were calculated to measure anti-anaerobic antibiotic redundancy (defined as the days of metronidazole administration with another anti-anaerobic antibiotic during the same admission

encounter). Metronidazole was not considered redundant in combination with another anti-anaerobic agent if prescribed within 28 days after a positive test for Clostridium difficile and during hospitalizations with a diagnosis of cholecystitis or cholangitis.

Result

A total of 620 patients were included in the study. The mean age of the participants was 43 years ± 29.4, with %55 of the female gender. The median length of stay was 5 days (IQR 8-3 days). Over the study period, there were 2338 metronidazole DOT, of which 205 were avoidable (,%8.8 0.33 DOT per patient). Piperacillin/ tazobactam was the most common concomitantly administered antibiotic with avoidable metronidazole (%69.83), followed by Meropenem (%12), Amoxicillin-clavulanate, clindamycin (%7.7 each), and tigecycline (%3). The most common indications associated with redundant anti-anaerobic coverage were intra-abdominal infection (%72.3), respiratory tract infection (10.76), and infection in immunocompromised patients (%4.6).

Conclusion

Per the study results, potentially avoidable use of metronidazole was mainly prevalent in intrabdominal infection management; these findings develop a valid target for antimicrobial stewardship programs.

202566

Safety of Flucloxacillin versus Cloxacillin: A Multicenter Retrospective Cohort Study

Maram Alzahrani, Khalid Eljaaly, Rahmah Algarni, Samah Alshehri, Mohannad Alshibani, Zainab AlAhmari, Shahad Alharthi

Background

Although previous studies compared treatment outcomes between cefazolin and antistaphylococcal penicillins, none have compared the safety between cloxacillin and flucloxacillin, the most commonly used ones in Saudi Arabia. This study aimed to compare the safety profiles of cloxacillin and flucloxacillin.

Method

A retrospective multicenter cohort study was conducted between 2016 and 2022. The IRB approval was obtained for the study. We included adults who received either IV flucloxacillin or cloxacillin ≥ 24 hours. Exclusion criteria were acute kidney injury at baseline, creatinine clearance < 10ml/min, and receiving dialysis, or missing serum creatinine readings. The primary outcome was nephrotoxicity. The secondary outcomes included hepatotoxicity, hypokalemia, hypernatremia, neutropenia, and thrombocytopenia. The sample size required was 228. For comparison, Chi-square test or Fisher's exact test was used for categorical data, while unpaired t-test or Wilcoxon rank-sum test was used

for continuous data. Multivariable logistic regression was used for adjustment.

Result

A total of 230 patients were included, 113 patients in flucloxacillin group and 117 in cloxacillin group. The mean age was 56.3 years, and %65.2 were men. There was no statistically significant difference in nephrotoxicity (%16.8 versus %18.8, respectively; P=0.694; adjusted odds ratio (aOR)=;0.808 %95 CI, 1.664-0.393; P=0.564). No statistically significant differences were observed in hepatotoxicity (%24.7 vs. %12.3; P=0.055; aOR, 95 ;1.244 CI, 4.127-0.363; P=0.745), neutropenia (5.3 % vs. %6.0; P=1) thrombocytopenia (%20.8 vs. %15.0; P=0.273; aOR, %95 ;1.471 CI, 3.046-0.710; P=0.299), and hypernatremia (%6.9 vs. %12.2; P=0.194; aOR, %95 ;0.692 CI, -0.247 1.938; P=0.484). On the other hand, flucloxacillin use was associated with significantly higher hypokalemia (%30.2 vs. %42.9; aOR, %95 ;0.528 CI, 0.971-0.287; P=0.040).

Conclusion

Using flucloxacillin or cloxacillin was not associated with significant differences in nephrotoxicity, hepatotoxicity, neutropenia, thrombocytopenia, or hypernatremia. Flucloxacillin was associated with higher hypokalemia, necessitating caution in this population and close serum potassium monitoring.

Clinical Pharmacy Students

201987

Impact of Bariatric Surgeries on Levothyroxine Absorption in Patients with Hypothyroidism: A Multi-Center Retrospective Cohort Study

Reem Alqahtani, May Almukainzi, Rimah AlAnazi, Rawan Alamri

Background

The growing rate of obesity led to an increased number of bariatric surgeries (BS) as a treatment option for obesity. The gastrointestinal tract (GIT) changes following BS can impact many drugs' absorption. Levothyroxine (LT4) is a synthetic thyroxine (T4) replacement used commonly as tablets to manage hypothyroidism disorder, which is more prevalent among patients with obesity.

Method

A retrospective cohort study was conducted in multi-center. The LT4 dose, TSH and T4 levels were compared before and after BS. The post-surgery readings were tracked up to six months after surgery. ANOVA test was used for analysis.

Result

A total of 14374 patients who underwent BS from 2019 /1 to 2022/3 were screened for eligibility, and n=105 participants matched the inclusion criteria. The TSH and T4 did not show statistically significant differences before and after surgery (P values of 0.4864 and 0.5970, respectively). However, the doses significantly differed before and after surgery in all the follow-up time points periods (P <0.002).

Conclusion

The LT4 required doses significantly reduced after BS due to the improvement in endogenous thyroid production in patients with obesity. However, the abnormality of the GIT induced by the BS limits the exogenous LT4 absorption. Using liquid dosage forms of LT4 while monitoring the thyroid function parameters can optimize the treatment after the procedure.

201990

Beneficial Effect of N-acetyl Cysteine on Type II Diabetes-Related Nephropathy

Manar Alghusn, Afnan Altawil, Maram alatawi, Areej Alghamdi.

Background

Diabetes mellitus (DM) is a metabolic disorder in which multiple complications appear due to inappropriate control of glucose levels in the blood. One of the vital complaints is diabetic nephropathy (DN) which is considered the leading

cause of renal failure in diabetic patients. DN is defined as a rapid decline in the glomerular filtration rate (GFR) associated with excess albuminuria level which is an early marker of chronic kidney disease (CKD)
Objective:
This research aims to study the significant effects of N-acetyl cysteine (NAC) in slowing the progression of nephropathy in diabetic patients.

Method

The study design was a prospective, randomized, placebo-controlled clinical trial. Eighty patients, aged -45 63 years with type 2 Diabetes mellitus were enrolled in the study. The patients were recruited in the study according to inclusion and exclusion criteria.
The patients were divided into two groups, the first interventional group was receiving N-acetyl Cysteine oral sachets 600 mg 2 times/day in addition to the regular medication of DM, and the second control group was receiving the same routine medications for DM. Laboratory biomarkers were estimated: proteinuria, lipoprotein (a), lipid profile, kidney function tests, and blood pressure measurements were also included.

Result

At the end of the therapy, there was a significant decrease in proteinuria and blood pressure in NAC group compared to placebo group (P<0.05), On the other hand, there was no significant difference in serum lipoprotein (P>0.05) and creatinine levels between the two groups.

Conclusion

this clinical trial provides evidence supporting the potential ameliorating effect of NAC on Type II diabetic nephropathy and enhances patient outcomes and quality of life by reducing albuminuria level and systolic blood pressure.

202000

Trimethoprim-sulfamethoxazole versus levofloxacin for the treatment of Stenotrophomonas maltophilia infections: A multicenter cohort study

Shatha alruwaite, Renad Alsahli, Thamer Almangour

Background

Trimethoprim-sulfamethoxazole (TMP-SMX) has long been considered the treatment of choice for infections caused by S. maltophilia. However, some factors may limit its usage including allergic reactions, intolerance, and resistance. Levofloxacin has emerged as a potential option for the treatment of these infections. The aim of this study was to evaluate the clinical outcomes in patients who received TMP-SMX versus levofloxacin for the treatment of S. maltophilia infections.

Method

his was a retrospective, cohort study conducted in 4 tertiary centers and included patients who were treated with either TMP-SMX or levofloxacin for infections caused by S. maltophilia. The main study outcomes were overall in-hospital mortality, 30-day mortality, and clinical cure. Safety outcomes were also evaluated. To control for the effect of the covariables, multivariate analysis using logistic regression was used. All statistical analyses were performed using STATA 15.1 (StataCorp LP, College Station, Texas, USA).

Result

We included 371 patients in this study, 316 received TMP-SMX and 55 patients received levofloxacin. A total of %70 were in the intensive care unit and %21 presented with bacteremia. Baseline characteristics were similar between the two groups. No statistically significant differences were observed in overall in-hospital mortality (%52 vs %40; p = 0.113; OR, %95 ;1.59 CI, -0.89 2.86), 30-day mortality (%28 vs %25; p = 0.712; OR, %95 ;1.13 CI, 2.18-0.59), or clinical cure (%55 vs %64; p = 0.237; OR, %95 ;0.70 CI, 1.31-0.37). Rates of acute kidney injury were comparable between the two groups (%11 vs %7; p = 0.413).

Conclusion

Patients receiving levofloxacin for the treatment of S. maltophilia infections demonstrated clinical outcomes similar to those receiving TMP-SMX. Our study suggests that levofloxacin can be a reasonable alternative to TMP-SMX to treat these infections.

202015

Albumin as A Prognostic Tool in Critically Ill Patients with Sepsis or Septic Shock: A Retrospective Cohort Study

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Background

Finding a reliable and powerful marker for prediction of mortality and severity of the disease, will help in optimizing clinical decisions in the first 24 hours of ICU admission, prioritizing patients and improving the patients' overall outcome. Objective: The main objective of our research was to establish an evidence of association between albumin use, low serum albumin level in septic patients and clinical outcome (mortality, length of stay, and the need of vasopressors).

Method

Methodology: A retrospective cohort study design conducted on 500 adult septic and septic shock patients who were admitted to the ICU in the period from 1st of August 2016 until 31st of July 2018 at king Fahad Specialist Hospital in Dammam (KFSHD). Patients were divided into two groups, those who received Albumin (ALBU group) and those

who did not (NA group). Data were analyzed using multiple logistic regression.

Result

Results: After applying inclusion and exclusion criteria, 79 subjects were included, there were (%56) 44 females, mean (SD) for age was 51.3 (19.2) years, ICU mortality was higher in patients who weren't on albumin at admission (%79), in patients who had severe hypoalbuminemia (%61), in patients who needed vasopressor (%84), and in patients who needed vasopressor for more than 3 days (%63). No association between albumin level upon admission (OR %95 ,1.003 CI 1.086-0.926, p = 0.942) and ICU mortality was observed. There was a significant positive relationship between need of vasopressor and ICU length stay (median length of stay was 5 days for patients on vasopressor and 3 days for patients who were not on vasopressor, p = 0.026). There was a significant relationship between days on vasopressor and ICU length stay (OR %95 ,1.755 CI 2.478-1.244, p = 0.001).

Conclusion

Conclusion: Albumin therapy was not associated with a reduction in mortality in septic patients; however, Albumin therapy was associated with favorable clinical outcomes. Our study supports the reliability of serum albumin as predictive value in septic and septic shock patients. These findings will help in optimizing clinical decisions in ICU admission, management and in evaluating prognosis of patients with sepsis.

202037

The potential nephron-protective effect of pentoxifylline and or folic acid on patients with chronic kidney disease: Randomized controlled trial

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Background

Chronic kidney disease (CKD) is a highly prevalent, irreversible, and progressive disease associated with high cardiovascular risk. The present study aimed to clinically investigate the effect of the administration of therapeutic doses of pentoxifylline and/or folic acid in patients with CKD to provide nephroprotection options. We hypothesized that therapeutic doses of pentoxifylline or folic acid reduce the renal and cardiovascular events in CKD patients compared to the background of standard therapy.

Method

A randomized, prospective, parallel, and controlled clinical trial of eighty patients diagnosed with CKD stages 5-3 were stratified by simple randomization into four groups (20 patient/ group). Control group: patients received standard therapy only; pentoxifylline (PTX) group: patients received therapeutic doses of

PTX (Tablets, 400 mg twice daily) with their standard therapy for six months; folic acid (FA) group: patients received FA (tablets, 500 mcg once daily) with their standard therapy for six months; and pentoxifylline and folic acid group): Patients who received both PTX (Tablets, 400 mg twice daily) and FA (Tablets, 500 mcg once daily) with their standard therapy for six months. All groups were followed up for six months post-treatment.

Result

There was a significant improvement (P > 0.001) in renal function and a significant reduction in the fatigue score state (FSS) in the intervention groups compared to the control group.

Conclusion

Our results demonstrated that administration of therapeutic doses of pentoxifylline and/or folic acid in CKD patients delayed the progression of advanced chronic kidney disease and has been used successfully to relieve fatigue in patients with CKD which will positively affect their quality of life.

202041

Circadian rhythm of blood pressure and its implication for the emotional process

Yazeed Almslmani, Abduallh J. Ghabban , Amer A. Alanazi , Worood E. Albalawi , Amyal H. Albalawi , Ahmed M. E. Hamdan

Background

Introduction: Blood pressure (BP) follows a circadian rhythm with a physiological decrease during the night. Nocturnal BP and its dipping pattern during night-time have a significant prognostic importance for mortality and the occurrence of cardiovascular events.
Objective: We aimed to investigate the relationship between nervousness and dipping pattern in the BP (extreme dipping, non-dipping, or reverse-dipping) during the day time in a sample of healthy and hypertensive adults in the absence of other medical conditions.

Method

Participants were recruited from the local community from March 2017 to December 180 .2019 adults took part in the study and were classified, according to ambulatorial blood pressure measure (ABPM), into three groups: dippers (n = 60), non-dippers (n = 60), and extreme dippers (n = 60). The participants completed a socio-demographic and anamnestic interview and the Toronto Alexithymia Scale-20 (TAS-20).

Result

The ANOVAs on the TAS-20 subscales showed that the groups differed in the difficulty identifying feelings and difficulty describing feelings. In both the subscales, dippers showed lower scores than non-dippers and extreme dippers. The ANOVA on the global score of TAS-20 confirmed

that dippers were less alexithymic than both extreme dippers and non-dippers.

Conclusion

This study confirms that some psychological factors, like alexithymia, could represent a characteristic of patients who fail to exhibit an adaptive dipping phenomenon. Moreover, it is the first time to confirm the relevant role of the emotional process in the modulation of an essential psychophysiological process such as the circadian variation of BP.

202043

Local Anesthetic Infiltration for Pain Control in Aesthetic Breast Surgery: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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Background

Aesthetic breast surgeries, including procedures such as breast augmentation, breast reduction, and breast lift, are commonly performed surgical procedures. Postoperative pain management is essential to ensure patient comfort, satisfaction, and early recovery. This systematic review evaluates the effectiveness of anesthetic infiltration in reducing pain after breast surgeries.

Method

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The review focused on collecting and analyzing clinical studies involving adult female patients who underwent aesthetic breast surgery and received local anesthetic infiltration for postoperative pain management. The collected data included variables such as study details, author information, journal details, country of origin, study design, sample size, and year of publication. Patient demographics, including age, sex, and body mass index, were also recorded.

Result

This systematic review involved selecting 484 articles from various sources, including PubMed, Science Direct, Cochrane Central Register of Controlled Trials, and Google Scholar, with only five relevant studies. A total of 191 patients across five studies were included, 107 received local anesthetics such as lidocaine and bupivacaine, while the remaining participants served as the comparison group and underwent reduction mammoplasty without receiving any local anesthetics. However, in four out of five studies, a significant statistical difference in pain reduction was observed during the initial phase after surgery.

Conclusion

A meta-analysis of the two groups found obvious differences in subgroup pain relief after breast augmentation surgery using various local anesthetic methods. However, additional research is necessary to gain a thorough understanding of the effectiveness and possible adverse effects of anesthetic infiltration for pain management after aesthetic breast surgery.

202069

The electrolyte imbalance is the major determinant for the duration of treatment in critically ill COVID-19 patients

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Background

Introduction: Serum electrolyte imbalances are highly prevalent in COVID-19 patients. However, their associations with the therapeutic outcomes are debatable, and of unknown prognostic value.
Objective: We aim to clarify the associations and prognostic accuracy of electrolyte imbalances (sodium, potassium and chloride) in predicting clinical outcome in critically-ill COVID-19.

Method

A retrospective cohort observational study was made for hospitalized patients diagnosed as critical COVID-19 cases admitted to King Salman Military Hospital. The primary outcome was the recovery time. We used multivariate logistic regression analysis in order to evaluate the correlation between the electrolyte concentrations, patient characteristics, and renal function, liver function and immunological biomarkers at the time of admission as independent variables and the recovery time.

Result

918 patients were included in the study. Age, gender significantly, serum sodium, potassium and chloride levels and renal function biomarkers (BUN and Serum Creatinine) were significantly affecting the recovery time for critically ill patients ($p < 0.001$). Logistic regression analysis of all of these factors revealed that serum sodium and potassium levels were responsible for such delay of the recovery in critically-ill COVID-19 patients.

Conclusion

Hyponatremia and hypokalemia were associated with poor COVID-19 clinical outcome. Hypernatremia is %97 specific for a poor outcome, and the association is independent of renal function. Correction of the sodium and potassium imbalance greatly improved the clinical outcome represented by decrease the recovery time.

202089

Effectiveness and Safety of Direct Oral Anticoagulant versus Warfarin in Patients with Venous Thromboembolism: A Systematic Review and Meta-Analysis

Saleh Alaraj, Razan Alshahrani, Munirah Alkathiri، Wala Alshahrani، Waad Altayyar, Abdulaali Almutairi, Osamah Alfayez, Majed Al Yami, Omar Almohammed, Abdulrahman Al-Abkka, Saeed Alay

Background

Background: Direct oral anticoagulants (DOACs) have emerged as promising alternatives to vitamin K antagonists such as warfarin for patients with venous thromboembolism (VTE). This is mainly attributed to the narrow therapeutic window and intra-variability observed among VTE patients treated with warfarin. Moreover, DOACs have shown comparable efficacy and superior safety profile based on clinical trials. However, the effectiveness and safety of DOACs compared to warfarin from real-world studies need to be assessed.

Purpose: To compare the effectiveness and safety of DOACs relative to warfarin in patients with VTE in a real-world setting

Method

A systematic review of literature using PubMed and EMBASE was conducted from inception until Jun 2023. We included observational studies that evaluated the effectiveness and safety of DOACs compared to warfarin for VTE management and reported adjusted hazard ratios and/or odd ratios for recurrent VTE, major bleeding, clinically relevant non-major bleeding, gastrointestinal bleeding, intracranial hemorrhage, and all-cause mortality. We estimated the pooled effect using the random-effect model meta-analysis.

Result

A total of 22 studies were included in this meta-analysis. DOACs therapy was associated with significantly lower risks of recurrent VTE (HR ,0.77 %95CI 0.83-0.65), major bleeding (HR %95 ,0.78CI 0.85-0.72), clinically relevant non-major bleeding (HR ,0.82 %95CI 0.88-0.77) and gastrointestinal bleeding (HR %95 ,0.74CI 0.98-0.48) compared to warfarin. However, there was no statistically significant difference in all-cause mortality between the two groups (HR ,0.97 %95CI 1.05-0.52)

Conclusion

This meta-analysis indicated that DOACs therapy is associated with a significant reduction in the recurrence of venous thromboembolism and a more favorable safety profile compared to warfarin therapy

202124

A meta-analysis of pregnant diabetic women supplementing with omega-3 fatty acids and vitamin D or E

Bader Munif, Bader Alshammari, Mohd. Imran, Abida Ash Mohd, Md. Tauquir Alam

Background

The combined effects of OFA and vitamin D or E in GDM women are assessed in this systematic review and meta-analysis based on randomized controlled trials (RCTs).
Objective: A meta-analysis of pregnant diabetic women supplementing with omega-3 fatty acids and vitamin D or E

Method

A thorough literature search was conducted using the Web of Science, Cochrane Library, and MEDLINE databases to identify studies evaluating the combined impact of OFA and vitamin D or E supplementation in women with GDM. The outcome measures were the homeostasis model of assessment-insulin resistance (HOMA-IR), FPG, lipid/insulin profiles, inflammatory and oxidative stress biomarkers, and pregnancy outcomes. RevMan 5.3 was used to conduct a meta-analysis. To calculate the mean difference (MD)/odd ratio (OR) with %95 confidence intervals (CI), the random effects model was utilized.

Result

Vitamins E or D supplemented with OFA considerably reduced insulin, HOMA-IR, and FPG levels. There was no discernible effect on the HDL/ lipid profile except for triglycerides. Supplementing with OFA with either D or E vitamins resulted in significant reductions in MDA (MD -%95 ,0.87 CI -1.26 to -0.47, $p < 0.00001$) and VLDL (MD -%95 ,3.47 CI -6.70 to -0.23, $p = 0.04$). While there was no discernible impact on GSH and NO, this supplement markedly raised plasma TAC (MD %95 ,148.32 CI 22.79 to 273.84, $p = 0.02$). The babies had noticeably lower hospitalization rates (OR %95 ,0.21 CI 0.08 to 0.56, $p = 0.002$) and hyperbilirubinemia (OR %95 ,0.19 CI 0.07 to 0.52, $p = 0.001$). Preterm delivery, polyhydramnios, hypoglycemia in neonates, macrosomia, caesarian sections, and preeclampsia were unaffected. When combined with vitamin E or D, dietary supplements containing OFA may help lower lipids, improve glycemic management, and significantly lower MDA while raising plasma TAC.

Conclusion

These supplements may reduce the risk of hospitalization and hyperbilirubinemia in babies. Large-scale, long-term research with a larger sample size is required to validate the results.

202129

Prevalence Of Uncontrolled Type 2 Diabetes Mellitus In Female Patients In Northern Border Region Of Saudi Arabia

Bader Munif, Shafi Shalal, Abdulrahman Kareem, Muhannad Thafi, Rashed A Alwatban, Sibghatullah Sangi

Background
Diabetes mellitus (DM) is one of the major fast growing noncommunicable disease (NCD) threats to global public health. Trends in the incidence of diabetes indicate a disproportionate increase due to current rapid demographic transitions from traditional to more westernized and urbanized lifestyles.

Method
Cross sectional research design conducted during the period of two months month (from beginning of December 2019 to end of January 2020) at Rafha central hospital on random sample of 1000 diabetic patients' files extracted from hospital database according to inclusion criteria including; Type 2 female Diabetes Mellitus patients, prescribed either oral antidiabetic agents or insulin or both and Have recorded measurement of fasting blood glucose and HbA1C, data collected by a data collection sheet specially designed for the study purpose. All data was analysed by SPSS program through descriptive statistics.

Result
Mean ± SD of age was 11.5 ±51 years, according to BMI, %52 of study subjects were obese (BMI: ≥ 30), %28 were overweight (BMI: 29.9-25). Of the included diabetic female patients; %52 was on oral antidiabetic drugs, %26 on insulin and %22 on both insulin and oral antidiabetics. About three quarters (%77) of study subjects was poorly controlled (Hb A1C <%8), %19 fairly controlled (Hb A1C %8-7), and only %4 can be considered with good control as their HbA1C was in the range of (>%7). Half of the study subjects (%50) with uncontrolled glycaemic level was in the age range (70-50 years) followed by age (less than 50 years) with percentage of (%44). The patients with uncontrolled glycemic level were obese (%49) followed by overweight (%29). Highest proportion of uncontrolled diabetic patients (%46) were on oral antidiabetic agents, %28 on insulin and %26 on both insulin and oral antidiabetic agents.

Conclusion
In conclusion, prevalence of uncontrolled type 2 diabetes mellitus in female patients in Northern Border Region of Saudi Arabia is high specifically among obese and overweight patients, those on oral antidiabetics and in the age range (70-50 years).

202132

Incidence And Risk Factors Of Vancomycin-Associated Nephrotoxicity In Preterm And Term Neonates: A Retrospective Cohort Study

Ibraheem Bagbag, Hanouf Bafhaid, Lujain Khan, Hanadi Alrammaal, Wala'a Felemban, Abduallah Derar, Rashed Munshi

Background

Vancomycin is commonly used in neonatal intensive care unit (NICU) to treat gram-positive microorganisms, although there is limited information available concerning vancomycin dosing, monitoring, and adverse effects. Vancomycin serum trough concentration is the most accurate and practical method for monitoring vancomycin efficacy and safety, including vancomycin-associated nephrotoxicity. The aim of this study was to record for the first time in Saudi Arabia, the incidence of vancomycin-associated acute kidney injury (VA-AKI) in preterm and term neonates. Also, to identify the risk factors that may precipitate VA-AKI in neonates.

Method

A retrospective cohort study at Maternity and Children Hospital in Mecca. Neonates who were admitted to NICU and received intravenous vancomycin therapy for more than 48 hours between the period of January 2018 to December 2021 were included in this study.

Result

A total of 179 out of 219 patients met the study inclusion criteria and entered the study. The incidence of vancomycin-associated nephrotoxicity was %27. Three quarters of all cases (n=151) were used vancomycin empirically to treat sepsis and pneumonia. The mean age of neonates who developed nephrotoxicity was significantly lower than patients without nephrotoxicity, 6 versus 10 days, respectively ($p<0.001$). Neonates who developed nephrotoxicity had extremely low-birth weight (<1 kg) and were at 28 gestational weeks compared to the patients without nephrotoxicity, with mean body weight of > 2.5 kg and > 37 gestational weeks ($p<0.001$). There was no statistically significant difference regarding trough level between those with or without nephrotoxicity, however %45 of patients did not represent true trough levels.

Conclusion

High incidence of VA-AKI was reported in premature infants due to immature kidney and inadequate nephrogenesis. Birth weight, gestational week and age were the prominent risk factors in VA-AKI. Incorrect vancomycin monitoring may mislead clinical and therapeutic judgment. An effort is required to improve the accuracy of vancomycin therapeutic monitoring

202138

Impact of Concomitant Mitral Regurgitation on Outcomes after Transcatheter Aortic Valve Implantation: A Systematic Review and Meta-analysis

Abdulaziz Alshammari , Mohammed Alshammari

Background

Severe aortic stenosis (AS) and mitral regurgitation (MR) frequently coexist in patients. The presence of concomitant MR in patients undergoing transcatheter aortic valve implantation (TAVI) can lead to unfavorable outcomes. We wanted to find out the effect of concomitant MR on mortality and other outcomes after TAVI in AS patients.

Method

An online literature search was carried out on PubMed and Cochrane to identify studies comparing outcomes in patients with and without MR, undergoing TAVI for AS. All identified studies were screened and selected by two individual reviewers. Baseline characteristics and data for outcomes were extracted and pooled using the random effects model. Review Manager v.5.3 was used for all data analyses and risk ratios (R) with corresponding %95 confidence interval (CI) were calculated. Open MetaAnalyst software was used for meta-regression.

Result

A total of 24 studies with 23,796 patients were included in our analyses. The AS patients undergoing TAVI with concomitant MR at baseline had a significantly higher incidence of all-
cause mortality at 30-days (RR: 1.68 [%95 CI: 2.15 ,1.31] P < 0.0001, I%52 = 2), 6-months, (RR: 1.94 [%95 CI: 2.90 ,1.30], P = %82 = 12 ,0.001), 1-year (RR: 1.75 [%95 CI: 2.22 ,1.38] P < = 12 ,0.0001
%87), and 2-years (RR: 1.30 [%95 CI: 1.56 ,1.08], P = %65 = 12 ,0.006 and re-hospitalization (RR: 1.79 [%95 CI: ,1.06 3.04], P = %86 = 12 ,0.03 than those without MR at baseline. However, no significant difference was noted in the risk of post-procedural stroke (RR: 0.83 [%95 CI: 0.67,1.04], P = %0 = 12 ,0.11) and bleeding (RR: 0.95 [%95 CI: 1.04 ,0.88], P = %0 = 12 ,0.27) between MR and no MR group. Meta-regression of all-cause mortality outcomes at 30-days, 6-months, 1-year, and 2-year showed no association with age, male gender, and LVEF.

Conclusion

Concomitant MR in AS patients undergoing TAVI is associated with an increased risk of all-cause mortality and bleeding compared to patients without MR. Further studies are required to establish the risk of MR on less studied outcomes.

202158

Effectiveness and Safety of Brentuximab Vedotin Containing Regimen Versus Standard Chemotherapy in Relapsed or Refractory Hodgkin Lymphoma: A Multicenter Cohort Study

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Background
Hodgkin Lymphoma (HL) account for %3.4 of all cancer diagnosis in Saudi Arabia and poses significant challenges with relapse rates reaching to %40 in advanced stages. Brentuximab vedotin (BV), a novel agent targeting CD 30, has shown promise in improving outcomes. This study aims to assess the real-world efficacy and safety of BV-containing regimens compared to non-BV regimens in Saudi Arabia.

Method
A retrospective multicenter cohort study included 93 adult patients with relapsed or refractory HL in Saudi Arabia (2021-2016). Patients were categorized into BV-containing (n=61) and control groups (n=32). Data collection adhered to ethical guidelines, with outcomes including overall response rate (ORR), complete response (CR), event-free survival (EFS), and complications post-chemotherapy.

Result
BV-containing regimens demonstrated a higher ORR (%82.5 vs. %76.9) without statistical significance (OR %95 ,12.25 CI 0.99,151.79, P=0.05). CR rates were similar between groups %61.5 of patients in the control group compared to %59.6 of patients who received BV (OR %95 ,1.37CI 0.19,9.83, P=0.76). BV demonstrated a trend toward longer EFS (680 days vs 338 days), however it was statistically not significant (Beta coefficient ,0.38 %95 CI -0.89-0.13, P=0.14). All post-chemotherapy complications were comparable between the two groups with more cases of hepatotoxicity and acute kidney injury reported in BV group.

Conclusion
The study suggests a potential benefit of BV in terms of response rates and EFS. Larger, longer-term studies are warranted to validate these findings and further optimize treatment strategies for HL patients in Saudi Arabia.

202166

Evaluation of Apixaban standard dosing in underweight patients with non-valvular atrial fibrillation: A Retrospective Cohort Study

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Background
Recent guidelines recommend using direct oral anticoagulants (DOACs) as first-line oral agents in patients with non-valvular Atrial fibrillation (AF). Research is currently investigating the use of Apixaban in underweight patients, with some results suggesting altered pharmacokinetics, decreased drug absorption, and potential overdosing in this population. This study examined the effectiveness and safety of standard Apixaban dosing in adult AF patients with a Body Mass Index (BMI) lower than 25.

Method
In a retrospective cohort study conducted at King Abdulaziz Medical City (KAMC), adult patients with a BMI below 25 who received a standard dose of Apixaban (5 mg twice daily) were categorized into two sub-cohorts based on their weight at the time of Apixaban initiation. Underweight was defined as patients weighing ≤50 kg, while the control group (normal weight) comprised patients weighing > 50 kg. The study followed these patients for at least one year after initiation. The study's primary outcome was the incidence of stroke events, while secondary outcomes included bleeding (major or minor), thrombosis, venous thromboembolism (VTE), and hospital readmission. Propensity score (PS) matching with a 1:1 ratio was used based on predefined criteria and regression model was utilized as appropriate to compare normal weight group (Reference)to those with underweight.

Result
A total of 1,433 patients were screened; of those, 277 were included according to the eligibility criteria. The incidence of stroke events was significantly lower in the underweight than in the normal weight group at crude analysis (%0 vs. %9.1).; p-value=0.06), as well in regression analysis (OR (%95CI): (0.76 ,0.001) 0.08, p-value = 0.002). On the other hand, the odds of major and minor bleeding were not statistically significant between the two groups (OR (%95CI): (2.03 ,0.07) 0.39, p-value = 0.26 and OR (%95CI): (2.84 ,0.56) 1.27, p-value = 0.40, respectively). Moreover, hospital readmission rates within 12 months were comparable between the two groups.

Conclusion

This exploratory study showed a higher effectiveness of Apixaban standard dosing in reducing stroke events in underweight patients with non-valvular AF without statistical significance differences regarding bleeding events. Further randomized controlled trials with extended follow-up are needed to confirm these findings.

202181

Prevalence of CYP2C8 Genetic Polymorphisms Among Healthy Western Saudi Population

Noura Alkinaidri, Saja Aljilani

Background

The CYP2C8 enzyme, encoded by the CYP2C8 gene, plays a critical role in metabolizing commonly prescribed drugs. Ibuprofen, a widely used non-steroidal anti-inflammatory (NSAID) for managing pain and inflammation in pediatric patients, is metabolized by the CYP2C8 enzyme. Studies suggest that the CYP2C3* ,2*8, and *4 variations of the CYP2C8 gene may diminish ibuprofen metabolism, increasing the risk of adverse reactions and necessitating careful consideration of ibuprofen use in pediatric patients with these genetic profiles.

Method

A cross-sectional study was conducted with 140 healthy Saudi children aged 12–6. Saliva samples were collected using Oragene™ DNA Sample Collection Kits and analyzed for CYP2C8 polymorphisms through polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) methodology.

Result

The study identified that CYP2C2*8 AA, AT, and TT genotypes occurred at frequencies of %9.29 ,%87.86, and %2.86, respectively. For CYP2C3*8, AA, AG, and GG genotypes were found in %8.75 ,%87.14, and %4.29 of subjects, respectively. The CYP2C4*8 allele was less frequent, with CC and CG genotypes at %97.86 and %2.14, respectively, and the GG genotype was absent. Allele frequencies for CYP2C3* ,82, and *4 were %8.57 ,%7.5, and %1.07.

Conclusion

Our findings reveal that the allelic frequencies for CYP2C8 polymorphisms in the Saudi pediatric cohort are substantially elevated compared to those reported in other Asian populations. This suggests Saudis may experience more variable drug responses, especially for medications that undergo metabolism by the CYP2C8 enzyme, like ibuprofen. These insights could inform better dosing guidelines to improve drug safety and efficacy.

202194

Identification and validation of potential Plasmodium recombinant proteins as diagnostic tool

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Background

The development of accurate malaria diagnoses has gained more attention due to the significant number of deaths brought on by malaria each year. Plasmodium species are responsible for malaria infection, which is transmitted by mosquitoes of the Anopheles genus. P. falciparum, P. vivax, P. ovale, P. malaria, and P. knowlesi are the five human malaria species that cause acute to severe sickness, although P. falciparum is the most dangerous and lethal form of the parasite. Histidine-rich protein 2 (HRP2) and lactate dehydrogenase (LDH) are two antigens that have been performed inconsistently as rapid diagnostic tests (RDTs) for prior Plasmodium falciparum infections. The main benefit of using an RDT diagnostic test is that results could be obtained in approximately 20 minutes, and the test is also inexpensive and simple to use. However, the specificity, sensitivity, quantity of false positives, quantity of false negatives, and temperature tolerance of these tests vary greatly, highlighting the problems and limitations of currently used RDTs. The present study focused on providing more specific diagnostics for effective treatment by improving the genetic stability of the two proteins. Thus, we used PfHPRT instead of PfHRP2, which is known to be more genetically stable. As well as PLDH, that was modified to be more conserved across all malaria species.

Method

Proteins were cloned and then expressed using clear coli-competent cells. Production of the proteins were achieved in LB media, and purification was performed using affinity chromatography

Result

The proteins expression was confirmed by SDS-PAGE and Western Blotting

Conclusion

We achieved our goal of developing novel recombinant proteins, PfHRPT and PLDH5, that can be used as a promising diagnostic tool to detect malaria infections.

202195

The Impact of Midodrine Tapering Versus Nontapering Regimens on the Clinical Outcomes of Critically Ill Patients: A Retrospective Cohort Study

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Background

Midodrine has been used in the intensive care unit (ICU) setting to reduce the time to vasopressor discontinuation. The limited data supporting midodrine use have led to variability in the pattern of initiation and discontinuation of midodrine. The aim of this study is to compare the effectiveness and safety of 2 midodrine discontinuation regimens during weaning vasopressors in critically ill patients.

Method

A retrospective cohort study was conducted at King Abdulaziz Medical City. Included patients were adults admitted to ICU who received midodrine after being unable to be weaned from intravenous vasopressors for more than 24 hours. Patients were categorized into two subgroups depending on the pattern of midodrine discontinuation (tapered dosing regimen vs. nontapered regimen). The primary endpoint was the incidence of inotropes and vasopressors re-initiation after midodrine discontinuation.

Result

The incidence of inotropes or vasopressors' re-initiation after discontinuation of midodrine was lower in the tapering group (%15.4) compared with the non-tapering group (%40.7) in the crude analysis as well as regression analysis (odd ratio [OR] = %95 ;0.15 CI = 0.73 ,0.03, P = 0.02). The time required for the antihypertensive medication(s) initiation after midodrine discontinuation was longer in patients who had dose tapering (beta coefficient (%95 CI): ,0.95) 3.11 (5.28, P = 0.005). Moreover, inotrope or vasopressor requirement was lower 24 hours post midodrine initiation. In contrast, the two groups had no statistically significant differences in 30-day mortality, in-hospital mortality, or ICU length of stay.

Conclusion

These real-life data showed that tapering midodrine dosage before discontinuation in critically ill patients during weaning from vasopressor aids in reducing the frequency of inotrope or vasopressor re-initiation. Application of such a strategy might be a reasonable approach among ICU patients unless contraindicated.

202206

Irrational Use of Antibiotics among Children with Acute Respiratory Infections in Saudi Arabia: Clinical Assessment

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Background

Antimicrobial resistance (AMR) presents a serious global public health challenge, leading to heightened morbidity, mortality, and unsuccessful treatments due to infections from multidrug-resistant bacteria. The root cause of this resistance is often linked to the irrational use of antibiotics. Therefore, we aimed to assess the common clinical practices, diagnostic tools, and treatment management of acute respiratory infections (ARI) in children and when antibiotics are recommended and prescribed.

Method

A retrospective review of medical charts was carried out at King Salman Bin Abdulaziz Medical City (KSAMC) Hospital to assess pediatric patients diagnosed with ARI, aged 14-0 years, excluding those requiring antibiotics for conditions other than ARI. Data, including demographics and treatment details, were extracted from 285 selected patient records using consecutive sampling, and statistical analyses were conducted using Jamovi software.

Result

A total of 285 pediatric patients were included, with a median age of 3 (IQR=4.5) years and a male predominance of %59.2. Bronchopneumonia was the most common respiratory disease, diagnosed in %39.1 of participants. The median durations for illness and hospital admission were 4 and 3 days, respectively. Clinical evaluations showed an average respiratory rate of 10.5±28 breaths per minute and a mean oxygen saturation of %3.46±96.4 through pulse oximetry. Antibiotic usage was high at %92.98, with Glycopeptide antibiotics, specifically Vancomycin (%41.0), being the most frequently prescribed.

Conclusion

The high antibiotic usage rates among Saudi children with ARI emphasize the need for more stringent antibiotic stewardship programs, enhanced diagnostic precision, and provider education. As the global community struggles with the presence of antibiotic resistance, studies like ours underscore the urgent need for interventions to ensure antibiotics' rational and judicious use.

202208

Association between rhesus blood group and the clinical outcomes in critically ill patients with COVID-19: A Multicenter Cohort Study

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Background
There is increasing evidence that ABO blood type may contribute to the immunopathogenesis of COVID-19 infection. This study aims to assess the association between the rhesus blood in COVID-19 critically ill patients and their clinical outcomes.

Method
A multicenter retrospective cohort study was conducted in Saudi Arabia and involved adult COVID-19 patients admitted to Intensive Care Units between March 2020 ,1, and July 2021 ,31. Patients were categorized based on the rhesus blood group type (Positive versus Negative). The primary endpoint was hospital length of stay (LOS). Other endpoints were considered secondary.

Result
After propensity score matching (1:3 ratio), 212 patients were included in the final analysis. The hospital length of stay was longer in a negative rhesus blood group compared with patients in the positive rhesus group (beta coefficient (0.51 ,0.02) 0.26, p = 0.03). However, neither 30-day mortality (HR %95 ;0.28 CI 1.25 ,0.47, p = 0.28) nor in-hospital mortality (HR %95 ;0.74 CI 1.14 ,0.48, p = 0.17) reached statistical significance. Among the ABO types, the A+ blood group type had the higher proportion of thrombosis/ infarction and in-hospital mortality (%28.1 and %31.2, respectively).

Conclusion
Critically ill patients with a negative rhesus blood group type tend to have a longer hospital stay, while their mortality rates and complications during ICU stay are similar to patients with a positive rhesus blood group. These observations indicate that blood group type could potentially impact the prognosis of critically ill patients with COVID-19.

202214
Insights on Using Medications Containing Lactose in Lactose Intolerance Patients

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Background
Around %70 of the global population suffers from lactose intolerance (LI). Lactose is commonly used as an excipient in most medications, so it potentially exacerbates LI symptoms and complicates treatment for LI patients.

Method
A cross-sectional study targeted healthcare practitioners using online questionnaires to assess knowledge and experiences with LI patients and medications with lactose. In addition to a review of medication leaflets to assess lactose content present and amount.

Result

A total of 569 physicians, pharmacists, and dietitians participated in the study. Out of them, only %58 know about the presence of lactose as an excipient material in most drugs. 45 % do not think that using medication containing lactose could affect LI patients. Also, 635 medication leaflets were scanned for lactose content presence and amount. %50 of these medications contain lactose, and only 50 % of these drugs have specified the exact amount of lactose in their formulation.

Conclusion

Despite lactose being the most prevalent excipient ingredient in medications, a lack of knowledge among healthcare professionals about lactose as an excipient in medications and its impact on LI patients. Moreover, drug leaflets, as a primary source of drug content, lack transparency in determining the specific amount of lactose. Enhanced education among health practitioners on lactose-containing medications and the impact of using these medications for LI and related conditions is necessary. Moreover, facilitating finding this information on drug leaflets is required to avoid complications for LI patients.

202218

Clinical characteristics and outcomes of patients newly diagnosed with Hodgkin Lymphoma: A Multicenter Descriptive Cohort Study

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Background

Hodgkin Lymphoma (HL) is a prominent B-cell neoplasm, impacting global and Saudi populations, with nodular sclerosis being the most common subtype. Given limited large-scale studies focusing on HL in Saudi Arabia, this retrospective multicenter cohort study reviewed clinical outcomes and characteristics of Saudi HL patients.

Method

All adult patients newly diagnosed with HL at three local tertiary care hospitals from January 2016 to December 2021 were included. Patients were excluded if they were diagnosed with nodular lymphocyte-predominant HL, known to have liver cirrhosis, or received unknown chemotherapy regimens. Patient demographics, comorbidities, HL type and stage, treatment, and clinical outcomes were collected. Descriptive

data and statistical analyses were performed using SAS version 9.4.

Result

Out of 768 screened patients, 521 with classical Hodgkin lymphoma (cHL) were included. Most patients had nodular sclerosis histopathology (%82.2) and were in stage IV (%44.8). ABVD was the primary chemotherapy treatment for cHL patients (%86.2). Final-evaluation showed %84 of patients achieved complete response. The overall response rate was %90.4, with %84 in complete remission. During 12-month follow-up, %95.7 of patients were alive. Post initial chemotherapy, %10 of patients experienced bleomycin-induced pulmonary toxicity, and %27.2 were hospitalized within six months. Almost %18 of patients had relapsed/ refractory HL.

Conclusion

This national comprehensive study provides insights into the clinical features and outcomes of Saudi HL patients. The predominance of nodular sclerosis subtype and high response rates to ABVD chemotherapy align with global trends, emphasizing the effectiveness of standard treatments for HL in Saudi Arabia. Monitoring patients closely remains critical for managing side effects and enhancing patient outcomes.

202263

Diagnostic Stewardship Initiative for Urine Culture Ordering in Saudi Arabia

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Background

Urinary tract infections are common in healthcare settings. Positive urine culture is a powerful stimulus to prescribe unnecessary antibiotics, such as in asymptomatic bacteriuria (ASB), which lead to undesirable outcomes. Therefore, diagnostic stewardship is important to ensure that urine culture is appropriately requested, which promotes appropriate use of antibiotics, prevents antibiotic resistance, and costs labour.

Method

single-centre, quasi-experimental retrospective cohort study. Urine specimen requests before (August 2021–January 2022) and after (February 2022–July 2022) an intervention consisting of 1) development of an ASP-approved automated intervention using clinical decision support (CDS) in hospital information system for appropriate urine requests in the outpatient and inpatient settings and 2) development of the UTI program, which included, but was not limited to, appropriate urine request recommendations that

were disseminated to all healthcare providers. The primary outcomes measured were evaluating the impact of diagnostic stewardship in appropriate practice for ordering a urine sample. The secondary outcome is to assess the impact of this initiative on appropriate antibiotic use.

Result

A total of 5309 urine specimens were included in the analysis (pre-intervention, n = 2,273; post-intervention, n = 3,036). Appropriate practices for ordering a urine sample were (1194) %52.5 in the pre-intervention period and (1725) %57.8 in the post-intervention period (p = 0.002). In terms of appropriate antibiotic use, there was no statistically significant difference between the pre-intervention and post-intervention periods (p = 0.8)

Conclusion

The implementation of the diagnostic stewardship of urine culture ordering significantly improved the appropriate order of urine specimens, but it did not have any impact on reducing unnecessary antibiotic use. This may highlight the importance of implementing different strategies to avoid treatment for ASP, such as pharmacist intervention and healthcare provider education.

202264

A Multi-center Cohort Study of Esomeprazole versus Omeprazole Prophylaxis in Critically Ill Patients at High Risk for Stress Ulceration

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Background

Stress ulceration can be defined as extensive superficial erosions, which mainly affect the fundus and body of the stomach. Gastrointestinal bleeding (GIB) is the most frequent sign of stress ulcers, and GIB in critically ill patients leads to a higher fatality rate. Stress ulcer prophylaxis is the standard of care to prevent stress ulcer-related bleeding in critically ill patients at high-risk (e.g., Mechanical ventilation and coagulopathy). Proton pump inhibitors (PPIs) are superior to other agents in preventing GI bleeding. There is a lack of evidence of superiority among the PPI agents; therefore, we aimed to evaluate the effectiveness and safety between different PPI agents (i.e., Esomeprazole and Omeprazole) as SUP in critically ill patients.

Method

A multicenter retrospective cohort study of critically ill adult patients admitted to the ICUs at four centers between January 2018 ,1, and December 2021 ,31. Eligible patients were categorized into two sub-cohorts

based on the type of PPI agent as SUP (Esomeprazole versus Omeprazole). The primary outcome was the incidence of confirmed GI bleeding, while mortality, MV duration, ICU/hospital LOS, and complications during ICU stay were considered secondary outcomes. Propensity score (PS) matching was employed based on the patient's age, body mass index (BMI), APACHE II score, baseline INR, baseline total bilirubin, MV status within 24 hours of ICU admission, history of bleeding within six months prior to ICU admission, liver disease as comorbid conditions and the dosing of PPI as SUP prophylaxis. Multivariable logistic, Cox proportional hazards, and negative binomial regression analysis were utilized as appropriate.

Result

We screened 10507 critically ill patients; 5566 patients were eligible. After PS matching (1:3 ratio) based on the predefined criteria, the demographic variables (e.g., Age, BMI), severity scores (e.g., APACHE II, SOFA), MV status, and coagulation profile at admission were comparable between the groups. The incidence of confirmed GI was higher in patients who received Omeprazole than Esomeprazole as SUP (%7.3 versus %2.3; aOR: %95 ,3.34 CI: 5.57 ,1.99; p=0.01). Additionally, the MV duration and ICU LOS were significantly longer in the Omeprazole group versus esomeprazole (beta coefficient: %95 ,0.19 CI: 0.36 ,0.01; p=0.04, and beta coefficient: %95 ,0.48 CI: ,0.38 0.58; p=0.01). Patients who received Omeprazole as SUP had a higher 30-day and in-hospital mortality compared with Esomeprazole (HR: %95 ,1.49 CI: 1.75 ,1.27; p=0.01, and HR: %95 ,1.75 CI: 2.03 ,1.51; p=0.01, respectively).

Conclusion

Omeprazole use as SUP in critically ill was associated with a higher incidence of confirmed GI bleeding with increased MV duration and length of stay. Moreover, Omeprazole was associated with higher mortality rates. Further randomized control studies are needed to confirm these findings.

202274

Systematic Review and Meta-analysis of Individualized Enoxaparin Dose Optimization in Critically Ill Pediatrics

Renad Almutairi , Shaden Alotaibi , Anhar Almohsin , Mohammed Alshammari

Background

Critically ill pediatric patients face an increased risk of venous thromboembolism, and enoxaparin is commonly used for prophylaxis and treatment. However. optimal dosing in this population remains uncertain, and individualized dose optimization is seen as a promising approach. This systematic review aims

to refine dosing strategies in critically ill pediatric patients, with the goal of improving outcomes and reducing VTE and bleeding complications.

Method

The study followed PRISMA guidelines and employed a comprehensive search strategy using relevant MeSH terms and keywords. Data extraction and management were performed using standardized protocols. The quality of the included studies was assessed using appropriate tools. The statistical analysis was performed using R software (Version 4.3.0, Vienna, Austria) and RStudio interface (Version 2023.03.0, Boston, MA, USA).

Result

systematic review included 15 studies on individualized dosing strategies of enoxaparin in critically ill pediatric patients. The studies revealed variations in dosing strategies, including higher initial doses for neonates and infants. The administration route (IV or SC and dosing frequency were also explored, with some studies suggesting IV administration as an alternative to SC. Clinical outcomes such as time to therapeutic anti-Xa levels. bleeding events, side effects, and the development of venous thromboembolism were assessed. Anti-Xa level-directed dosing and weight-based dosing were found to yield optimal outcomes. Meta-analysis results showed low mortality rates. a low incidence of thrombotic events with therapeutic prophylactic doses, and a low frequency of bleeding events.

Conclusion

This systematic review reported that initial high dose of enoxaparin is required to achieve therapeutic levels. However, limited data regarding dose optimization of enoxaparin is available on critically ill pediatrics. Pharmacokinetic studies, therapeutic drug monitoring, and population pharmacokinetic modelling can guide personalized dosing decisions. The implementation of personalized dosing protocols in clinical practice has the potential to improve patient care, enhance safety, and optimize anticoagulation management in critically ill pediatrics. Further research including prospective studies and RCTs is essential to establish pediatric-specific dosing guidelines and target anti-factor Xa ranges for enoxaparin in critically ill pediatrics.

202316

Evaluating the Efficacy and Safety of Cyclophosphamide as Prephase Treatment in Aggressive Lymphomas: A Comprehensive Retrospective study in Saudi Arabia.

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Background

Cyclophosphamide is a chemotherapy drug frequently used as a prephase

treatment for aggressive lymphomas like diffuse large B-cell lymphoma (DLBCL) and Burkitt's lymphoma. Previous studies have shown its efficacy, but it is often associated with significant side effects. This study aims to evaluate the safety and efficacy of cyclophosphamide as a prephase treatment of lymphomas and to evaluate management and treatment factors as potential predictors of outcomes.

Method

This retrospective cohort study was conducted at King Abdullah Medical City (KAMC). It included adult patients treated with prephase cyclophosphamide from January 2015 to December 2022. Patients were selected using the electronic healthcare system, focusing on those over 18 who received prephase therapy. Key data collected included demographics, clinical information, treatment details, and outcomes.

Result

A total of 60 patients were included, making this the largest study of its kind globally. The findings demonstrated a high response rate and prolonged progression-free survival. The treatment was well-tolerated with a low incidence of serious side effects.

Conclusion

The use of cyclophosphamide as a prephase treatment for aggressive lymphomas in our study population is effective and safe. This contributes significantly to the global understanding of cyclophosphamide's role in treating aggressive lymphomas, highlighting its potential for broader application in diverse populations.

202331

Evaluation of Anidulafungin Standard Dosing in Critically Ill Obese Patients with Candidemia: Retrospective Cohort Study

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Background

Echinocandin antifungal drugs represent pivotal treatments for fungal infections due to their broad spectrum, favorable toxicity profile, and reduced drug interactions compared to azole antifungal drugs. Studies indicate that obese patients exhibit lower anidulafungin exposure due to physiological changes affecting anidulafungin's pharmacokinetic parameters, raising uncertainty about its impact on clinical outcomes for this demographic. This research aims to assess the clinical outcomes of critically ill obese patients undergoing anidulafungin standard dosing for candidemia.

Method
A retrospective cohort study conducted in Saudi Arabia from January 2018 to December 2021 categorized patients into obese (BMI >= 30 kg/m2) and normal-weight (BMI > 18 and < 25 kg/m2) groups. Inclusion criteria encompassed critically ill obese adults (≥ 18 years old) with candidemia receiving standard anidulafungin dosing (200 mg loading dose initially, followed by 100 mg daily). Exclusions comprised patients on combination antifungal therapy, anidulafungin for prophylaxis, high-dose anidulafungin (200 mg daily), or lacking adequate source control. The primary outcome measured was clinical cure, with secondary outcomes encompassing microbiological cure, mortality, infection recurrence, and hospital stay duration.

Result
127 patients were included (55 obese and 72 with normal body weight [NBW]). Despite similarities in comorbidities between obese and NBW patients—predominantly diabetes mellitus, hypertension, dyslipidemia, and chronic kidney disease—clinical cure rates were comparable between groups: %54 for both obese and NBW patients (p= 0.98).
Furthermore, microbiological cure, mortality, infection recurrence, and hospital stay length did not significantly differ between the two groups.

Conclusion
anidulafungin displayed similar clinical efficacy in treating candidiasis among obese critically ill patients and those with NBW. Further investigations with larger sample sizes are imperative to validate these findings.

202360
Identification of mutations, genotype-phenotype correlation of Autosomal recessive spastic ataxia of Charlevoix-Saguenay in Saudi families

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Background
Autosomal recessive spastic ataxia of Charlevoix-Saguenay (ARSACS) is a progressive hereditary disorder characterized by muscle movement abnormalities caused by bi-allelic mutations in the SACS gene impairing the function of sacsin. Sacsin is primarily found in cells in the brain, skin, and muscles used for movement. Here, we report the first nine affected individuals from three unrelated consanguineous Saudi families.

Method
We analyzed clinical manifestations and performed Whole exome sequencing (WES) to screen potential mutations within genomic DNA extracted from the proband.

Suspected mutation was validated by combining clinical condition and results of Sanger sequencing.

Result

We have investigated nine patients from three different consanguineous Saudi families. The affected individuals presented with pasticity, cerebellar ataxia, peripheral neuropathy, urinary tract problems, intellectual disability, hearing loss, and recurrent seizures. However, there was variability in the severity and progression of symptoms among the individuals. Genetic analyses using WES followed by Sanger sequence verification yielded four different novel variants in the SACS gene. Novel compound heterozygotes variants were identified in the affected in family 1; one of them is duplication variant (c.4274_4265dup10), causing truncating mutation (inherited from the father) the other is missense variant (c.8937G>C) (inherited from the mother). In family 2, a novel homozygous deletion variants (c.9564_9561del) was detected, whereas a novel homozygote missense variant (c.11978G>T) was found in family 3, for which their parents were both heterozygous carriers. These novel variants contribute to the pathogenic mechanisms underlying ARSACS.

Conclusion

This study represents the first report of ARSACS with SACS in Saudi Arabia with novel variants, highlighting the importance of genetic analysis to facilitate accurate diagnosis and management of patients with this disorder and facilitating genetic counseling and prenatal diagnosis for the affected families. Identifying novel and known SACS gene mutations expands our understanding of the genetic landscape of ARSACS.

202391

Unmasking Colistin Therapy for Urinary Tract Infections due to Multidrug-Resistant Bacteria: Experience at a Tertiary Academic Medical Centre

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Background

Colistin, a last-resort antibiotic for multi-drug resistant (MDR) bacteria-induced urinary tract infections (UTIs), which concentrates well in the urinary tract. Despite potential advantages, its use is constrained by a high nephrotoxicity risk affecting up to %60 of patients. We evaluated clinical outcomes in hospitalized patients treated with colistin for UTIs caused by MDR bacteria and identified nephrotoxicity risks.

Method

This retrospective study analyzed hospitalized patients at King Abdulaziz Medical City with MDR

bacteria induced UTIs treated with colistin. Primary outcomes included clinical failure (persistent/worsening symptoms or death), with secondary outcomes being microbiological failure (positive culture despite therapy) and nephrotoxicity (>26 mol/L increase in serum creatinine). SPSS was employed to analyze results, and logistic regression was performed to identify risk factors for nephrotoxicity.

Result

A total of 102 patients were included, of whom (%48) 49 had pyelonephritis, and (%51) 52 had complicated cystitis. The most commonly isolated microorganisms were carbapenem-resistant Klebsiella pneumoniae (CRKP) (%41.5) ,44, and Pseudomonas aeruginosa (%18.9) ,20. The mean duration of colistin therapy was 9.8 5.5 ± days and the mean total daily dose was 2 ± 4 mg/kg/day. Seventeen patients (%16.7) required ICU admission with average stay of 14 ± 17 days. The overall rate of clinical failure was (102/13) %12.7 and microbiological failure rate was (102/3) %2.9. The overall nephrotoxicity rate at end of colistin therapy was (93/17) %18.2, and in-hospital mortality rate was %13.7 (102/14). The only significant risk factor for nephrotoxicity was chronic kidney disease at baseline (odds ratio [OR] %95 ,9.17 confidence interval [CI] -2.32 36.2, p = 0.002).

Conclusion

Colistin for MDR UTIs was associated with improved clinical and microbiological outcomes, but high nephrotoxicity and mortality rates. Chronic kidney disease at baseline was a significant risk factor for nephrotoxicity. Colistin should be used with caution and close monitoring of renal function.

202432

Assessing Venous Thromboembolism Risk in Advanced HR+/HER2- Breast Cancer Patients Undergoing CDK6/4 Inhibitor Therapy

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Background

Breast cancer is considered to be one of the most common cancer incidences around the world and the leading cancer type in women in Saudi Arabia. Furthermore, invasive breast cancer patients are well known to have an increased risk of developing thromboembolic events including Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE). The aim of the study is to assess venous thromboembolism risk in advanced HR+/HER2- breast cancer patients taking CDK6/4 inhibitor therapy.

Method
This is a single-center retrospective study which was conducted at King Abdulaziz Medical City in Riyadh from January 2016 to December 2023. The primary outcome was to see the incidence of thrombotic events while using CDK6/4 inhibitors. The secondary outcomes include assessing the predictors of thrombosis in this population.

Result
A total of 110 individuals diagnosed with breast cancer were initially identified through the pharmacy database, with 95 patients ultimately included in the study (comprising %95 Palbociclib and %5 Abemaciclib). %96 of included patients were women while advanced stage breast cancer composed %85. Among these patients, (%19.5) 9 experienced thrombotic events; where %66 of these events were classified as DVT, while the remaining %34 were PE. Notably, all thrombotic events were observed in patients who had undergone palbociclib treatment. The analysis did not reveal any statistically significant associations between thrombosis and various potential predictors among these patients, including BMI >35, hemoglobin levels <10 mg/dl, a Khorana score >2, or age differences.

Conclusion
The risk of venous thromboembolism was consistent with the reported literature and clinical trials; however, further investigation is needed to assess the need for DVT/PT prophylaxis in this population.

202444
Characteristics of patients with recurrent Clostridioides difficile infection: who is at risk?

Raghad Alamri, Atheer Aldairem, Raghad Alenazi, Norah Alwehaiby.

Background
Clostridioides difficile infection (CDI) is a severe infectious diarrheal illness that can occur after antibiotic exposure. Recurrent CDI (rCDI) is an episode of CDI that occurs within 8 weeks of a previous episode. This study aims to evaluate the characteristics of patients with rCDI after oral vancomycin treatment. Identifying those patients may aid in treating and decreasing the incidence of recurrent CDI.

Method
This retrospective, propensity score-matched cohort study was conducted at King Abdulaziz Medical City. Propensity score matching was used to select control patients without rCDI with similar baseline characteristics. Logistic regression analysis was performed using SPSS to identify risk factors for rCDI.

Result
A total of 280 patients were included in the study, of whom (%50.7) 142

were included in the rCDI group, and 138 patients in the control group. The duration of vancomycin and concurrent metronidazole use were similar between the groups (3.7 ± 12.23 vs. 8.1 ± 12.6 days, p = 0.562; and %48.6 vs. %44.2, p = 0.472, respectively). The length of hospitalization and ICU stay were also similar (24 ± 48 vs. 50.6 ± 39.5 days, p = 0.255; and 32 ± 25.12 vs. 20 ± 19.66 days, p = 0.337, respectively). However, the rCDI group had a significantly higher rate of ICU admission (%29.6 vs. %42.8, p = 0.025). The results of the regression analysis showed that age, chronic kidney disease, being on antacids, and antibiotics use within 90 days were significantly associated with increased odds of rCDI.

Conclusion

This study found that age, chronic kidney disease, being on antacids, and antibiotics use within 90 days were significant risk factors for rCDI among patients treated with oral vancomycin. These findings suggest that patients with these characteristics may benefit from alternative treatment options, such as fidaxomicin, to prevent recurrence.

202448

The Utilization of Complementary and Alternative Medicine among Adults in Al Qassim Region, Saudi Arabia: A Cross Sectional Study

Maha Alyousef, Ghada Ben Salah, Maha Alyousef, Maryam Farooqui, Lama Alrasheede, Ray Alharbi, Shihana Alazzaz

Background

Complementary and alternative medicine (CAM) encompasses all forms of therapies that fall outside the mainstream of medical practice. Because previous surveys were limited and not generalizable, we estimated the prevalence, pattern and factors associated with use of CAM in the community.

Method

A cross-sectional survey was conducted among the adults resident at Al Qassim region (Center of Saudi Arabia). Data were collected using a selfadministered questionnaire adopted consisting of 28 items. All statistical analyses were conducted using R software.

Result

A total of 861 responses were received. CAM use was prevalent (%86.4). The most commonly CAM used were spiritual therapies; Quran recitation (%57), Prayer (%53), Honey and bee products (%53), Myrrh (%50), Zamzam water (%42), and Medicinal Herbs mix (%43). CAM practice was associated with gender (p=0.003), age, marital status, and monthly income (all p<0.001). Multivariable regression analysis showed that age ranges between 49-40 years, 59-50 years, and monthly income 10000-5000 were

significantly associated with higher CAM use ($p<0.05$). Recommendations by relatives and friends were reported as the main reason for CAM use (%35.8). The acute respiratory disorders (%60), abdominal pain (%38), and immune system boosting (%34) were the common causes for CAM use. More than half of participants (%69.3) were very satisfied with their CAM use. Individuals who are in stable relationships, not currently employed, and living comfortably on their monthly income may be more likely to experience greater satisfaction with their CAM therapies ($p<0.001$).

Conclusion

Overall, there is a high prevalence of CAM use in Al Qassim region and the most important predictors for CAM use were the age ranges 59-40 years and the comfortable socioeconomic situation. For people to make informed decisions on the use of CAM more research are needed to fully understand their mechanisms and identify which specific therapies are most effective for different health conditions.

202451

Impact of the Sequence of Sedatives and Antipsychotics Discontinuation in Mechanically Ventilated Patients

Reem Alshammari, Norah Bin Aydan, Mohammad Aljawadi, Mohammad Alarifi, Abdullah Alhammad

Background

Mechanical ventilation (MV) in critical care often involves a combination of sedatives and antipsychotics, with no standardized practices for discontinuation when used concomitantly. The purpose of this study is to evaluate the impact of discontinuation orders of sedatives and antipsychotics in MV patients on patient outcomes.

Method

A retrospective observational study was conducted between -2021 2023 in mixed adult ICUs including patients on MV for > 48 hours with concomitant sedative(s) and antipsychotic(s) for ≥ 24 hours. Exclusions comprised those with pre-ICU psychiatric/neurological conditions. Patients were categorized by the order of discontinuation of sedative(s) and antipsychotic(s) before MV extubation. The primary outcome was MV duration. Secondary outcomes: reintubation rate, length of stay, and mortality. Independent samples t-test was used to compare the continuous variables, whereas Chi-square and Fisher's Exact test were used for categorical variables Ethical approval was obtained.

Result

Among 1000 screened patients, 114 patients included (60 sedative-first, 54 antipsychotic-first). In both groups, the median age was 35 years, and the majority were male (%78 vs. %76). The median APACHE II scores were 21 vs.

18.5, and the lowest PaO2/FiO2 ratio during MV was 167 vs. 165. The median numbers of administered sedatives and antipsychotics were 3 and 1, respectively. Patients requiring NMBs during MV (%87 vs. %76), undergoing SBT (%33 vs. %32), undergoing SAT (%42 vs. %32), and testing positive for CAM-ICU during MV (%8 vs. %2). Both groups, showed no significant differences in MV duration (175 vs. 192 hours, P = 0.9), reintubation rate, ICU/ hospital length of stay, or mortality.

Conclusion

Discontinuation order of sedatives and antipsychotics did not substantially impact patient outcomes during MV, including duration and mortality. While suggesting that sequence may not be a critical factor, these findings warrant validation through larger-scale research, particularly in specific patient subgroups.

202466

Aminoglycoside/ Fluoroquinolone/ Colistin Combination Based Regimen versus Ceftazidime/ Avibactam or Ceftolozane/ Tazobactam for Treatment of Multidrug Resistant Pseudomonas aeruginosa Pneumonia.

Jinan Alhuwayshil, Hajar AlQahtani, Hessa Bin Hithlayn, Atheer Almutiri, Rema Alharbi, Shatha Alotaibi

Background

Development of multidrug resistant (MDR) strains of Pseudomonas aeruginosa (PSA) have made treatment with appropriate therapy challenging. Ceftolozane/tazobactam (C-T) and Ceftazidime/avibactam (CAZ-AVI) showed clinical efficacy in treatment of infections caused by MDR-PSA. The lack of local data describing efficacy of both agents compared to best available options impacted the ability to choose one over the other. This research aimed to compare clinical efficacy of C-T or CAZ-AVI vs aminoglycosides/ fluoroquinolones/ colistin (AMG/FLQs/ Colistin) based regimen in treatment of MDR-PSA pneumonia.

Method

This was a retrospective cohort study conducted from January 2018 until September 2023 at King Abdulaziz Medical City. Patients deemed to be eligible for inclusion if they were adults aged ≥ 18 with a diagnosis of MDR PSA pneumonia with microbiological findings of MDR and received appropriate antimicrobial therapy for ≥ 72 hours. Patients with life-threatening bacterial, fungal, and viral co-infection within 7 days pre and post onset of infection, were excluded from the study.

Result

A preliminary result of this research included 104 patients with MDR PSA pneumonia. The majority of patients were males (%55.7) with a median age of 66 years. The most common comorbidities were diabetes mellitus

and hypertension. Hospital-acquired pneumonia was the predominant type of pneumonia. Among those patients, 53 patients received AMG/ FLQs/ Colistin based regimen (Group 1), while the rest (N=51) received CAZ/ AVI or C-T based regimen (Group 2). In terms of clinical outcomes, group 1 had a clinical cure rate of %79.2, while group 2 had a slightly higher clinical cure rate of %82.4. The 30-day mortality rates were %20.8 and %15.7 for group 1 and 2 respectively.

Conclusion

Treatment with CAZ-AVI or CT compared to AMG/ FLQs/ Colistin based regimen for MDR-PSA pneumonia is associated with numerically higher clinical cure and lower 30 day mortality rates.

202476

Assessment of Native Myocardial T1 Mapping for Early Detection of Anthracycline-Induced Cardiotoxicity in Patients with Cancer; Systematic Review and Meta-Analysis

Amira Mohamed, Laila Elmancy, Sara Abulola, Sara Al-Qattan, Mohamed Ibrahim, Zaid Almaayah

Background

Anthracycline antibiotic is one of the most effective anti-tumor drugs used in the management of certain types of breast cancers, lymphomas and leukemias. However, anthracyclines induce a dose dependent cardiotoxicity that may progress to heart failure. Thus, the use of sensitive predictor of early cardiac dysfunction in patients treated with anthracyclines can help in early detection of subclinical cardiac dysfunction and help in initiating interventions to protect these patients. Among parameters of myocardial measure, cardiac magnetic resonance (CMR)–measured native myocardial T1 mapping is considered as a sensitive and an accurate quantitative measure of early subclinical cardiac changes, in particular cardiac inflammation and fibrosis. However, to understand the quality and the validity of the current evidence supporting the use of these measures in patients treated with anthracyclines, we aimed to conduct a systematic review of clinical studies of this measure to detect early myocardial changes in cancer patients treated with anthracyclines. The primary outcome was the level of T1 mapping.

Method

We performed fixed-effects meta-analyses and assessed certainty in effect estimates. Of the 1780 publications reviewed (till 2022), 23 papers were retrieved and 9 articles met the inclusion criteria.

Result

Our study showed that exposure to anthracycline was associated with a significant elevation of native myocardial T1 mapping from baseline

(%95 CI: -0.5802 to -0.1121; p = 0.0038) as well as compared to healthy control patients (%95 CI: 0.2925 to 0.7448; p < 0.0001). No significant publication bias was noted on assessment of funnel plot and Egger's test. According to the Q-test, there was no significant amount of heterogeneity in the included studies (I%0.0000 = ² versus healthy controls, and I%14.0666 = ² versus baseline).

Conclusion

Overall, our study suggests that native myocardial T1 mapping is useful for the detection of anthracycline-induced cardiotoxicity in patients with cancer.

202487

Comparison of three bags method Acetylcysteine versus two bags method Acetylcysteine for the treatment of acetaminophen toxicity: a systematic review and meta-analysis

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Background

Acetaminophen is generally considered safe when used as directed but taking it in high doses can cause serious liver damage, and in extreme cases, it can be fatal. In the United States, non-abusive use of paracetamol products leads to roughly 78,414 emergency room visits each year due to toxicity. To counteract the harmful effects of an overdose, N-acetylcysteine (NAC) is the preferred treatment to prevent liver damage. NAC has been traditionally given as a three-bag regimen, which comes with several drawbacks. The aim of this updated systematic review and meta-analysis is to rigorously assess the potential advantages of a two-bag N-acetylcysteine (NAC) dosing regimen over the conventional three-bag system in treating acetaminophen-induced liver toxicity. This comprehensive evaluation will cover a range of critical aspects, including the frequency and severity of gastrointestinal symptoms, the effectiveness of liver function restoration, the rate of anaphylactoid reactions associated with each methods.

Method

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The research team utilized the PubMed and Cochrane databases to perform a thorough and comprehensive search of relevant literature from the inception of these databases up until January 2023. The treatment effects were analyzed and presented as relative ratios (RR) along with %95 confidence intervals, and the data were combined using a random-effect model.

Result
A total of seven studies were included. The overall use of two-bag NAC was associated with lower anaphylactic reactions and gastrointestinal symptoms (P <0.05) compared to the three-bag method. The rate of liver toxicity resolution was the same between the two treatment groups.

Conclusion
Using two-bag NAC may be considered a safe and effective approach for acetaminophen toxicity. Anaphylactic reactions and gastrointestinal symptoms in this systematic review and meta-analysis appeared lower with the two-bag NAC method.

202506
Dual anti-platelet treatment in chronic coronary disease utilizing the CHADS-p2a2RC: a retrospective cohort study

Sohaib Murad, Rayan Wali, Saeed Alqahtani, Nayyra Fatani, Awattif Hafidh

Background
Evidence regarding the prolonged use of dual antiplatelet therapy (DAPT) beyond one year in high-risk patients following an acute coronary syndrome (ACS) is scarce. In a previous study, the decision to continue DAPT beyond one year was assessed by the CHADS-P2A2RC score. The aim of this project is to test the ability of the CHADS-P2A2RC risk score to identify patients in our institution whom prolonged DAPT may be indicated.

Method
This is a single-center, retrospective observational study of patients previously admitted with coronary artery disease to King Abdulaziz University Hospital, between January 2019 to December 2021. Patients were included if they were 18 years or older and had coronary angiography during the inclusion period. Our primary efficacy outcome was recurrent myocardial infarction (MI). Our primary safety outcome was bleeding. The CHADS-P2A2RC score was calculated for each patient. Binomial logistic regression was used to compare the recurrence of MI.

Result
A total of 459 patients were enrolled in the study, 172 patients met the inclusion criteria. There was no significant difference in the odds of recurrent MI between the patients who scored low to moderate CHADS-P2A2RC score compared to the patients who scored high (aOR %95 ,0.88 CI: 1.74-0.45). Patients who continued DAPT >1 year had 3.17 higher odds of recurrent MI compared to patients who continued DAPT for =< 1 year with adjustment to gender, A1c, and CHADS-P2A2RC score (aOR %95 ,3.17 CI: 6.21-1.61). The safety outcome of bleeding didn't occur in any patients in both groups.

Conclusion

The utilization of the CHADS-P2A2RC score to identify patients who may be at high risk for recurrent myocardial infarction and may benefit from prolonged DAPT is not clear.
The factors that lead clinicians to continue DAPT beyond one year need further investigation.

202507

Immune checkpoints, PDCD1 and CD48, predict relapse and survival in pediatric acute lymphoblastic leukemia

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Background

Dysregulation of immune checkpoints (ICPs) has been implicated in cancer progression and treatment resistance. Our study aimed to screen for dysregulated ICP genes that might be associated with cancer recurrence and survival in pediatric acute lymphoblastic leukemia (ALL) following a course of cancer treatment, providing insights into the underlying mechanism of ICP-driven therapy resistance and disease recurrence.

Method

51 ICP genomic data (gene expression, copy number alterations (CNAs), and mutation) and microRNA transcriptome Profiling of 133 patients with relapse information [relapse-free (n=29) and relapsed (n=104)] extracted from the Therapeutically Applicable Research to Generate Effective Treatments (TARGET) were examined in the study. Patient's t-test (p-value < 0.05) was used to identify significant genetic factors between relapse-free and relapsed patients. Free and overall survival analyses were performed using log-rank test (p-value < 0.05) based on patient gene expression profiles.

Result

PDCD1, PVR, CD70, and CD48 were significantly upregulated in relapsed patients compared with relapse-free patients. Individuals with high expression profiles of PDCD1 and CD48 at diagnosis were 1.71 and 1.47 more likely to relapse compared to individuals with low expression profiles, respectively. Furthermore, the upregulation of PDCD1 (P= 0.0004, HR= 1.972) and CD48 (P= 0.0344, HR= 1.533) significantly worsened patients' survival following treatment. 93 microRNAs were found significantly downregulated in the relapsed cohort compared to the relapse-free cohort. Among these microRNAs, let-7f-3-2p, miR-30b-3p, and miR-3-21p significantly influenced the recurrence and survival of ALL patients. In addition, let-7f-3-2p and miR-30b-3p had seeding regions for PDCD1, while miR-3-21p had a seeding region for CD48.

Conclusion

PDCD1 and CD48 can potentially be used as prognostic biomarkers for relapse risk and rationale for alternative therapeutic strategies. The upregulation of PDCD1 might be explained epigenetically by the downregulation of let-7f--2 3p and miR-30b-3p, whereas the upregulation of CD48 might be driven by the downregulation of miR-3-21p.

202535

Real-world retrospective study of the impact of the intravenous vs. subcutaneous insulin on the management of non-emergent hyperglycemia and emergency department (ED) length of stay (LOS)

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Background

Intravenous (IV) and subcutaneous (SQ) insulin are the two modalities of treating hyperglycemia in the ED. Despite published guidelines for the optimal selection of insulin therapy, there is no consensus on the necessity of ED glucose reduction for ED patients. AACE and ADA guidelines recommend administration of insulin therapy prior to discharge. Glycemic control remain one of the challenges for choosing insulin route of administration in the ED. In our experience this practice has been extrapolated to include provision of IV or SC first dose insulin in ED patients with hyperglycemia despite a lack of evidence in this patient population. The effect of a single IV vs. SC insulin dose administered in the ED prior to discharge home is unknown. Thus studies are needed to evaluate if IV insulin administration in the ED confers advantages over SC insulin administration in the ED.

Method

This retrospective cohort study conducted at the emergency medicine department at King Abdulaziz Medical City (KAMC) to compare length of stay and the rate of re-visits within 30 days between patients with hyperglycemia who received SC or IV insulin during ED visit.

Result

A total of 429 patients with an ED visit for hyperglycemia were included. ED treatment consisted of IV push (%37) vs. Subcutaneous (%63) insulin administration. ED LOS and number of administered unites were similar among patients received IV push or Subcutaneous (P = 0.16 & P = 0.25 respectively). Advanced age, obesity, worsening kidney function were associated with longer ED LOS. Further analysis will be conducted to gain insight into the number of received insulin units to the patient's weight.

Conclusion

Findings of this study suggest that the use of subcutaneous insulin administration may be considered an effective and safe approach for the management of non-emergent hyperglycemia in the ED.

202567

The differences between Teriflunomide and Dimethyl fumarate on the health-related quality of life for Relapsing-remitting Multiple Sclerosis) patients in Saudi Arabia

Khalid Alqahtani, Mohammad Muazen, Mohammed Ashrafulslam, Foziah Alshamrani , Dhafer Alshayban

Background

Multiple sclerosis (MS) is one of the chronic neurological conditions that affect many people in Saudi Arabia, resulting in a wide range of neurological impairment, leading to functional limitations and disability. Both the physical and mental burden of MS affect patients' health-related quality of life (HRQoL). Nevertheless, there is limited research conducted in Saudi Arabia to evaluate its effect on HRQoL.

Method

A cross-sectional study was conducted from November 2022 to April 2023 among 82 MS patients from King Fahd Hospital of University (KFHU), who are on either Teriflunomide or Dimethyl fumarate. The EQ-5D-5L questionnaire was used to attain the response. The participants were divided into two arms (Teriflunomide and Dimethyl fumarate) interviewed (face to face or by the phone) in Arabic, and their socio-demographic and clinical characteristics were obtained.

Result

Eighty-two RRMS patients were included in this study after applying inclusion and exclusion criteria. Among of them 28 male, 54 female and majority were aged >40 years. Nearly %43.9 of the participants were taking Teriflunomide and %56.1 of them were on Dimethyl fumarate. Health comparison was done by independent sample t- test after calculating the score from the five domains of the EQ-5D-5L questionnaire. There was no statistically significant difference observed in all the three health indicators (EQ Index, EQ Vas score and Years of suffering for MS disease) between the patients who were receiving Dimethyl fumarate or Teriflunomide. Although no statistical difference was realized, descriptive results showed that MS patients receiving Dimethyl fumarate medicine reported better health indicators compared with Teriflunomide.

Conclusion

RRMS was associated with a low physical and mental HRQoL for

patients taking either dimethyl fumarate or teriflunomide; however, patients on Dimethyl fumarate expressed a non-significant better quality of life. Further research is required to identify the gaps that can aid to improve the quality of life of patients of RRMS patients. This study can be utilized for developing effective intervention programs to improve MS related HRQoL among the Saudi population.

Social and behavioral sciences Professional

202150

Psychological Challenges in Saudi Arabian Prostate Cancer Patients: An Analysis of Depression, Anxiety, and Loneliness

Abdulrahman Hijri, Mazen Alaqil, Osama, Fahad Alzahrani.

Background
Prostate cancer is a significant health concern worldwide, and it can have a profound impact on a person's psychological well-being. Depression, anxiety, and loneliness are common psychological challenges that individuals with prostate cancer may experience. This study aimed to examine the prevalence and associated factors of depression, anxiety, and loneliness among Saudi Arabian prostate cancer patients.

Method
A cross-sectional study was conducted among 433 Saudi males aged 80-35, diagnosed with prostate cancer from February to March 2023. Data were collected using face-to-face interviews and structured questionnaires, including the Generalized Anxiety Disorder-2 (GAD-2) Scale, Patient Health Questionnaire (PHQ-2), and the Three-Item University of California, Los Angeles (UCLA) Loneliness Scale. Factors associated with these states include personal monthly income and employment status.

Result
The study included 433 prostate cancer patients, with a mean age of 46.8 years (SD=12), and %48.3 of them were older than 45 years, a significant proportion of the respondents suffered from depression (%30.5), anxiety (%31.2), and loneliness (%31.9). Furthermore this study demonstrates that patients who were single, divorced, or widowed, had lower education, and lower income reported higher levels of depression. For instance, %47.6 of single, %40 of divorced or widowed, and %31.8 of married patients reported depression. Similarly, %68.2 of uneducated patients and %33.3 of those with general education reported depression.

Conclusion
The findings underscore the importance of incorporating mental health support into comprehensive care for prostate cancer patients. The study also suggests that targeted mental health interventions can enhance the quality of life and treatment outcomes for prostate cancer patients in Saudi Arabia. Further research is needed to develop and evaluate these interventions.

202117

Patient Satisfaction toward discharged Pharmacy Services in a Tertiary Care Center in Jeddah, KSA

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Background

In today's healthcare, pharmacies play a crucial role in patient discharge, going beyond dispensing medication to ensuring patient understanding and adherence. This critical contribution significantly influences recovery and outcomes. Our study dives into this vital area, assessing patient satisfaction with discharged pharmacy services and uncovering key factors that impact their experience. It's a step towards enhancing care quality and patient well-being in the crucial post-discharge phase.

Method

This study was conducted at 800-bed tertiary care hospital in Jeddah, Saudi Arabia. Data collected via face-to-face interview by using validated questionnaire addressing patient counseling, pharmacist-patient relationship, and pharmacy location. The study population comprised 437 adult patients discharged from July to September 2023 and responded to a questionnaire. All statistical analyses were performed with SPSS version 26. logistic regression analysis was run to determine factors associated with patient satisfaction towards discharge pharmacy. p-value <0.05 was considered statistically significant.

Result

A total of 437 participants were included. The study revealed that %94 of patients were highly satisfied with pharmacist-patient relationship, while %86 expressed high satisfaction with patient counseling. Satisfaction with pharmacy location and waiting area was reported by %84 of patients. Logistic regression analysis further identified time-related factors as significant; patients with pharmacy visits under 10 minutes were 9.45 times more likely to report high satisfaction (Odds Ratio [OR] =,9.45 %95 CI: 36.8 – 2.43, p<0.05), and those with medium hospital stay had 0.31 times lower satisfaction odds (OR =%95 ,0.31 CI: 0.88 – 0.11, p<0.05). Demographic factors such as age, gender, and education level did not significantly influence satisfaction levels (p>0.05).

Conclusion

The study found high levels of patient satisfaction with discharge pharmacy services. Significant factors influencing this satisfaction included the duration of pharmacy visits and length of hospital stay. These findings underscore the importance of efficient and effective pharmacy services in enhancing patient satisfaction.

202097

Pediatric Physicians' and Pharmacists' Awareness About Monitoring Unbound Valproic Acid Concentration in Pediatric Patients with Hypoalbuminemia

Nada Safhi, Mayam Alharthy, Naji Alsulami

Background
Valproic acid (VPA) is a commonly used antiepileptic medication in pediatric patients with epilepsy and other neurologic disorders. However, VPA is highly bound to plasma proteins, particularly albumin, and changes in protein binding can lead to a discrepancy between the total concentration of VPA and the pharmacologically active free drug in the plasma. This puts patients with hypoalbuminemia at risk of altered drug pharmacokinetics and drug toxicity. This study aims to assess the awareness of pediatric physicians and pharmacists regarding the monitoring of unbound VPA concentrations in pediatric patients with hypoalbuminemia.

Method
A cross-sectional study was conducted in 2 healthcare institutions in Makkah, Saudi Arabia. An online questionnaire was distributed to the potential participants through a mobile-based application from 12th September 2023 to 23rd October 2023. The questionnaire consisted of two sections. The first section aimed to gather sociodemographic information and assessed the participants' knowledge regarding monitoring VPA levels. The second section focused on practice-related information.

Result
A total of 226 participants completed the survey. Only (%20) 45 were found to be aware of the relation between VPA blood level and albumin level. A statistically significant association between knowledge score toward VPA and age, gender, healthcare specialty and years of experience was found ($p = 0.019$; $p = 0.009$; $p < 0.001$ and $p = 0.001$; respectively). However, these factors were found to be not significantly associated with positive practice toward VPA.

Conclusion
This study highlights the importance of raising awareness and knowledge among physicians and pharmacists regarding the monitoring of unbound VPA in pediatric hypoalbuminemia patients. Further research on education about monitoring is warranted, which may help physicians make better decisions to improve clinical outcomes in patients with hypoalbuminemia and avoid VPA toxicity.

202086

Medication Errors in Secondary Care Hospitals in Kuwait: The Perspectives of Healthcare Professionals

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Background
Medication errors (MEs) are the most common cause of adverse drug events (ADEs) and one of the most encountered patient safety issues in clinical settings. This study aimed to determine the types of MEs in secondary care hospitals in Kuwait and identify their causes. Also, it sought to determine the existing system of error reporting in Kuwait and identify reporting barriers from the perspectives of healthcare professionals (HCPs).

Method
A descriptive cross-sectional study was conducted using a pre-tested self-administered questionnaire. Full-time physicians, pharmacists, and nurses (aged 21 years and older) working in secondary care governmental hospitals in Kuwait were considered eligible to participate in the study. Descriptive statistics and the Statistical Package for Social Science Software (SPSS), version 27 were used to analyze the data.

Result
A total of 215 HCPs were approached and asked to take part in the study, of which 208 agreed, giving a response rate of %96.7. Most HCPs (n = %62.0 ,129) reported that the most common type of ME is “prescribing error,” followed by “compliance error” (n = %39.9 ;83). Most HCPs thought that a high workload and lack of enough breaks (n = %61.5 ;128) were the most common causes of MEs, followed by miscommunication, either among medical staff or between staff and patients, which scored (n = ;89 %42.8) and (n = %39.4 ;82), respectively. In the past 12 months, %77.4 (n = 161) of HCPs reported that they did not fill out any ME incident reports. The lack of feedback (n = %31.3 ;65), as well as the length and complexity of the existing incident reporting forms (n = %30.3 ;63), were the major barriers against reporting any identified MEs.

Conclusion
MEs are common in secondary care hospitals in Kuwait and can be found at many stages of practice. HCPs suggested many strategies to help reduce MEs, including proper communication between HCPs; double-checking every step of the process before administering medications to patients; providing training to keep HCPs up to date on any new treatment guidelines, and computerizing the health system.

202074
Systemic Approach of Risk Assessment Elemental Impurities

Haya Alzeer, Ahmed Al-Ghusn, Yahya Al Shehry.

Background
Risk assessment of elemental impurities is a systematic approach consisting of questions cascade to ensure that pharmaceutical products are free of elemental impurities. These impurities could negatively affect health and safety. Pharmaceutical contraceptives are one of the sources that can cause chemical accumulation in the body, copper toxicity, and oxidative stress. Additionally, they may severely affect the gut and vaginal microbiomes and hepatic function. The statistical data indicated that the percentage of contraceptive users is increasing year by year. In addition, the elemental impurities can lead to various toxic effects. Therefore, elemental impurities in contraceptive drugs must be monitored and controlled. Using the International Council for Harmonization (ICH) guidelines, this study evaluates the hazard level of elemental impurities in combined oral contraceptives by following the risk assessment approach.

Method
Eleven drug products of the hormonal contraceptive class were selected for analysis. The sample was obtained from the local market. The analysis was performed using (ICP-MS). The analytical method, Sample and standard preparation, and instrument setup were conducted based on the US-Pharmacopeia chapter <233> Elemental Impurities—Procedures. The data was analyzed using Microsoft Power BI and Excel.

Result
Based on the test results, no elemental impurity concentration exceeded the ICH and USP daily exposure limits. However, elemental impurities belonging to class 1 or 2A have been found in tiny concentrations in some samples. For that, performing a risk assessment should be considered. Because these elements in class 1 and 2 are human toxicants. Thus, these elements require evaluation during the risk assessment across all potential sources of elemental impurities and routes of administration. Then, risk assessment outcomes will determine if they need further control.

Conclusion
The proposed risk assessment approach in oral contraceptive pills is a systemic process designed to support decision-makers in taking the required actions quickly and precisely.

202062
Challenges of Pharmacy Residency Program Publications from Residents and Preceptors' Prospective in Pediatric Oncology Hospital in a Developing Country

Faihan Alzabni, Sally Ellethy, Omnia Hassanien, Manal Zamzam

Background
Residency program in Children's Cancer Hospital-Egypt (CCHE) is the first ever accredited international

pharmacy practice residency program (IPPR) from American Society of Health System Pharmacist (ASHP). Pharmacy residency programs play a significant role in achieving the goal of highly qualified pharmacist. They give residents the chance to "conduct a practice-related project using effective project management skills" in order to be accredited by the American Society of Health-System Pharmacists (ASHP). The majority of these projects, despite the time and effort invested in them, are only presented at regional and national residency conferences and do not ultimately result in peer-reviewed publications.5 Recent studies show that pharmacy resident projects have low publication rates. The results of pharmacy residency publication barriers are mostly from studies that surveyed residents and directors in the United States, no studies were done in a developing country. Purpose: is to determine the challenges that are facing the pharmacy residents during project publication in CCHE among the graduated residents from 2019 till 2022.

Method

This was a cross-sectional questionnaire for pharmacy residents and pharmacy preceptors. A list of the graduated residents and the active preceptors was prepared in with the help of the residency program director and an online version was distributed among them.

Result

A significant barrier identified by half of the residents %50 was the challenge of completing the residency project within a year. Meanwhile, %41.7 pointed out the lack of allocated time for their projects, and for %33.3, writing the manuscript posed a challenge. The majority of the preceptors acknowledged the significance of the research project as a foundational learning opportunity that hones lifelong learning skills.

Conclusion

Residency program directors should work on providing more time for the residents to conduct their research project. Workshops on scientific writing may be a helpful tool to improve the residents' skills.

202008

Utilizing Artificial Intelligence (AI) to prioritize adult diabetic patients for medication adherence program

Mashael Almutairi, Yahya Bokairy, Maha Al Ammari , Renad alfawzan

Background

Adherence is considered the cornerstone for chronic disease management particularly when it comes to chronic diseases like diabetes mellitus. AI has shown promising results in measuring adherence levels, which in turn improves patients' outcomes, and lowering mortality and morbidity rates as well as reducing health care

costs. This study aimed to prioritize adult diabetic patients to be enrolled in medication adherence program by developing a prediction model using machine-learning technique and identify patients with high risk for non-adherence therefore can help health care providers to pritorized diabetic population with direct focus on their compliance

Method

This single-centered, cross-sectional study enrolled 109 diabetes patients and evaluated several factors that affected patients' adherence, classifying them into two groups: those who were adhering to their treatment regimens and those who were not. We used three different machine-learning algorithms: decision trees, support vector machines (SVMs), and logistic regression and evaluate performance for each model by measure area under the curve (AUC), accuracy, precision, recall and F1 score.

Result

109 patients participated in this study, 56 patients were labelled as compliance and 53 labelled as non-compliance. 16 variables were chosen as potential factors for modeling. The most significant factors that affect prediction of medication adherence include prior hospitalization for hypo- or hyperglycemia, usage of numerous medications, monthly income and presence of diabetic complication. The average accuracy and AUC of the three model was %68 with higher AUC was %72 in logistic regression.

Conclusion

This is a first study in Saudi Arabia that predict medication adherence for diabetic patients using machine learning algorithm .We developed three model with acceptable accuracy, which may establish a technical tool for individualized diabetes care, and leads to better patient outcomes.

201967

Parental Perception and Satisfaction of T1DM Management Among Children and Adolescents

Rasha Alradadi, Hamoud Alrashidi, Ibrahim Dighriri, Sarah Abu Sabir, Ghadeer Alshammari, Abdullah Alfutaiman, Shatha Almushhen

Background

The family is considered a significant resource to help children with self-management. Despite a lot of research studies show the importance of family support for diabetic management in children with T1D. There have been significantly less studies that assess the level of parental knowledge and their perception of the disease. The objective of the study is to evaluate parental knowledge, behavior, and perception of diabetes management in children and adolescents with T1DM.

Method
A qualitative study with one-to-one, semi-structured interviews for 45–20 minutes was conducted via phone by well-trained personnel. Appendix A included demographic questions about participants. Appendix B included 11-items questionnaire. Two researchers separately examined the data. Using the NVivo® programme, the researcher thematically examined the data. The major themes and underlying sub-themes were determined

Result
Theme 1: Role of Parents in T1DM. Some parents are entirely in charge of the management. One mother reported that she resigned from her job to be able to provide better care for her child with diabetes. Theme 2: Parent's Knowledge of T1DM The common theme was the poor diabetes education at diagnosis and follow up visits. Some parents had to look up the information from different resources including websites, social media, etc. Other parents reported having challenges with the carb counting. Theme 3: Parent's Perception of T1DM. Parents perceive diabetes as a disease that very difficult to deal with. Theme 4: Barriers to T1DM. lack of good communication and guidance on how to deal with the disease.

Conclusion
The top three sub-themes that were raised by parents: uncontrolled DM, lack of adequate supply, and poor education. So, It is crucial that Ministry of Health engages policymakers and health insurance providers in enhancing insurance coverage of diabetes management and make it more thorough including providing more formal diabetes education classes with specialized diabetes educator.

201964
Knowledge and practice of foot self-care among patients with diabetes attending primary healthcare centres in Kuwait: A cross-sectional study

Fatemah Alsaleh, Khaled AlBassam, Zahra Alsairafi and Abdallah Naser

Background
Diabetes mellitus (DM) is a major cause of morbidity and mortality worldwide. Many patients have one or more risk factors for diabetic foot diseases, such as diabetic peripheral neuropathy (DPN). Patients can overcome such complications through good knowledge and practice of foot self-care. This study aims to evaluate the knowledge and practice of foot care among DM patients and to identify those at risk for developing DPN.

Method
This is a cross-sectional study using a self-administered questionnaire. Adult patients with a diagnosis of DM for at

least 1 year were randomly selected. Data were analysed using SPSS, version 26.

Result

A total of 357 patients participated, giving a response rate of %87.3. Most patients (n = %79.3 ,283) showed good knowledge. In comparison, less than one-third of patients (n = %30.8 ,110) practiced good foot care. Approximately %17.4 of the patients had a higher risk of developing DPN. University students had lower odds of having good knowledge about foot care [OR: 0.19 (%95CI: 0.86–0.04)]. On the other hand, patients who reported having diabetes for a long duration (10 years and above) [OR: 1.88 (%95CI: 3.18–1.11)] and patients who did not have any other comorbidities [OR: 0.49 (%95CI: 0.90–0.26)] had higher odds of having good foot care knowledge. Patients who were on oral hypoglycaemic agents (OHAs) only had lower odds [OR: 0.63 (%95CI: –0.39 1.00)] of practicing good foot care. Patients who were using combination therapy with OHAs and insulin had a higher risk [OR: 2.67 (%95CI: 6.41–1.11)] of developing DPN. On the other hand, patients who reported that they did not have a previous history of a foot ulcer had a lower risk of developing DPN [OR: 0.21 (%95CI: 0.47–0.09)].

Conclusion

To improve the foot care knowledge and self-care practice of patients, healthcare providers (HCPs) need to support patients through educational programmes and appropriate training.

201953

Evaluation of Sleep Behavior and the Use of Sleep Aids among Adults Living in Saudi Arabia: A Cross Sectional Study

Nawaf Almutairi, Ahmed Aldhafiri, Mohammed Alharbi, Abdullah Alouf, Abdulaziz Hakeem, Abdulmalik Kattan, Fahad Alzahrani

Background

A negative attitude toward sleep has greatly affected sleep habits. In addition to contributing to physical and metabolic disorders, poor sleep quality may cause emotional disturbances. This study aimed to measure sleep behavior and factors contributing to poor sleep quality in the Madinah region, Saudi Arabia. We also assessed whether the use of sleeping aids improved people's sleep.

Method

Three hundred and ninety-nine adults in the Madinah region of Saudi Arabia participated in this cross-sectional study. Three data domains were collected using an online questionnaire between 30 January and 26 April 2022. In the first domain, the characteristics of participants were discussed. In the second domain, questions about sleep behavior were asked. In the

third domain, we examined the types, frequency, and impact of sleep aid use.

Result

Out of the 399 participants, 154 (%38.59) reported sleep problems. A total of %64.94 of the 154 participants blamed stress as the leading cause of their sleep disorders, and %74.68 of those with sleep problems reported reduced productivity. Among those who reported having sleep problems, %46.10 used sleep aids, with Panadol night (antihistamine) being the most used, %49.30, followed by Melatonin at %39.44. Sleep quality improved by %67.6 among those who used sleep aids. A total of %71.8 of the participants think it is not safe to use sleep aids in the long term.

Conclusion

Our findings suggest that sleep problems are a prevalent concern in Madinah, Saudi Arabia, and even though the use of sleep aids improved sleep quality, it should be considered an emerging and important public health objective in Saudi Arabia. Further studies are needed to evaluate sleep quality and the level of sleep aid usage among other Saudi Arabian regions.

201944

Exploring the effectiveness of pharmacy curriculum in Saudi Arabia in developing leadership skills among pharmacy students from their perspective: A mixed-methods study

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Background

Leadership is an important component of pharmacy education. Unlike US, there is a lack of literature focusing on leadership development among pharmacy students in KSA. This study aimed to identify strengths and limitations of pharmacy curriculum in KSA in order to improve the curriculum to better prepare pharmacy students to become effective leaders in healthcare profession.

Method

Mixed-methods research design was employed with a sequential exploratory design following IRB approval. Phase I: semi-structured interviews with student leaders of pharmacy student clubs/societies from different universities in KSA. Interviews were recorded, transcribed and analyzed using thematic analysis. Phase II: survey questionnaire to

collect data from a larger sample of pharmacy students and interns from different universities in KSA.

Result

Eleven eligible participants were interviewed. Thematic analysis generated 288 codes, categorized into 17 subthemes which were further categorized into five overarching themes: Leadership development and acquisition; skills and characteristics of effective leaders; challenges and support; personal growth and benefits of leadership; vision, goals and responsibilities of student leader. The findings informed the development of an online survey questionnaire which was completed by 484 students/ interns. Mixed opinions were received regarding whether the pharmacy curriculum/program is helping or has helped the respondents develop leadership skills, and whether the college has provided or is providing adequate support, resources or opportunities for development of leadership skills. Eighty-eight per cent of them requested that pharmacy curriculum in their college should include more courses or workshops focused on leadership development. They suggested several topics to include in these courses/workshops of which effective communication was the most prominent.

Conclusion

This study highlights that pharmacy students in KSA are aware that leadership is an important component of their professional development. They identified that the pharmacy curriculum in KSA needs to be revised in order to prepare students for leadership positions.

202200

Assessment of Nurses Knowledge and Behavior Towards Electronic Missing Medication Request in a Tertiary Care Hospital in Riyadh, Saudi Arabia

Haya AlMufrij, Shaima Alshareef, Asma Altoub, Mohammad Al Harbi, Saleh Alanazi

Background

Missing doses and delayed medication administration are frequently reported as medication errors that present a significant concern for patient safety. Our study aims to evaluate electronic medication requests, nurses' knowledge of it, and the associated factors with missing requests.

Method

Phase I: Retrospective review of electronic medication requests at King Abdulaziz Medical City- Central Region. Data were collected over three months, including all types of requests (Missing, PRN, Refill).
Phase II: An electronic questionnaire was distributed for all inpatient nurses using multiple questions employing scenarios to assess nurses' knowledge of requests utilization.

Chi-square test was used to compare categorical data and a multivariable logistic regression to assess the predictors for missing requests.

Result

Out of 97663 electronic requests, 4817 (%4.9) were missing, antimicrobials being the most common category with 2232 requests (%46.34). Requests during the day and evening shifts were 1.68 (%95 CI: 1.82 -1.55, p=0.022) and 1.51 (%95 CI: 1.74 -1.38, p=0.012) times more likely to be missing compared to the night shift. Batch and compounding medications were 0.43 times less likely to be missing than non-formulary medications (%95 CI: 0.68 -0.39, p=0.021). Out of 362 nurses surveyed, (%90.6) 328 were females, mean age of 8.1±37.7 years, and (%61) 223 had more than five years of experience. Of all participants, (%57.5) 208 had good knowledge of electronic requests. Fewer participants identified the two appropriate scenarios for missing request, (%61.0) 221 and (%53.0) 192, compared to Refill (%82.6) 299 and PRN (%75.4) 273 requests.

Conclusion

The high percentage of missing requests in our study could be correlated with nursing knowledge. Factors associated with increased risk of missing requests were working shifts, type of the supply and non-formulary items. This study will serve to guide the identification of the source of system defects in the workflow.

202167

Satisfaction Toward Virtual Pharmacist-led Clinic in Renal Transplant Recipients: A Cross-Sectional Study

Njood Alsuhaibani, Aziza Ajlan, Roaa Algain, Nasser Alrubayan, Tamadhor Abu-Riash

Background

Solid organ transplant patients require lifelong monitoring and follow-up with the medical team. Coronavirus Disease 2019 (COVID-19) pandemic has necessitated the development of telemedicine strategies, including pharmacy-led virtual clinics. This study aims to assess renal transplant patients' satisfaction with the pharmacy counseling virtual clinic, identify barriers, and assess patients' medication adherence.

Method

This is a single-center, cross-sectional study conducted over one year in the ambulatory care setting (RAC #222118). Post-renal transplant patients ≥ 18 years were eligible for the study, and verbal consent was obtained. The primary outcome was to assess patients' satisfaction with the pharmacy counseling virtual clinic using the Short Assessment of Patient Satisfaction (SAPS) survey. It consists of seven questions, each scored from 0 to 4. A score of 0 to 10 indicates the patient is very dissatisfied, 18–11 dissatisfied, 26–19 satisfied, and 28–27 very satisfied. The

secondary outcomes were identifying the barriers to the virtual clinic and evaluating the patient's medication adherence using Medication Morisky Adherence Scale (MMAS-8). MMAS-8 categorizes patients into three adherence groups: high (score of 8), medium (7-6), or low (<6).

Result

A total of 150 participants were enrolled in the study (Oct 2022 to Feb 2023). The overall patient satisfaction score was 26.51 out of 28, indicating a high satisfaction rate. Pharmacists have identified several barriers to the virtual clinic implementation including technical difficulties, lack of patient understanding about service scope, and scheduling conflicts with pharmacist workflow. According to MMAS-%78 ,8 of the patients had high adherence scores (8), %17.33 medium (7-6), and %4.66 low score (<6).

Conclusion

Overall, patients were highly satisfied with the pharmacy counseling virtual clinic. They found the service to be convenient and accessible. Generally, virtual pharmacy counseling clinic is a valuable addition to the healthcare paradigm and supports improving the patient's experience.

202542

Assessment of Antimicrobial Stewardship in Pediatric Oncology: A Knowledge, Attitude, and Practice Survey

Bandar Al Shammari, Mohamed Nagy, Dalia Makhlouf, Omnial Hassanien, Lobna Shalaby

Background

Infections present a significant risk to pediatric oncology patients, increasing their morbidity and mortality rates. Antimicrobial stewardship programs (ASPs) play a crucial role in effectively managing infections and improving patient outcomes. This study aimed to assess the knowledge, attitudes, and practices of healthcare workers towards the implemented antimicrobial stewardship program in a pediatric oncology hospital.

Method

A cross-sectional survey was conducted among practicing pharmacists and physicians at the Children's Cancer Hospital Egypt 57357 (CCHE). The survey evaluated participants' understanding of antimicrobial resistance, attitudes towards stewardship, and adherence to hospital guidelines on antibiotic use. Reliability analysis was performed to assess the internal consistency of the survey.

Result

The study included 170 healthcare workers, predominantly female pharmacists aged between -26 35 years. The findings revealed that the majority of respondents exhibited confidence in various aspects of antibiotic usage, including appropriate initiation of antibiotics,

accurate dosing and interval selection for different infection sites, dose adjustments based on hepatic or renal dysfunction, utilization of local resistance patterns for therapy guidance, interpretation of susceptibility testing, de-escalation of therapy based on clinical response, and determination of the optimal duration of therapy.

Conclusion

This study emphasizes the significance of antimicrobial stewardship in pediatric oncology and provides valuable insights into the knowledge, attitudes, and practices of healthcare professionals. Further research is warranted to explore the effectiveness of stewardship programs in enhancing patient care and mitigating antibiotic resistance within this specific patient population

202361

Assessing Antibiotic Prescribing Patterns in Private Outpatient Settings: A WHO AWaRe Classification Analysis in a Jeddah Polyclinic.

Sana AlWafai, Esraa Alwafai, Husam althobiti

Background

Antibiotic resistance, a global concern, is exacerbated by misuse. However, understanding antibiotic prescription patterns in outpatient settings for privately insured patients in Saudi Arabia remains limited. This study examines such patterns using the WHO AWaRe classification.

Method

This cross-sectional study over nine months (January to September 2023), 389 antibiotic prescriptions were retrospectively analyzed from outpatient clinics and the emergency department of a Jeddah polyclinic. Descriptive analysis Were used, WHO AWaRe classification guided the assessment.

Result

Among the prescriptions, %53.7 fell under the “Watch” category, while %46.3 were in the “Access” category. Certain departments, such as dental, gastroenterology, and general surgery, exclusively prescribed “Access” category antibiotics (%100 of their prescriptions), with endocrinology at %66.7. The pulmonary department predominantly prescribed “Watch” category antibiotics (%100). The emergency department had %71.7 in the “Watch” category and %28.3 in the “Access” category. Commonly prescribed antibiotics included Amoxicillin/Clavulanic Acid (%31.1) and Azithromycin (%16.2). Overall, a recurring trend emerged, indicating a higher percentage of “Watch” category prescriptions across specialties compared to the “Access” category.

Conclusion

The study reveals a prevalent use of

antibiotics in the Watch category, highlighting the need for monitoring and regulating outpatient antibiotic prescriptions. Understanding specialty-specific prescribing patterns can inform targeted interventions to promote judicious antibiotic use and curb the escalating threat of antibiotic resistance.

202306
Using Pharmacy Value Added Services (VAS) to Collect Repeat Medications

GAITHERY JAGADESON

Background
Pharmacy Value Added Services (VAS) facilitate the collection of repeat medications at outpatient pharmacy departments (OPD) of Malaysian Hospital Pharmacy Department. Two new VAS innovation, namely Scan and Collect which is drive through pharmacy, and Medication Home Delivery were introduced in National Heart Centre Malaysia (IJN) in April 2019 to increase the uptake of VAS, which had reached a state or level of little growth. The objective of this study was to determine the awareness and perception regarding these two new VAS variants among eligible patients who were not using the services six months post-introduced.

Method
This cross-sectional study entailed distribution of self-administered questionnaires to patients collecting their repeat medications at OPD, IJN between October and December 2020. The VAS studied were (1) Drive through pharmacy and (2) Medication home delivery, both introduced in April 2018. It Included patients had partial medication supply, literate, and not using both services. Respondents' demographic data, experience in collecting medication, awareness towards current and new VAS, as well as perception and likelihood to adopt new VAS were collected.

Result
A total of 167 usable responses were analyzed. Demographic characteristics were balanced. Lack of parking space was the main problem faced in collecting medications (n=126). One-third were current VAS users, and %46 (n=76) had heard about the new VAS variants, mainly from pharmacy staff (n=63). Service uptake was mainly hampered by the lack of understanding on how to use the service (n=52). Respondents largely perceived novel VAS as time-saving and convenient but remained neutral on the ease of use of these services. High likelihood (%60) to adopt both services were demonstrated. Diversifying avenues of service promotion and increasing ease of use may improve service uptake.

Conclusion
Pharmacy users mostly have positive perceptions of new VAS introduced

but awareness of the service can be improved. Thus, efforts should be concentrated on ratification of identified barriers to improve service uptake.

202293

The Challenges Facing Saudi National Pharmacists in Community Pharmacies in Riyadh, Saudi Arabia – Qualitative Study

Amjad Alsaeed, Hind Almodiemeigh, Lama Alrasheed, Ruba Alsmari

Background
The evolving landscape of healthcare in Saudi Arabia, driven by Vision 2030, has transformed community pharmacies into crucial primary healthcare providers. This study explores challenges encountered by Saudi national pharmacists in fulfilling expanded roles within this changing environment.

Method
A qualitative, cross-sectional design was employed, utilizing focused group discussions with national pharmacists across Saudi Arabia. Interviews were conducted virtually, addressing perceptions, experiences, and challenges. Interpretative Phenomenological Analysis (IPA) was employed for data analysis.

Result
Three super-ordinate themes emerged: (i) Role of Pharmacists and Practices, covering diverse services provided and challenges in current practices; (ii) Challenges and Obstacles, encompassing limited public awareness, workload issues, burnout, and cultural challenges; and (iii) Motivators of Change, identifying key factors for improving the sector, such as work environments, compensation, and collaboration. The study highlights the expanding roles of community pharmacists beyond dispensing, emphasizing their involvement in patient education and complex healthcare issues. Challenges include public misconceptions, dispensing without prescriptions, and time constraints. Work-related stress, burnout, and cultural challenges persist, necessitating a supportive environment. Motivators for change include conducive work environments, competitive compensation, efficient task delegation, and collaboration platforms.

Conclusion
As Vision 2030 transforms healthcare, addressing challenges and embracing motivators is crucial for revitalizing the community pharmacy sector. Standardized roles, public education, effective regulation, and supportive workplaces are essential. These findings contribute to shaping Saudi Arabia's community pharmacy sector during this transformative phase in the healthcare system.

202290

Patients' Satisfaction with Medication Delivery Pharmacy Services in a Tertiary Hospital in Asir, Saudi Arabia: A Cross-Sectional Study

Amaal Alshahrani, Ibrahim Dighriri

Background
Medication adherence remains a challenge, with a significant percentage of patients discontinuing their medications. Value-added services (VASs), such as medication delivery, have been introduced to enhance pharmacy services and medication adherence.

Method
A cross-sectional survey assessed patient satisfaction with a new pharmacy delivery service between January 2023 and March 2023. The target population consisted of adult patients who had used the pharmacy delivery service for at least one month. The survey contained 23 Likert scale questions assessing satisfaction across three domains: delivery process/personnel, medication quality, and pharmacist adherence to best practices.

Result
A total of 110 patients responded to the survey, 383 invited patients; the mean age was 15.3 ± 51.2, and most were male (%83.6) 92, married 97 (%88.2), and living in urban areas (%57.3) 63. The overall satisfaction rate was (%88.1) 97, with (%60.9) 67 reporting satisfaction with the medication delivery service. On the delivery process/personnel items, over half strongly agreed that the delivery person called before arriving (%53.6) 59, medications were received on time (%51.8) 58, and the delivery person was polite (%58.2) 64. Most strongly agreed that the service helped with adherence (%63.6) 70 and saved travel costs (%65.5) 72 for medication-quality items. Most also strongly agreed that medications were properly packaged (%59.1) 65 and labeled (%64.5) 71. Regarding pharmacist practices, approximately (%50.9) 56 strongly agreed that the pharmacist provided education materials, inquired about adherence (%44.5) 49, and was respectful 55 (%50). Bivariate analyses found no significant associations between satisfaction and age, gender, residence, education, marital status, income, or disease (all $p > 0.05$). Satisfaction remained uniformly high across subgroups.

Conclusion
The medication delivery service demonstrated excellent patient reception regardless of its characteristics. Overall satisfaction with these services was high. There was no association between sociodemographic characteristics and the level of satisfaction.

202282

Implementation Status and Challenges Associated with Implementation of the Targeted Medication Safety Best Practices in a Tertiary Hospital

Hamzah Alothmany, Douha Bannan

Background

The Institute for Safe Medication Practices (ISMP) is a well-known non-profit organization dedicated to preventing medication errors. Every two years they publish best practices that can reduce the occurrence of medication errors. We aimed to evaluate the implementation status of these best practices and understand barriers associated with non-implementation at a tertiary hospital in Jeddah.

Method

A two-phase qualitative study. First, a survey consisting of the ISMP best practices was sent to employees (mainly heads of departments) to fill out the implementation rate for each best practice. Then an interview or a focus group was conducted to validate their answers and understand why some best practices were not implemented.

Result

Highest implemented best practices included: having strategies to improve safety with high-alert medications (best practice #%85.7 ,19), having antidotes and reversal agents readily available (best practice #%75 ,9), independent verification of sterile preparation (best practice #%75 ,11), and limiting the number of removable medications from the automated dispensing unit by override (best practice #%75 ,16). The least implemented best practices were ensuring that oral liquid medications are dispensed in a syringe (best practice #%12.5 ,4), maximizing use of barcode verification (best practice #,18 %12.5), purchasing oral liquid dosing devices that display metric scale (best practice #%25 ,5), eliminating glacial acetic acid from all areas of the hospital (best practice #,6 %28.6), and eliminating all 1,000 mL of sterile water from all areas outside of the pharmacy (best practice #%28.6 ,10). Challenges associated with implementation were related to knowledge, motivation, and opportunity in the environment, with the latter being the highest barrier associated with non-implementation.

Conclusion

Healthcare providers need to have knowledge about the best practices and the rationale behind them, the motivation to perform them, and the necessary resources to implement the best practices in their hospital

202262

Modeling Outpatient Pharmacy Operation through Artificial Intelligence (AI): Decision Support Model

Najah Alanazi, Mohammad Alawagi, Roaa Algain, Fahad Alsahli, Hazzaa Alghamdi, Rania Aljaber, Ahmad Abusalah, Abdullah Aleissa, Abdulrazag Aljazairi.

Background

There are numerous attempts by healthcare institutions to cope with the pressure of improving patient flow. Healthcare authorities have applied artificial intelligence (AI) to address patient flow problems in different settings. To our knowledge, no study has examined the impact of forecasting prescription numbers in outpatient pharmacies. This study aimed to assess the validity of the AI predication model in forecasting prescription numbers in ambulatory care pharmacies. Thus, to improve pharmacy operational outcomes, patient experience and care.

Method

This was a retrospective cohort study, conducted at King Faisal Specialist Hospital and Research Centre in Riyadh, Saudi Arabia. Ambulatory care pharmacies serving ≥ 500 patients per day were included. The primary outcome was to validate the AI predication model. Secondary outcomes were to assess the impact of the AI predication model on changes in average waiting time, and patient satisfaction score. The reliability of the AI predication model was assessed by an %80 accuracy of the total forecasted prescription numbers over one year (excluding weekends and seasonal holidays). Hence, if the difference between the forecasted and actual prescription numbers is ≥%80, this will be reported as "within range". Correlation between the actual numbers and the AI predication model was examined by using Cohen kappa.

Result

Two large ambulatory care pharmacies were included namely Outpatient Pharmacy and North Tower pharmacy. For both pharmacies, total of 256 working days were reported. Outpatient pharmacy predictions were mostly within the range, %84.4. In North Tower Pharmacy, %83.6 of predictions fell within the range. Analyses of secondary outcomes are on-going and will be presented in the poster.

Conclusion

The developed AI prediction model achieved more than %80 accuracy. Our study findings is shedding new light on the importance of artificial intelligence in improving pharmacy operational efficiency and patient care in the ambulatory care setting.

202247

Assessing the knowledge, perception and practices of physicians and pharmacists towards medication reconciliation in a referral Hospital in Oman: a cross-sectional study

Iman Al Dhawyani, Saoud Al Ghafri, Rahma Al Ghadani, Saif Al Hamrashdi, Jamila Al Jaafari

Background:
Medication reconciliation is an important method in clinical settings that helps reducing medication errors and adverse events. Medication reconciliation is a shared process between healthcare providers and patients that includes attaining the best possible medication history on patient admission and integrating it with the physicians' prescriptions to ensure communication of complete and correct medication information on admission, transfer and discharge. The aim is to detect, record and dispute discrepancies with the prescribing physician and make proper modifications if required to ensure patient safety. Medication errors happening at points of transition in care can be caused by discrepancies whether intentional or non-intentional and may include omissions, duplications, dosing errors, different medication and so on, which may negatively affect patient safety and clinical outcomes. Objectives of this study are to assess the knowledge, perception and practices towards medication reconciliation and its related policies among physicians and pharmacists in governmental hospitals in Oman and identifying potential obstacles that prevent the successful implementation of Medication reconciliation.

Method:
The study tool was a self-administered questionnaire adapted from the ISMP survey and from a previously published study consisting of 29 questions to assess knowledge (three questions), perceptions (four questions), practices (nine questions), policies (four questions) and to collect demographic data (eight questions). The questionnaire also included one open-ended question to capture any additional comments from the participants and was distributed in English. Minor format changes were made to improve clarity of some questions without changing their essence.

Result:
Out of the 240 surveys that were distributed, 126 were filled out, consisting of 103 responses from physicians and 23 from pharmacists, resulting in a response rate of %52.5. The survey results revealed that the majority of participants were familiar with the term Medication Reconciliation, with 83 participants (%65.9) indicating their awareness. Notably, a higher percentage of pharmacists (%87) were aware of Medication Reconciliation compared to physicians (%61.2), however, there was no significant difference among participants from different clinical departments.
A significant portion of the participants considered Medication Reconciliation to be a valuable process for enhancing patient safety.

Nevertheless, there was a noticeable contrast in the level of awareness of Medication Reconciliation policies within their respective institution, with more pharmacists (%69.6) being aware of such policies compared to physicians (%19.4), and this difference was highly significant ($p<0.001$). Additionally, the majority of participants (117 ,%92.9 out of 126) reported asking patients for a current list of medications upon their arrival in their service, with no significant difference between physicians and pharmacists. Interestingly, a small number of pharmacists reported rarely or never asking for this information (%13 vs. %5.8 of physicians). Likewise, when it came to providing an updated medication list upon discharge, a greater proportion of pharmacists (%69.6) exceeded the number of physicians (%59.2). These findings were consistent with the perception that participants had of physicians being primarily responsible for various aspects of Medication Reconciliation.

Conclusion:
In conclusion, this study revealed that there was a low level of awareness among physicians and pharmacists regarding hospital Medication Reconciliation policies, despite a general recognition of the value of Medication Reconciliation. Physicians appeared to be the primary healthcare providers responsible for and involved in the Medication Reconciliation process, possibly driven by the policies that placed them at the core of this process. These findings suggest the need to expand existing

202243
Perceptions of young people regarding pharmaceutical care provided by pharmacists

Mohammed Almunef

Background
According to recent literature, the prevalence and incidence of long-term illnesses in young people have substantially risen over the past 13 years. Recent figures indicate that, in England, %4.10 of all prescriptions were prescribed for young people. More than 45 million prescriptions were dispensed to young people in 2017 by pharmacists. The aim of this study was to investigate young people's perspectives on the pharmaceutical services that are provided by primary care pharmacists relating to medication.

Method
A cross-sectional survey was conducted. The population for this survey was young people from ages 18 to 24 years registered as students at a UK university. The survey consisted of twenty-four questions and they were a mix of closed-ended and open-ended questions. This research gained ethical approval from Ethics Committee at the same university.

Result

A total of 210 survey responses were returned. The number of people who initially received the survey is unknown. As a result of this, the response rates could not be performed due to the nature of the distribution. Most of the participants were female (%62.38). The most frequent age was 18 years (%35.24). Among participants, %15.70 were diagnosed with long-term illnesses and the majority of them (%33.33) were diagnosed with respiratory disease all of which was reported as asthma. Pharmacists were not utilised as a source of information for young people whereas the majority (%60.60) obtained information from their doctors. Most of the participants (%96.97) had not taken part in an MUR or NMS and %78.79 of them had never been told about any services or support groups by their pharmacist.

Conclusion

There is a lack of provision of pharmaceutical services and support by primary care pharmacists for young people with long-term illnesses. Further research will enhance understanding of the perceptions of young people about the pharmaceutical services that are offered by primary care pharmacists concerning medications.

202312

Empowering Healthcare Entrepreneurs: Analyzing Facilitators and Barriers in the Saudi Arabia

Saud Alhilaly, Rahaf Ali , Taef Alharbi , Khaled Aljouni , Naif aljehani , Refal Fagieha , Mohammed alnuhait

Background

Entrepreneurship within the healthcare sector is an emerging focus in Saudi Arabia, pivotal for advancing healthcare services and fostering innovation. However, there exists a gap in understanding the entrepreneurial mindset among healthcare providers in the region. This study seeks to explore the enablers and barriers faced by healthcare providers in Saudi Arabia when engaging in entrepreneurial activities. The primary aim is to identify key factors that motivate or hinder healthcare professionals from pursuing entrepreneurial ventures.

Method

The methodology involves conducting a comprehensive cross-sectional survey targeting healthcare providers across various disciplines in Saudi Arabia. Ethical approval for the survey was secured, ensuring participant confidentiality and voluntary participation.

Result

A total of 435 healthcare providers participated in the study, offering

valuable insights into the state of entrepreneurship within the Saudi healthcare sector. The findings revealed that a significant %64 of participants had never engaged in entrepreneurial activities within healthcare. Furthermore, nearly half (%47) of the respondents were not familiar with basic entrepreneurship terms and concepts, indicating a knowledge gap in this area. A striking %93 reported that they had never started a healthcare-related business, reflecting a low rate of entrepreneurial initiation among these professionals. Additionally, %63 of the healthcare providers identified inadequate entrepreneurial education and training as a key barrier to pursuing entrepreneurship. These results highlight both the challenges and the potential areas of focus for fostering a more robust entrepreneurial culture in the healthcare sector in Saudi Arabia.

Conclusion

The findings underscore the importance of creating a supportive ecosystem for healthcare entrepreneurship in Saudi Arabia. This includes enhancing educational initiatives focused on business skills for healthcare professionals, streamlining regulatory processes, and increasing access to start-up capital. Addressing these areas could significantly catalyze entrepreneurial activity in healthcare, ultimately contributing to the advancement of the healthcare system in Saudi Arabia.

202337

Evaluating the Impact of Clinical Pharmacy Unit in Mubarak Al-Kabeer Hospital in Detecting Drug-Related Problems

Hailah Aldosari, Salah Waheedi, Mohammad Taher, Aisha Al-Janaee

Background

Drug-related problems can occur when medication therapy is used inappropriately, such as adverse drug reactions, drug-drug interactions, overdose, or noncompliance. Clinical pharmacists play an important role in identifying and resolving DRPs and optimizing medication therapy.
The study aims to evaluate the effectiveness of implementing clinical pharmacy services in identifying drug-related problems, and to explore the acceptance rate by physicians of the recommendations made by clinical pharmacists.

Method

A retrospective cross-sectional observational study was conducted on 1433 patients admitted to Mubarak Al-Kabeer Hospital between October 2021 to April 2022. The study population was patients admitted to various hospital wards and treated by a team that included a clinical pharmacist. PCNE classification system version 9 was used to identify and classify DRPs. The data were analyzed using SPSS.

Result

A total of 3139 DRPs were identified among 1433 patients, and corresponding interventions were proposed to physicians. adverse drug events accounted for the largest proportion of drug related problems (%33.3), followed by untreated symptoms or indications (%22.7). No or incomplete drug treatment despite existing indications (%22.8) was the most common cause identified. Out of 3123 interventions made, (%23.7) 743 were proposed to the prescribers to make decisions, followed by 587 (%18.7) that involved stopping the drug, and (%15.5) 485 that aimed to modify the drug. The acceptance rate of clinical pharmacist interventions was high (%90.6). The drug categories most frequently involved were antimicrobials (%22.9), cardiovascular drugs (%11.8), and PPIs (%9).

Conclusion

This study emphasizes the importance of clinical pharmacy services in hospital settings. The findings provide strong evidence that clinical pharmacists play a vital role in the multidisciplinary circle of care. The high acceptance rate indicates that physicians are willing to collaborate with clinical pharmacists to improve the quality of patient care.

Social and behavioral sciences Students

202135

The Extent of Patient Satisfaction About Inhaler Counseling in the Kingdom of Saudi Arabia – A Cross-sectional Study

Amal Alagha, Manal Anwar, Arwa fairaq

Background
Asthma is a common condition of chronic inflammation of the lower respiratory tract. Non-adherence to inhalation therapy and incorrect inhalation techniques is important problems for optimal disease management. However, no previous studies have been conducted in Saudi Arabia to evaluate patient satisfaction about pharmacist counseling. Thus, we aim to study the extent of patient satisfaction with inhaler counseling and the factors associated with appropriateness of inhaler techniques in Saudi Arabia.

Method
A cross-sectional single-center face-to-face interview survey was carried out between January to March 2023. That was conducted in Heraa General Hospital, Makkah, Saudi Arabia. We use a 16-item questionnaire by Counseling's Satisfaction and Appropriateness of Use Inhaler Technique (CSAUIT). Statistical analysis was performed using the chi-square test. $P<0.05$ was considered statistically significant. All data were analyzed using Statistical Package for Social Sciences (SPSS).

Result
A total of 286 patients were included in the study. Most participants were female (%58.7). The inappropriate use of inhaler devices was observed in two-thirds of patients (%62.6). Half of patients shake the inhaler devices between the puffs (%56.6). More than half of patients were satisfied with pharmacist counseling (%56.4). Female patients were appropriate to use inhaler devices more than males (%27.6 vs. %9.8) (p <.01). The usage of inhaler device by patients with high school education was inappropriate compared to patients with basic and higher degrees (%38.5 vs. %24) (p <.01). The usage of inhaler devices by patients who do not work in medical field was inappropriate compared to those who work in medical field. (%56 vs. %6.6) (p <.01). Patients use one inhaler were never clean inhaler devices more than patients use two inhalers (%25.2 vs. %7) (p <.05).

Conclusion
This study showed that most patients were satisfied by pharmacist counseling about inhalers. However, the Inhaler technique among these patients was inadequate.

202083

Assessment of patient satisfaction with automated drug dispensing system in Tabuk region

Sultan Alanazi, Ahmed Alatawi, Hazem Alebrahimi, Abdullah Albalwi, Palanisamy Amirthalingam

Background

Background: Automated drug dispensing system (ADDs) was introduced to improve the efficiency in dispensing and patient safety. To our knowledge, the level of patient satisfaction with ADDs is not widely established.
Objectives: The study aimed to compare the level of patient satisfaction in ADDs with traditional drug dispensing systems (TDDs).

Method

Methods: A cross-sectional study was carried out to compare patient satisfaction regarding pharmacy services between ADDs and TDDs. The study was approved by the Institutional Review Board, Ministry of Health, Tabuk, Saudi Arabia.
A validated 17-item Likert-scale questionnaire was used to compare patient satisfaction between ADDs and TDDs. The questionnaire has four domains including pharmacy administration, dispensing practice, pharmacy administration, and dispensing system. Independent student 't' test was used to compare patient satisfaction to pharmacy services between ADDs and TDDs and $p<0.05$ was considered statistically significant.

Result

Results: A total of 503 and 496 patients visited the pharmacies of ADDs and TDDs, respectively were included in the study. Overall, the mean value of patient satisfaction was higher in ADDs than in TDDs. The participants had significantly higher satisfaction in ADDs with the items related to domains of dispensing practice and dispensing systems ($P<0.05$). However, the patient satisfaction with a few items related to the domains of patient education, particularly, 'The Pharmacist explains the side effects of medications' ($p=0.902$) and 'The Pharmacist provides all the necessary information for the patient' ($p=0.069$) have no significant difference between ADDs and TDDs. Also, the item in the pharmacy administration domain regarding 'A sufficient number of pharmacists working in the pharmacy' has no significant difference between ADDs and TDDs ($p=0.206$).

Conclusion

Conclusion: Patients significantly had higher satisfaction with ADDs in many aspects than TDDs. However, the pharmacist needs more motivation regarding the utilization of freed-up time for patient education.

202063

Awareness And Attitudes Towards Digital Cognitive Behavioral Therapy Among Users And Non-Users: A Cross-Sectoral Sectional Study Among The General Population Of Saudi Arabia

Samirah Alhewar, Maryam Alabdullah, Madhawi Alsultan, Norah Alhajri, Rahaeef Alotaibi, Naira Eltahtawi, Ahmed Mohammed, Abdulrahman Alnijadi

Background

Mental illness impacts nearly half a billion people, yet stigma and limited knowledge prevent many from receiving needed care. Digital cognitive behavioral therapy (dCBT) provides effective remote treatment via psychiatrists. Despite the potential advantages of adopting dCBT for mental illness, there are few studies on the population's level of awareness and views of dCBT services and resources in Saudi Arabia.Therefore, the objectives of this study are to assess the awareness, benefits, and barriers of using dCBT among the Saudi population.

Method

An online cross-sectional study was conducted from March to May 2023 in Saudi Arabia. We used Chi-square tests and Mann-Whitney U to investigate the relationship between participant demographics and the use of dCBT.

Result

The study included 640 participants, and (%65.3) had heard of or used dCBT, and (%27.7) reported having a mental health diagnosis. The most stated benefits of dCBT were time savings, convenience of scheduling, and the no need for transportation. However, both dCBT users and non-users voiced concern about the service's fees, privacy, and a preference for in-person sessions. The Mann-Whitney U test was used to compare dCBT viewpoints between users and non-users. The findings revealed that non-users rated considerably greater percentages of usefulness than users in areas of cost and time (p=0.012), satisfying cultural needs (p=0.001), and making scheduling appointments simple (p=0.00). Users and non-users held comparable views about the efficiency of the session's communication with the therapist (p=0.365), its comfort and adaptability (p=0.051), and the session's appropriate length (p=0.172).

Conclusion

Our findings point to the necessity of more dCBT accessibility and awareness, as well as strategies to reduce the stigma associated with mental health in Saudi Arabia. Future studies should examine methods to raise the utilization of digital mental health services and applications among the Saudi Arabian population.

201973

Prevalence of Potentially Inappropriate Prescribing in Older Adults in Gulf Cooperation Council Countries: A Systematic Review and Synthesis/without Meta-Analysis

Reem Aljohani, Sarah Alqahtani, Reuof Aldajani, Manal Althobaiti, Taif Alzlami, Abdullah Alshehri, Wael Khawagi

Background
Potentially Inappropriate Prescribing (PIPs) poses a significant risk to patient safety and healthcare outcomes in Gulf Cooperation Council (GCC) countries. PIPs have been linked to adverse events, increased hospitalizations, and unnecessary healthcare expenditures, emphasizing the need for effective interventions and understanding of current prevalence. This systematic review aimed to assess the prevalence of potentially inappropriate prescribing in older adults across all care settings in GCC countries.

Method
The study protocol was registered on PROSPERO and followed the PRISMA and JBI guidelines. A comprehensive search was conducted on six electronic databases. Eligible studies utilized validated explicit or implicit tools to evaluate the prevalence of PIPs in older adults in GCC countries. Data extraction included study details, sample characteristics, and outcomes. The risk of bias in the included studies was assessed using the JBI Prevalence Critical Appraisal Tool.

Result
A total of 14 studies conducted in GCC countries over a ten-year period included 39,168 patients. Saudi Arabia had the highest representation with seven studies, followed by Qatar (Three studies), Kuwait (Two studies), and one study each from the United Arab Emirates and Oman. The most common setting was hospitals. Two studies used multiple tools, while the rest used a single tool each, including Beers and STOPP/START criteria. Prevalence of PIPs varied across countries and settings, with Saudi Arabia reporting the highest prevalence (%2.1 to %80.6 in hospitals). Kuwait reported a prevalence of %58.4 in hospitals and a range of %19.8 to %73.6 in primary care settings. Variations in prevalence were also observed based on settings, tools used, data sources, and geographical areas.

Conclusion
These findings highlight the significant prevalence of PIPs in GCC countries. However, further well-designed studies conducted across countries, with a particular focus on primary care, are needed to strengthen the existing evidence and increase the generalizability of findings.

201970

Impact of Intern-led Transition of Care Services on Health-related Outcomes at King Abdullah bin Abdulaziz University Hospital.

Haya Alhumoud, Lama AlQahtani, Hayam Alrasheed, Feras Alhulaylah

Background
The transition of care (TOC) service reflects a systemic approach to the quality and safety of the healthcare system. Globally, several studies have evaluated the impact of TOC programs. These studies have demonstrated a high reduction of all-cause hospitalization, length of stay, and 30-day readmissions or emergency department visit rates. Therefore, this study aims to evaluate the effect of TOC services on patients' health-related outcomes at King Abdullah bin Abdulaziz University Hospital (KAAUH) in Saudi Arabia.

Method
This study is a retrospective secondary data analysis, extracted data from August 2020 to July 2022, that compares patients who received TOC services and patients who only received standard care services. Eligible patients of higher risk with diseases of high readmission rates and on multiple medications.

Result
Of 457 included patients, 247 received the TOC services. Compared to patients not receiving TOC services, ED visits within 30 days were lower in the TOC group (%44.8 vs. %55, p = 0.030). Similarly, the 30-day hospitalization rates were significantly lower following TOC services (%37 vs. %62.9 p = 0.004). Moreover, there was a significant difference between patients who TOC received and those who did not in the mean length of the study patient's stay in the hospital.

Conclusion
This study was the first to evaluate the impact of TOC services on healthcare utilization at KAAUH in Saudi Arabia. TOC services were associated with lower risk in most measured outcomes. The study findings demonstrated the significance of implementing TOC programs and how this can optimize patients' therapy plans.

202191
Using the Contingent Valuation Approach to Examine Patients' Willingness to Pay for Healthcare Services: A Cross-Sectional Study in Saudi Arabia

Malek Alqahtani, Abdullah Alrashdi, Salman Majrashi

Background
Regularly gathering data on patients' willingness to pay (WTP) for healthcare services is crucial, as WTP can also be an indicator of the demand and acceptance of these services. Therefore, this study employs the contingent valuation approach to examine and compare patients' WTP for health care services.

Method
The present study will use a cross-

sectional research design and a convenience sampling method in order to assess the participants' WTP. The contingent valuation technique will be used in face-to- face interviews to gather data in Riyadh, Saudi Arabia. For quantitative data, descriptive findings will be given as mean (± standard deviation), and for categorical data, as percentage (%). The independent factors influencing WTP will be found via a series of unadjusted and multivariate experiments. Unpaired t-tests or Mann-Whitney tests will be used for comparing the mean WTP values between two groups, while ANOVA or Kruskal-Wallis tests will be utilized for comparing the mean WTP values among three or more groups. These comparisons will be conducted in unadjusted analyses.

Result

%10 of the net equivalent income of the average household was allocated towards healthcare services during a given month, or approximately SAR1,840. The findings from multiple regression analyses indicated that a higher level of private health insurance (b=131.1, p=0.001), a younger age (b = 1.4, p=0.001), and a higher family income (b = 1.2, p 0.001) were all associated with a greater WTP.

Conclusion

Individuals may be willing to make contributions to healthcare services, given the relatively high average WTP for such services. A correlation was observed between socioeconomic status, health-related variables, and WTP

202075

Assessment of Pharmacists Knowledge and awareness about the role, importance and nature of Drug Information Centre Services

Shaden Almutairi, Renad Almutairi , Samar Alshawwa, Amal Alnajjar, Saud Gohal

Background

Drug Information Centers (DICs) receive many questions about medications and their uses. This leads to a huge pressure on the workers in the DICs and affecting their ability to respond to critical questions. Pharmacists, other than DIC pharmacists, should be able to search for information on their own at least to answer routine drug-related questions. This study aims to assess the pharmacists' knowledge and awareness about the role, importance and nature of DIC services.

Method

This cross-sectional study was conducted from September 2023 to November 2023 in two tertiary hospitals in Riyadh-Saudi Arabia. Data were collected from drug information databases and a self-reported questionnaire directed to institution pharmacists.

Result

Totally 4334 DI requests were received during a 4-years period and answered by DIC pharmacists. Most of the DI requests were received during 2022 (%34). The majority of queries were received from hospitals pharmacists %73, followed by physicians. %72 queries were about dosage and administration. The most commonly used references were Micromedex %51. Pharmacists showed up good knowledge concerning DIC; where %96.2 have good knowledge about correct definition for DIC and %66.3 of were aware about procedures and policies for DIC. %70.3 of pharmacists have excellent practice where they counselled DIC during last 6 months only less than 10 times while; %79.25 revealed excellent searching skills for information before communicating DIC. %92.2 of pharmacists consider resources used for DIC answers as reliable. %64.35 admitted that answers received from DIC were enough and comprehensive.

Conclusion

DICs play a major role in disseminating information related to medication management and provision of high-quality health care. Based on annual inquiries, pharmacists were mostly inquiring about medications management. There is a real need to improve pharmacists' searching skills among resources. Educational sessions to train pharmacist on responding to DI questions effectively is highly needed.

202579

Knowledge and behavior regarding Toxoplasmosis among adult female in Riyadh region

Shatha Aljudayi, Muath Almubarak, Maryam Alaseem, Shatha Aljudayi, Amal Albalawi, Lina Alsaweed, Nuha Abouobaid, Dayel Alshahrani

Background

Toxoplasmosis, caused by the parasite Toxoplasma gondii, and associated with serious risks specially for pregnant women. It can be transmitted through contaminated food, undercooked meat, contact with infected cats, and soil exposure. In Saudi Arabia, there's a lack of data on female awareness, accordingly, this study aims to assess knowledge and behavior, promoting awareness through infection prevention, understanding the disease, and advocating for serological exams during pregnancy to prevent toxoplasmosis in our population.

Method

This cross-sectional study was conducted on a random sample of adult female in Riyadh region,Saudi Arabia, using a semi-structured, self-administered web-based questionnaire. Data with numerical/ qualitative variables were expressed as percentage. In addition, independent samples t-test and One-Way Analysis of Variance (ANOVA) was used, with threshold of ($\alpha \leq 0.05$) as a statistical significance threshold in this study.

Result

The study involved 406 females, with age of (%46.1) 25-18. Majority of the participants held a bachelor's degree (%60.1), and (%72.9) were unemployed, and earned ≤4000 SAR monthly (%58.6). Regarding Toxoplasmosis, %2.2 were pregnant, %97.8 were not. According to knowledge assessment %79.1 were unfamiliar with Toxoplasmosis. In the other case of Preventive behavior assessment, measures were varied; %77.6 avoided undercooked meat, but only %18.5 were tested before pregnancy for toxoplasmosis. In case of Cat owner's preventive behavior (%20) displayed mixed preventive practices. Regarding participant Income status, it had significantly influenced the preventive behaviors. Overall, awareness gaps highlight the need for education on toxoplasmosis prevention.

Conclusion

The findings collectively highlighted the comprehensive educational initiatives and public health campaigns need in order to improve awareness and preventive practices related to Toxoplasmosis, particularly among subpopulations with limited awareness and potential misconceptions. It is essential to address these knowledge gaps for effective prevention and management of Toxoplasmosis in our study population.

202578

Investigator-Initiated Versus Industry-Sponsored Clinical Trials in Saudi Arabia: A Clinician's Perspective

Reema alotaibi, Hadeel alkofide , Haifa algazlan

Background

Clinical trials are pivotal in dru g development, impacting the introduction of new drugs and the expanded use of existing medications. In Saudi Arabia, there's a notable presence of investigator-initiated trials, led by academic and research institutes, alongside industry-sponsored ones. This study fills a research gap by exploring how funding sources, such as sponsor-initiated and investigator-initiated trials, influence the success of clinical trials in the Saudi context.

Method

This cross-sectional, survey-based study aims to assess the challenges faced by clinicians and researchers in both types of clinical trials in Saudi Arabia. We designed a structured online survey informed by an extensive literature review. The survey encompasses various dimensions including regulatory compliance, funding challenges, resource allocation, ethical considerations, and data management. It was initially pre-tested on a cohort of experienced clinical trial participants, whose feedback was integral for refining the

survey questions. The refined survey is now being administered to a broader group of investigators with diverse experiences in conducting clinical trials in Saudi Arabia. For data analysis, we will employ both descriptive and inferential statistical techniques to discern patterns and key factors influencing the challenges in both investigator-initiated and sponsored clinical trials. The study has received the necessary ethical approvals.

Result

At the time of this abstract, the pre-testing phase of the survey has been completed. We have incorporated feedback from experienced clinical trial investigators in Saudi Arabia to enhance the survey's relevance and comprehensiveness. We anticipate presenting detailed findings from the final survey at the time of the conference.

Conclusion

This study sheds light on the distinct challenges faced in different types of clinical trials in Saudi Arabia, underscoring the critical need for enhanced support and regulatory frameworks. The insights obtained are crucial for advancing the effectiveness and success of clinical research in the region.

202548

Assessment of Knowledge and Perception of CAR-T Cell Therapy Among Healthcare Providers in Saudi Arabia

Lina Alqurashi, Sultanah Naitah, Btool Albeladi, Roaya Alqurashi

Background

Chimeric antigen receptor (CAR) T-cell therapy is a potential immunotherapy for patients with recurrent non-Hodgkin's lymphoma (NHL). Many clinical trials suggest CAR T-cell therapies may be more effective than standard treatment. Despite the FDA approvals and promising clinical data being produced, CAR T-cell therapy is not an option for every patient and is not widely used in Saudi Arabia due to significant barriers that include concerns regarding clinical outcomes and cost-benefit analysis. This study aims to assess healthcare providers' knowledge about CAR T-cell therapy and identify the barriers to the application of CAR T-cell therapy in Saudi Arabia.

Method

The present study is a web-based cross-sectional study directed to healthcare providers in all regions of Saudi Arabia. The questionnaire included three parts: demographic questions, knowledge of pharmacology and toxicology of CAR-T cell therapy, perception of healthcare providers on barriers to applying CAR-T cell therapy in Saudi Arabia, and recommendations on how to overcome those barriers. Descriptive statistics were obtained using SPSS.

Result

Our results showed that about %70 of the participants had good knowledge about the pharmacology and toxicology of CAR T-cell therapy. Most of the participants were Saudi pharmacists (%70) and who worked in hospitals (%59). Lack of standardized guidelines, cost-effectiveness issues, CAR T-cell therapy complications, and lack of trained staff were considered barriers, which over %60 of participants agreed on.

Conclusion

This study found that Saudi Arabian healthcare providers believe CAR T-cell therapy can treat recurrent NHL. Its greater use in Saudi Arabia is hindered by a lack of defined rules, cost-effectiveness concerns, problems, and qualified staff. Policymakers and healthcare professionals must collaborate to remove these barriers and make this potentially life-saving medication more accessible for Saudi patients. With more research and financing, CAR T-cell therapy could change cancer treatment in Saudi Arabia.

202547

A Cross-sectional Study to Assess Healthcare Challenges of Phenylketonuria (PKU) Patients in Saudi Arabia

Asma Alshreef, Bashayer Hakami, Raneem Almadabighi, Zain Alsharif, Nada Alshehri, Orjwan Sendi, Roaya Alqurashi, Amal Alotaibi

Background

Phenylketonuria (PKU) is an inborn error of metabolism (IEM) caused by a defect in the phenylalanine hydroxylase enzyme (PAH), which converts phenylalanine (Phe) into tyrosine (Tyr). It can cause neonatal neurological abnormalities if left untreated. The primary management approach for PKU involves eliminating animal protein, legumes, nuts, and carbohydrates like bread, pasta, rice, and vegetables. One of the main challenges of PKU patients is adhering to a highly restrictive low-Phe diet with an amino-acid (AA)-based formula. The study aims to assess the level of awareness and challenges that face PKU patients and their families in Saudi Arabia and to address the healthcare needs to enhance the quality of life for these individuals.

Method

This study is a cross-sectional survey aim to include PKU patients' families in Saudi Arabia. The web-based questionnaire targeting adult PKU family members was distributed between November-December 2023. It consists of 37-questions, includes demographic data, disease awareness, level of adherence and challenges faced by PKU patients and families. Descriptive analysis was conducted using SPSS.

Result

Our results indicate that %20 of the participants are unaware of the

disease's causes, and %17 of them were not educated by health care providers. Another %9.5 acquired information about the disease through alternative sources, including social media. The majority, %64.3, received their education about the disease from healthcare providers. Lack of pre-marriage knowledge about the disease was evident in %44.9 of parents, with %59.2 being relatives. Obstacles to adhering to appointments included distant centers (%51), perceived lack of treatment effectiveness (%51), financial burden (%91.8), and absence of specialized health centers (%55.1).

Conclusion

This study emphasizes the need for educational programs to raise community awareness about the disease. Also highlights the need to establish initiatives that alleviate the financial strain and facilitate the access to specialized healthcare services in Saudi Arabia.

202503

Evaluation of Pharmacists' Knowledge of Pregnancy Issues in Epilepsy: A Cross-sectional Study in Saudi Arabia

Sarah Al-Harbi, Bushra Bukhari, Ameerh Almalki, Roaya Alqurashi

Background

Epilepsy is one of the most common chronic neurological diseases that is treated with anti-seizure drugs (ASDs).1 Many healthcare providers encountered many difficulties managing ASDs in pregnant women with epilepsy (WWE) due to the potential teratogenic effects of ASDs.3 Therefore, the pharmacist plays an important role as a medication expert and monitors ASDs in pregnant WWE.2 This study aims to be the first to assess the pharmacists' knowledge of pregnancy-related issues in WWE in Saudi Arabia.

Method

A cross-sectional study was performed to evaluate pharmacists' knowledge of WWE pregnancy issues in Saudi Arabia. We used the knowledge of women's issues in epilepsy (KOWIE-II) questionnaire. Licensed pharmacists aged > 18 years were included in our study. Demographic details were collected, and scores were calculated as a percentage of correct answers for each pharmacist. Statistical analysis was performed using the chi-square test. P <0.05 was considered statistically significant. For data analysis, we used Statistical Package for Social Sciences (SPSS).

Result

The study revealed that over 576 pharmacists from all regions of Saudi Arabia had inadequate knowledge of common pregnancy-related issues in WWE. Most pharmacists mainly worked in hospitals (%49). The place where the basic pharmacy degree was earned (P= 0.04), and practice

settings (P=0.01) were considered significant factors affecting the pharmacist's overall knowledge towards WWE.

Conclusion

Pharmacists always have the burden of being knowledgeable about pregnancy issues and epilepsy to provide better healthcare services. Our study revealed a significant knowledge gap among pharmacists in Saudi Arabia concerning WWE, which could lead to potential hazards, including detrimental effects on both the fetus and the mother's well-being. It is strongly advised to implement educational interventions and seminars in pharmacy schools in Saudi Arabia to enhance the understanding and knowledge of pharmacists about pregnant WWE.

202491

An Investigation into the Usage and Perceptions of Dietary Supplements among University Students in Saudi Arabia: An Assessment of Knowledge, Motivations, and Influencing Factors

Deema Al Erwi, Alanoud Al Sadi, Taef Al Johani, Fahad Alzahrani, Waleed Mohammed-Saeid

Background

This study aims to investigate the awareness, knowledge, motivations, and influences on the use and purchasing behavior of dietary supplements (DSs) among university students in Saudi Arabia. The growing interest in DSs displays an opportunity for pharmacists to play a crucial role in assisting patients in making informed decisions about these products. However, understanding the knowledge gaps, attitudes and purchasing behavior of young consumers are crucial to ensure the quality of care provided.

Method

A cross-sectional study was conducted using a validated 77-item self-administered questionnaire distributed electronically to university students in Saudi Arabia. The questionnaire gathered information on socio-demographic characteristics, use of DSs, pre-existing knowledge, health status, and health awareness, as well as awareness and social perception of DSs.

Result

A total of 463 participants were included in the study (August – October 2023), with the majority being female (%83). The findings revealed a generally inferior level of knowledge on the safety and efficacy of DSs use, with health sciences students showing slightly competent knowledge (mean score of 2.7 out of 3). A positive attitude was found towards community pharmacies as the best place to purchase safe DSs (%82), and the majority of participants agreed on the influence of advertisements on their choice of

supplements (%76). Supplement users exhibited more positive attitudes and perceptions regarding the beneficial use of DSs compared to non-users ($p<0.05$). Additionally, a correlation was found between general health status and positive attitudes and perceptions towards the health benefits of DSs ($r=0.34$, $p<0.01$). Interestingly, participants who followed a special diet regimen were more likely to use DSs (%65 vs. %35, $p<0.05$).

Conclusion

University students in Saudi Arabia consume DSs regardless of their knowledge about their efficacy. Social media and visual advertisements significantly influence the use and choice of DSs, necessitating targeted educational interventions to promote informed decision-making.

202488

Over-the-Counter Sleep Aids: How Safe are They?

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Background

Sleep disorders are a major issue for public health, affecting a significant portion of adults worldwide. A lot of people use over-the-counter (OTC) sleep aids to deal with these conditions. However, despite their widespread usage, the safety of OTC sleep aids has not been thoroughly studied. Therefore, this study aims to evaluate reports of adverse events of OTC sleep aids received by the FDA Adverse Event Reporting System (FAERS) from October 1969 ,1, to June 2023 ,19.

Method

A retrospective analysis was conducted of adverse drug event (ADE) reports submitted to US FDA. ADE reports for diphenhydramine, melatonin, and valerian were extracted from the FAERS database. Descriptive statistics and disproportionality analysis using Reporting Odds Ratios (RORs) and %95 confidence intervals (CI) were performed to identify safety signals of adverse reactions among OTC sleep aids.

Result

Over the study period, a total of 29,357 ADE reports were submitted to the FAERS database. Diphenhydramine was responsible for the majority of these reports, accounting for %98.94 of all reports (29,046 reports). On the other hand, melatonin and valerian accounted for only %0.95 (280 reports) and %0.11 (31 reports) of all submitted reports, respectively. Out of 29,046 AE reports for diphenhydramine %71.10 of submitted reports were for serious adverse events. Also, %81.43 and %100 of the submitted reports for melatonin and valerian, correspondingly, were reported as serious adverse events. Also, disproportionality safety signal (ROR =

1.78 [%95 CI: 2.44-1.33]) were detected for melatonin with occurrence of serious adverse events.

Conclusion

Potential safety signals for OTC sleep aids were identified in this study that merit future clinical evaluation. While causal inferences cannot be drawn using FAERS database, it remains as an important post-marketing surveillance tool to identify potential safety and efficacy concerns for these widely used sleep aids.

202473

Pharmacists Satisfaction with the Wasfaty E-service in Saudi Arabia: Using the Expectation Conformation Theory

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Background

Implementing the Wasfaty e-service has significantly improved patient satisfaction by allowing them to easily access medication from nearby community pharmacies. To ensure the program's continued success, evaluating the satisfaction level and intentions of pharmacists who have participated in the Wasfaty e-service is essential. This study aimed to measure pharmacists' expectations, perceived behavior, satisfaction, and intentions with participating in the Wasfaty e-service in Saudi Arabia.

Method

Based on the Expectation Conformation Theory, a survey was conducted to gather information from pharmacists in community pharmacies across Saudi Arabia. The survey consisted of the following sections: expectations, performance, confirmation, satisfaction, intention, and sociodemographics. Pharmacists were requested to participate online and invite their colleagues. The collected data was analyzed using descriptive and inferential statistics.

Result

The study involved 101 pharmacists with an average age of (5.6±) 28.0 years. Most of them were male (%68.3), had an income between SAR 5000 and SAR (%73.2) 10,000, had less than three years of pharmacy experience (%61.4), and worked in an urban pharmacy (%77.2). The pharmacists' expectations, perceived behavioral, satisfaction levels, and intention to continue participation in the Wasfaty e-services were low (,1.5±2.4 ,1.6±2.9 1.6±2.6, and 1.9±2.8, respectively). Additionally, the pharmacists showed high burnout levels (1.9±5.4) and low overall satisfaction (1.9±2.8) regarding their work in community pharmacies. The satisfaction level and years of experience of pharmacists participating in the Wasfaty e-services were the only factors that predicted their intention to continue participating in the program. Pharmacists with high satisfaction levels with Wasfaty and more

experience with the program are likely to continue participating.

Conclusion

Although the Wasftay e-service allows patients to receive their medications from their community pharmacies, the pharmacists providing these services might have negative experiences. Improving pharmacists' perceived behavior would increase their satisfaction, improving their intention to continue participating in these services.

202461

Assessment Of Oral Health Literacy And Oral Health Related Quality Of Life In Saudi University Students: A Cross Sectional Study

Raseel Alamri, Geetha Kandasamy

Background

Oral health literacy was recognized as important to encouraging oral health and avoiding oral health diseases. Therefore, this study was conducted to assess oral health literacy (OHL) and oral health-related quality of life (OHRQoL) among undergraduate students studying at university.

Method

A prospective cross-sectional study was carried out from November to February 2023 among the students of King Khalid University. OHL and OHRQoL were assessed using a Rapid estimate of adult literacy in dentistry 30 (READ 30) and oral health impact profile (OHIP 14). Further, Pearson's correlation tests were used to measure the correlation between READ 30 and OHIP 14.

Result

Among the 394 completed respondents, the majority were Aged>20 years (n=%56.09 ;221), Aged <20 years (n=%43.91 173), female (n=%82.23 ;324), male (n=%17.7 ;70). Participants from health-related colleges were (n=%87.06 ;343), and other colleges were (n=%12.94 ;51) *P<0.04. Participants brushing frequency once daily were (n=;165 %41.88) twice or more per day (n=;229 %58.12) *P<0.018. The overall mean READ-30 score of the participants was 0.17± 11.76 indicating Low OHL. The higher mean score of OHIP-14 for the following domains physical pain 0.56±12.93, physical disability 0.72±12.05, and psychological disability 0.76±12.71. Oral health impact profile 14 and READ showed a positive correlation for health-related colleges (r = 0.314; *P<0.002) and other colleges (r = 0.09; P<0.072). However, a significant correlation was observed between READ-30 and OHIP 14 scores among health-related colleges (P < 0.05).

Conclusion

The current study concluded that self-rated poor oral health is significantly linked with OHIP-14 scores. Furthermore, systematic health education programs such as

regular dental checkups for college students must be arranged to assist in changing the student's everyday life and oral health behaviors.

202435

Evaluation of Codeine Containing Analgesic Medication Utilization in Saudi Arabia

Muteb Alanazi, Mukhtar Ansari, Tareq Alharbi, Nader Alrashidi, Marwan Alrashidi

Background
Global public health is continuously concerned about the misuse and addiction of drugs containing codeine. Given its impact and rapid tolerance development with frequent or excessive usage, codeine has a known abuse potential. Thus, there are growing calls for surveillance, improved misuse detection in practice, and public health awareness initiatives. The purpose of the study was to determine utilization pattern of codeine-based medications in Saudi Arabia.

Method
This quantitative cross-sectional study was conducted from July 2023 to October 2023 among 226 community pharmacists in various cities of Saudi Arabia. Participants of this study were recruited using a convenience sampling technique. The data was collected using Research Electronic Data Capture tool (RedCap). The collection of data was through an amended version of the CODEMISUSED survey questionnaire. Reliability and validity of the instruments were thoroughly assessed. The SPSS software version 29 was used to analyze data.The chi-square test was employed to assess variations in the category data.

Result
More than %54 of the community pharmacists were Saudis, and nearly one-half (%46.9) of the pharmacists had attained a professional qualification of PharmD. Among the pharmacists employed by community pharmacies, almost half (%46.9) did not have specialized training in substance abuse or misuse. The intention of more than %32 of the consumers who purchase codeine containing analgesics was to enhance mood or to relieve mental stress, and %8.4 continued taking the medication for more than 4 weeks. About %45 of the consumers were not aware that using codeine-containing analgesic medication can lead to addiction. Regarding the preference to a specific brand, solpadeine soluble tablet was among a high demand (%52.7) among the consumers.

Conclusion
There is a need of promoting awareness among the consumers about the codeine-containing analgesics that can lead to addiction if it is used at higher doses and for longer duration.

202434

Empowering Asthma Patients with Innovative Inhaler Education: A Quasi-Experimental Study

Ahad Almutiri, Abrar alqurashi, Rahaf almutairi, Shahad Alharbi, Lamyaa Kassem

Background

Inadequate inhaler technique poses a significant threat to the health outcomes of asthma patients worldwide. While clinical guidelines emphasize the importance of inhaler education, existing methods often fall short in delivering this crucial knowledge effectively. To address this challenge, a cost-effective, technology-based intervention utilizing QR codes and Telehealth has emerged as a beacon of hope.
Objective:
This study aims to empower asthma patients by enhancing their competence and compliance with inhaler usage. Through the integration of direct instruction and virtual demonstrations facilitated by QR Scan technology, a transformative approach to personalized inhaler technique education has been unveiled.

Method

A multicenter quasi-experimental clinical trial was conducted, engaging a carefully selected group of participants. The study spanned from December 2022 to February 2023 and encompassed four distinct phases: inclusion, training, follow-up, and participant satisfaction. Participants were provided with a QR code containing educational materials, complemented by face-to-face sessions or video calls for comprehensive follow-up support. Statistical analysis using SPSS 26 breathed life into the findings.

Result

Out of the 101 enrolled asthmatic patients, all 101 completed the initial phase, 47 required a second training and evaluation session, and only 19 needed a third session until they achieved proper inhaler usage proficiency. Among the participants, 96 preferred scanning the Arabic educational video provided by the Saudi Ministry of Health, while 4 preferred reading the instructions. The study included 70 male and 31 female participants, with 85 individuals falling within the age group of 14 to 34. A significant correlation ($P < 0.000$*) was observed between patients' practice of proper inhaler use and improvement in asthma status. Furthermore, educating patients about proper inhaler usage was associated with a positive attitude towards other asthmatics within the participants' community ($P < 0.019$).

Conclusion

This groundbreaking intervention, utilizing QR code scans, video calls, and telehealth, has the potential to reshape asthma management for children and beyond. Future studies

should explore the widespread implementation of pharmacy telehealth interventions, catering to diverse populations and disease severities, to unlock the greatest impact. Through this technological revolution, asthma patients can look forward to a brighter and healthier future.

Keywords: asthma, inhaler, proper use, QR code, quasi-experimental study, telehealth.

202407

Patient's Satisfaction with Wasfaty System and community pharmacy services

Lama Alharbi, Kousalya Prabahar, Sara Alsharif , Zood Alaqais, Maha Almarwani

Background

Patient's satisfaction is an indicator of quality of pharmacy services. Pharmacists are able to recognize and resolve drug-related issues, provide patients with the information they need, raise patient satisfaction, and improve the standard of patient care. Utilizing E- prescription (WASFATY) is one of the key services in the healthcare system that achieves the aspiration of the Kingdom's vision 2030 by improved efficiency, accuracy, and convenience for both patients and healthcare professionals. The present study aims to assess the impact of community pharmacy services and Wasfaty system on patient's satisfaction in Tabuk region.

Method

A cross-sectional study was conducted between October and November 2023 in Tabuk among patients using community pharmacy services. Data was collected using a convenience sampling technique and a self-administered questionnaire. The data was analyzed using SPSS software version 22.0. Chi-square test was performed to find the association between the services provided and the satisfaction with Wasfaty and community pharmacy services. Significance was reached when $p < 0.05$.

Result

A total of 173 beneficiaries participated in the study. The majority of respondents were male (%50.9) and majority were under 50 years. Only %20 of the included population visit the community pharmacy for chronic diseases. Most of the participants (%71) had a positive perception of the community pharmacy services and E-prescription. There was an association between the services provided by the community pharmacy and Wasfaty system and the satisfaction with Wasfaty and community pharmacy services.

Conclusion

The Wasfaty System aims to achieve the Saudi Vision 2023 by linking hospitals and primary health care centers with community pharmacies

thus contributed to expand the role of it in the country. The results of our study demonstrated overall high satisfaction with E-prescription and its effectiveness in improving management of patient medication.
Keyword: E-prescription, Wasfaty system, community pharmacy services

202357

The Impact of Virtual Refilling System on Patient Adherence to Anti-heart Failure Medications: A Retrospective Study

Othman Daghriri , Bandar Saad Alanazi

Background

Heart failure (HF) is a globally prevalent chronic disease, significantly impacting patient quality of life and healthcare systems. The importance of medication adherence in managing HF is well-documented, yet non-adherence remains a critical challenge. In Saudi Arabia, where coronary heart disease is a leading cause of death, enhancing medication adherence is particularly crucial. This study investigates the role of a Virtual Refilling Service (VRS) in improving medication adherence among HF patients at the Prince Sultan Cardiac Centre in Riyadh.

Method

This retrospective study examines HF patients treated at the Prince Sultan Cardiac Centre between 2021 and 2023. Data from electronic health records and pharmacy refills are analyzed to compare the medication adherence of patients using VRS with those using traditional manual refills. Patients under 18 and pregnant women are excluded. The study employs the Medication Possession Ratio (MPR) and the Proportion of Days Covered (PDC) as adherence measures, adjusting for confounders like age, gender, and comorbidities.

Result

Data on anti-heart failure medication dispensation for 1,131 patients reveals varied adherence levels, with %38.5 adhering, %25.3 overfilling, and %58.8 non-adhering to their medication regimen. These figures highlight the complexity of medication adherence in HF management, suggesting the potential benefits of VRS in addressing this issue.

Conclusion

The study's findings underscore the significance of VRS in potentially improving medication adherence among HF patients. While VRS demonstrates promise in reducing non-adherence and possibly healthcare costs, further research is necessary to explore long-term impacts and generalize these findings beyond the Saudi context. This study contributes to the growing evidence supporting technological innovations in healthcare, aiming to enhance patient outcomes and optimize resource utilization.

202326

Perception of Pharmacy Students of Providing Online Pharmaceutical Services

Shahad AlKahlah, Arjwan AlQarni, Manar AlGhamdi, Mohamed Barka, Mahmoud Elraggal, Mansour Mahmoud, Marwan Alrasheed, Abdullah Alahmari, Mohammed Alsultan

Background

Patients can obtain economical long-distance medical care through telehealth by using online methods and technology. The relevance of providing online pharmacy services in Saudi Arabia is emphasized by the kingdom's 2030 goal and the country's high level of technological innovation. Thus, the purpose of this study is to explore how pharmacy students perceive and understand the incorporation of online pharmacy services into their curriculum.

Method

A cross-sectional study was conducted from June 1st, 2023 to September 30th, 2023 using an online survey. The study was conducted in the Kingdom of Saudi Arabia. A Online questionnaire containing thirty two questions was created based on an extensive literature review of previous studies. To collect the data, we used the convenience sampling approach. The descriptive analysis was done in frequency and percentage form and the logistic regression was used to explore any relationship between the perception of online pharmacy services and sociodemographic variables. All statistical analyses were performed using SPSS-Software.

Result

A total of 523 study subjects participated. The mean age of the study participants was 21.65 years. Males and females were represented almost equally (261 males and 262 females). Most of the study participants (%89.7) 469 showed positive perception of online pharmacy services. The logistic regression analysis showed none of the socio-demographic variables was significantly associated with the perception of online pharmacy services, age (OR %95 ,0.97 CI -0.54 1.75), gender (OR %95 ,1.20CI -0.33 4.40), receiving any training on how to use online pharmacy services (OR %95 ,1.57CI 7.33-0.34), and receiving any exercise for training on online pharmacy services (OR %95 ,0.59CI 3.18-0.11).

Conclusion

This study has highlighted areas that need to be improved. Optimizing online pharmacy services requires addressing the highlighted unfavorable impressions. To assurance that aspiring pharmacists are fully prepared to successfully handle the continually shifting healthcare environment, this planned improvement is important.

202310

Assess knowledge, attitudes, willingness and beliefs of community pharmacists in Saudi Arabia towards providing vaccines in pharmacies

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Background
Community pharmacists had important role in increasing vaccinations rates especially in countries where they offer vaccination services and administration. However, little is known about community pharmacist's willingness to provide vaccination services in Saudi Arabia. The objective of this study was to assess knowledge, attitudes, willingness and beliefs of community pharmacists in Saudi Arabia towards providing vaccines in pharmacies.

Method
A cross-sectional, online questionnaire-based study using convenience sampling (Snowball technique) was used to obtain responses from the community pharmacists across Saudi Arabia. The survey collected information on participants' demographics, knowledge about vaccine, attitude towards vaccine and their attitude to be immunizers. Bivariate analysis and multiple linear regression models were employed to assess the relationships between demographic variables and outcomes.

Result
The study sample consisted of 384 community pharmacists. Most of the participants had poor knowledge about vaccines (%54). Only %8.4 of the participants had good knowledge about vaccines. The results indicated that community pharmacists in the study sample have positive attitude toward vaccines and are willing to provide vaccination services. There was a significant relationship between knowledge about vaccine and attitude toward vaccines. Pharmacists with poor knowledge about vaccines had negative attitude toward vaccines as compared to those with high knowledge (β= -1.743; P-value = 0.024). Additionally, there was a significant relationship between knowledge about vaccine and attitude to be immunizers. Pharmacists with poor knowledge about vaccines had negative attitude to be immunizers as compared to those with high knowledge (β= -2.631; P-value = 0.002). Furthermore, a significant number of the community pharmacists reported facing critical barriers to provide vaccines including legal liability, lack of personal resources and lack of appropriate training.

Conclusion
Comprehensive training and certification programs for pharmacists are crucial to improve

their competencies in handling and administering vaccines to increase the rate of vaccinations in Saudi Arabia.

202242

Impact of Ramadan Fasting on the Severity of Symptoms Among a Cohort of Patients With Gastroesophageal Reflux Disease (GERD)

Abdullah Bohamad , Danah Alqattan, Walaa Aladhab , Sawsan Alhashem , Mohammed Alajmi , Turki Alhumam , Ahmed Elshebiny

Background
Gastroesophageal reflux disease (GERD) is a condition caused by the reflux of stomach contents into the esophagus. Heartburn, chest discomfort, and regurgitation are the main symptoms. Medications, surgical procedures, and lifestyle modification are considered treatment options. Fasting is believed to be one of the lifestyle modifications that helps minimize GERD symptoms. Muslims abstain from eating, drinking, and smoking from dawn until dusk. The objectives of our study were to investigate the relationship between fasting and GERD symptoms and evaluate how fasting affects GERD symptoms in Saudi Arabia.

Method
This was a longitudinal study that selected GERD patients for its consecutive sampling. The patients answered the questionnaires at two separate times: once during Ramadan and once after Ramadan. A validated gastroesophageal reflux disease health-related quality of life (GERD-HRQL) self-administered survey was used.

Result
After Ramadan, heartburn symptoms significantly decreased, particularly when lying down. Overall, the 45-point heartburn score decreased from 17.9 during Ramadan to 14.3 thereafter. The regurgitation score decreased from 12.3 during Ramadan to 9.9 after fasting, with statistical significance (P = .049). Although satisfaction was much higher after Ramadan (%17 vs. %15.1), there was no statistical significance (P = .422), and %45.3 of the patients were satisfied with their health state during Ramadan compared to %34 after Ramadan. There was no relationship between the severity of GERD symptoms before or after fasting and the type of food, the timing of eating, or the amount of food consumed.

Conclusion
The results suggested that Ramadan fasting may improve GERD symptoms. However, more studies are required to validate these results and comprehend the underlying mechanisms.

202238

Knowledge, Attitudes and Practices (KAP) of Medical University Students towards Vitamin D deficiency in Saudi Arabia: A Cross Sectional Study

Manal Alajmi, Abir Elghazaly, Deem Alsaloom, Lamyaa Alfayizi, Layan Alduwirej

Background
Vitamin D deficiency is a serious health problem that is widespread across all age categories and associated with many health consequences. The current study aimed to assess the knowledge, attitudes, and practices of medical students in Qassim university, Saudi Arabia regarding vitamin D deficiency.

Method
An observational cross-sectional study was conducted among students of Unaizah College of Pharmacy (UCP) and Unaizah College of Medicine (UCM) at Qassim University, Saudi Arabia over a period of 3 months. A well-structured self-administered questionnaire was used for the data collection. Statistical analysis was applied through using SPSS version 1/0 .22 scoring process was employed. Midpoint is considered as the cutoff point.

Result
A total of 337 complete responses were received. The majority of participants (%62.3) were female. (%86.3) 291 of participants, were considered to have good knowledge, with mean score of 6.326 out of 9. Moreover, (%65.2) 220 of participants had positive attitudes, with a mean score of 4.077 out of 7. Unfortunately, only (%2.6) 9 participants demonstrated satisfactory practices, with a mean score 0.911 out of 6. Most of the participants considered the college as their trustworthy source of information. Female participants were significantly better than male participants in terms of knowledge and attitudes, but worse in terms of practices. UCM participants significantly had better knowledge than UCP participants. Sun exposure during safe daytime hours is considered the main cause of vitamin D deficiency. Nearly %60 confirmed that KSA indoor activities and COVID-19 lockdown might maximize vitamin D deficiency.

Conclusion
The study highlighted the discrepancy between knowledge and actual practices regarding vitamin D among participants, with gender and educational background playing a role in these differences. It also emphasizes the importance of educational institutions as a trusted source of information and the impact of the COVID-19 pandemic on participants' views and behaviors related to vitamin D.

202349

Evaluation of Hesitancy toward the Human Papilloma Virus Vaccine among Parents in Saudi Arabia: A Cross-Sectional Study

Manal Alghamdi, Ahad Alotaibi, Shumukh Althobaiti, Taif Alkhashi, Asma Alosaimi, Rami Alzhrani, Mohammad Alzahrani

Background

The human papillomavirus (HPV) vaccine is a safe and effective way to prevent HPV-related cancers. However, vaccine hesitancy remains a significant barrier to achieving high vaccination rates. This study sought to assess hesitancy toward HPV vaccine among parents in Saudi Arabia.

Method

This was a cross-sectional survey of a non-probability sample of parents in Saudi Arabia. Data were collected from April to June 2023 using a web-based, self-administered survey. The collected data included sociodemographic characteristics, awareness and knowledge of HPV infection, vaccine hesitancy, and the receipt of HPV vaccine. Parental HPV vaccine hesitancy was measured using the 10-item Vaccine Hesitancy Scale (VHS), with higher scores indicating greater hesitancy. The median VHS score was used as a cut-off to dichotomize hesitancy (hesitant vs non-hesitant). Multiple logistic regressions were performed to identify hesitancy predictors.

Result

The study included a total of 591 parents, the majority of whom were female (%82.9), Saudi (%88.8), and bachelor's degree holders (%71.7). While more than half of the parents (%55.7) had heard of HPV vaccine, only %23.2 knew that cervical cancers are caused mainly by HPV infection. Awareness of HPV vaccine was significantly higher among younger parents, higher income respondents, parents with higher education, Saudi parents, and those who work in the medical field ($p<0.05$). Nearly %49 of the parents had a VHS score above the median and were classified as HPV vaccine hesitant. The multivariable analysis showed that being unaware of HPV vaccine is a significant predictor of hesitancy (OR=%95 ,2.13 CI: 3.59 – 1.26). Only %9.9 of the parents had vaccinated their child against HPV vaccine, the majority of whom were female children (%71.2).

Conclusion

Our study conducted in Saudi Arabia showed substantially high hesitancy among parents regarding HPV vaccine, underscoring the need for targeted education to address concerns and improve vaccine uptake.

Pharmaceutical Sciences Professionals

201934

pH-Sensitive Liposomes for Enhanced Cellular Uptake and Cytotoxicity of Daunorubicin in Melanoma (B16-BL6) Cell Lines

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Background
The development of pH-sensitive liposomes is a very promising strategy for cancer treatment. The concept is based on the fact that tumors have a lower pH than healthy tissue, and stimuli-sensitive liposomes can be prepared to release the incorporated drug only when subjected to this unique tumor condition. Among phospholipid classes, Cardiolipin (CL) increases the bilayer fluidity of cancer cell membrane as its presence introduces a higher unsaturation degree to the membrane bilayer. Daunorubicin (DNR) was delivered using a pH-sensitive liposomal system in B16-BL6 melanoma cell lines for enhanced cytotoxic effects. DNR was encapsulated within liposomes and CL as a component of liposomes lipid bilayer.

Method
PEGylated pH-sensitive liposomes, containing CL, were prepared in the molar ratio of 40:30:5:17:8 for DOPE/cholesterol/DSPE-mPEG (2000)/CL/SA using the lipid film hydration method and loaded with DNR (drug: lipid ratio of 1:5). The liposomes were characterized on the basis of their encapsulation percentage, release profile, size, zeta potential and polydispersity index. In addition, cytotoxicity, cellular uptake, drug retention and fluorescence imaging studies were conducted.

Result
The CL liposomes exhibited high drug encapsulation efficiency (>%90), a small size (~94 nm), narrow size distribution (polydispersity index ~0.16), and a rapid release profile at acidic pH (within 1 h). Furthermore, the CL liposomes exhibited 12.5- and 2.5-fold higher cytotoxicity compared to free DNR or liposomes similar to DaunoXome® (commercially available liposomes).

Conclusion
The pH-sensitive liposomes enriched with CL exhibited a higher cytotoxic and DNR cellular uptake effect on B16BL6 cell lines than liposomes similar to DaunoXome® and free DNR, suggesting that pH-sensitive liposomes change the physical properties of the plasma membrane leading to more diffusion of DNR into cancer cells. Therefore, this formulation appears to be a promising

delivery system for the treatment of melanoma.

201940

Cosmeceutical Potential of Taif Rose Oil in Skin Aging: An in-vivo Study of Protection from UVB-Induced Oxidative Damage and Photoaging

Abdulrahman Koshak, Hossam Abdallah, Mohamed Farag, Nesrine El Sayed, Shaimaa Badr-Eldin, Osama Ahmed, Mardi Algandaby, Ashraf Abdel-Naim, Sabrin Ibrahim, Gamal Mohamed, Peter Proksch and Haidy Abbas

Background

Extracts of rose petals (Rosa damascena mill L.) are traditionally used for cosmetic purposes and various skin conditions. Short-wave UVB (ultraviolet B) causes rapid oxidative damage to the skin. This work aimed to evaluate the possible protective potential of rose oil obtained from the Taif region against UVB-induced photoaging in an animal model.

Method

Taif rose oil (ROSE) was obtained from R. damascene by classical steam distillation and formulated in emulgel (100 mg/g). In addition, the oil was formulated in nano-emulsion (ROSE-NANO)-loaded emulgel (50 and 100 mg/g) to enhance the effect of ROSE. All prepared formulas were tested topically for their potential protective effect on UV-induced skin photoaging in adult male Wistar rats.

Result

Application of ROSE-NANO-loaded emulgel resulted in superior antiaging potency over ROSE emulgel based on histological studies as well as biochemical evaluations via amendments in catalase and superoxide dismutase activities, decreasing the concentration of the inflammatory markers and preventing collagen fragmentation through reduction of MMP-9 content in fibroblasts. Moreover, a significant decrease was observed in mRNA expression of NF-KB, JNK, ERK2/1, and p38 MAPK genes.

Conclusion

This study supported the traditional use of rose oil in skin aging and its cosmetic potential. The nano-emulsion formula showed superior and promising efficacy as a skin photoprotector against UV-induced oxidative damage and skin aging. These results encourage the development of cosmetic products based on local resources to enrich the Saudi economy.

201943

Targetting cancer cell with quinazoline ring

Wafa Alhirsan, Asma Mahmoud , Atheer Ibrahim and Dr.rania bakr

Background

Deregulation of epidermal growth factor receptor activity is considered as major mechanism by which cancer cells evade normal physiological constraints on growth and survival . Many EGFR inhibitors as Erlotinib , Gefitinib and Lapatinib had been approved by Food and Drug Administration for cancer treatment .Quinazoline derivatives are fused heterocyclic ring systems which attracted much attention due to its biological importance especially as anti cancer agents . The present review sheds the light on recent synthetic strategies and medicinal aspects including structure activity relationships of substituted quinazoline as EGFR inhibitors reported to date .

Method

Cancer has been considered as one of the most serious diseases characterized by upnormal and uncontrolled cell growth ,it is realized that neither surgery nor radiation nor the two in combination can adequately control metastatic cancer , therefore , efforts to cure cancer have been focusing on conventional chemotherapy . However , this type of treatment usually does not discriminate between dividing normal cells and tumor cells , leading to severe side effects . In the last decade , the use of molecular targeted therapies (a new generation of selective cancer drugs which interfere with specific receptors and signaling pathways that promote tumor cell growth) has made treatments more tuor-specific.

Result

There are several targets for anti-cancer agents they can reacts with special enzymes , protein or block specific receptors leading to cancer cells death .

Conclusion

Progress in the understanding of cancer and improved tools in cancer biology led to significant advances in targeted cancer therapy .EGFR enzymes are prominent alternatives to traditional chemotherapy in cancers overexpressing receptor tyrosine kinase . The crystal structure of EGFR has revealed the essential features which must be included in the design of EGFR inhibitors . Quinazoline ring is one of important ring as EGFR inhibitors that may act as a potential lead for the synthesis of clinically important candidates in near future."

201951

Coronary Implants Coated with Rapamycin and Heparin to Retard Bacterial Adhesions and Restenosis–An Experimental Study

Tariq Alfauri, Bader Ghanem Alanazi, Jawaher Ghanem Aldawsari, Fatimah Mohammed Alenazi, Radhi Ghanem Alanazi, Abdullah Abdlulmajeed Ali and Ahmad Sheihan Alonazi

Background
Atherosclerosis is a common type of coronary artery disease caused by occlusion of coronary arteries. Plaque narrows and hardens the arteries. Stent implantation is considered to be the most successful treatment for atherosclerosis. Hyperplasia and bacterial adhesion are complications found among stent implanted patients.

Method
The present research investigates solving the dual problems of restenosis and bacterial adhesion using a rapamycin- heparin mixture impregnated with cyclodextrin as a carrier. Drug discharge analysis using HPLC, the bacterial adhesion ability of organisms, and the inhibitory effect of drug-coated stents were evaluated. The uniform coating of drugs on the stents can be observed under scanning electron microscopy.

Result
The discharge of drugs from a coated stent surface was analysed for a maximum of 144h. Polymer degradation occurred and the mean concentration release remained almost constant from 72h to 144h, indicating the sustained release of drugs from the coated stents. Strong bacterial adhesion-producing organisms, Staphylococcus aureus (0.28) and Escherichia coli (0.27), showed a 1.7 ± 29.4mm and ± 23.2 0.8mm zone of inhibition.

Conclusion
The dual role of stents in preventing bacterial adhesion-associated infection and restenosis was achieved. Thus, a rapamycin-heparin coated drug with a cyclodextrin carrier can be considered as a novel product in the biomedical industry, with respect to its constant drug releasing ability.

201954
Discovery of Quinazolin-4(3H)-ones Bearing Urea Functionality as Novel VEGFR-2 inhibitors: Design, Synthesis, Anticancer Evaluation and Docking study

Mohammad Al-Sanea, Ahmed Mohamed, Hamed El-Shafey, Abdullah Elgazar, Samar Tawfik and Abdelrahman Hamdi

Background
In response to the urgent need for continuous discovery of new anti-proliferative agents, a new series of quinazoline compounds 5a-r was prepared.

Method
The in vitro anticancer activity of the new motifs had been tested on four cancer cell lines which are HCT116, HePG2, Hela and MCF-7, using sorafenib (SOR) as a reference.

Result
Of the tested compounds, compound 5d showed the best antitumor activity with IC8.94 ,2.39 ,6.09 50 and 4.81 μM,

in succession. In addition, compound 5h revealed potent anticancer effect against HCT116 and HePG2 with IC6.74 & 5.89 50 µM, respectively. Also, compound 5p exhibited very strong activity against HCT116, HePG2 & MCF7 with IC9.72 ,8.32 50 7.99 &, respectively. The compounds which showed the best cytotoxicity, underwent a VEGFR-2 inhibitory assay where 5p proved to be the best inhibitor of VEGFR-2 with IC0.117 50 µM, in comparison to 0.069 µM for SOR. Flow cytometric analysis of the best VEGFR-2 inhibitor 5p in MCF-7 cells revealed that it inhibited cell population in the G1/S phase.

Conclusion

The three new motifs were able to bind to the active site of VEGFR-2 enzyme as the co-crystallized ligand SOR in good accordance with the obtained experimental results.

201956

Development, Optimisation, and in Vitro Evaluation of a Nano Structure System Loaded with Essential Oils for Enhancing its Biopharmaceutical Attributes

Amani Khaled Ibrahim, Sarah Almutairi and Ruwina Bugis

Background

Musculoskeletal disorders affect approximately 1.71 billion people worldwide and can severely impair mobility and dexterity, resulting in decreased well-being, and diminished ability to engage in society.Non-steroidal anti-inflammatory drugs or NSAIDs have been used extensively throughout the world to manage such disorders . However , NSAIDs toxicity is common and may result in significant morbidity and mortality. Thus, the present study aimed to develop essential oils (EO) - loaded nanoemulgel (NEG) to enhance permeability of the oils through the skin, which will enhance their analgesic and anti inflammatory actions .Therfore , alleviating a variety of symptoms associated with musculoskeletal disorders . For this purpose, the EO -loaded nanoemulsion (EO-NE) was further optimised using I-optimal response surface design.

Method

The OM composed of (lavender oil, turmeric oil, eucalyptus oil, ginger oil, black seed oil, peppermint oil, frankincense oil, and clove oil) was prepared and mixed with several surfactant mixtures prepared with different ratios of Tween 80 and Span 80, and a cosurfactant (Transcutol) to formulate the OM-NE. Different surfactant mixtures were tested to attain the required HLB for emulsification of the oil . The prepared NEs were characterized for globule size, zeta potential, and stability index. After that, the optimum OM-NE formulation was converted into nanoemulgel (NEG) using %3 hydroxypropyl cellulose as the gelling

agent and evaluated for release and permeation across semipermeable membrane. Results indicated that, optimum RHLB for emulsification of OM was RHLB = 13. The formulated NE showed globule size of 184.6 nm, a stability index of 96.53 %, and a zeta potential of 19.9 mV. About 71.2 4.7 ± % of the OM was released and permeated across semipermeable membrane.

Result

Results indicated that, optimum RHLB for emulsification of OM was RHLB = 13. The formulated NE showed globule size of 184.6 nm, a stability index of 96.53 %, and a zeta potential of 19.9 mV. About ± 71.2 4.7 % of the OM was released and permeated across semipermeable membrane. About 4.7 ± 71.2 % of the OM was released and permeated across semipermeable membrane. In conclusion, the formulation of an analgesic and anti-inflammatory OM as NEG succeed in enhancing the oil permeation across semipermeable membrane by %71 compared with %41 for OM that was not formulated in nano-sized range.

Conclusion

Formulation of essential oils (peppermint oil, lavender oil, eucalyptus oil, turmeric oil, frankincense oil, black seed oil, and clove oil) in the form of combined oil mixture which was emulsified by using surfactant mixture with HLB=13 and Transcutol as co-surfactant lead to formulation of NE with a globule in a nano size range (184.6 nm) and %96.53 stability index. Incorporation of this NE in a gel base to formulate the OM-NEG enhanced the permeation of OM across semipermeable membrane by 1.7 times compared to OM not formulated as NEG. Thus, the outcomes of this research confirmed that an OM-NEG formulation could be effective in producing topical analgesic and anti-inflammatory action in the case of musculoskeletal problems.

201960

Collaboration of Hprt/K-RAS/c-myc mutation in the oncogenesis of T-lymphocytic leukemia: A comparative study

Mai O. Kadry, Rehab M. Abdel Megeed and Abdel Hamid Z. Abdel Hamid

Background

The development of mutations in hematopoietic cells results in leukemia, a malignant clonal illness. Acute lymphoblastic leukemia (ALL) is one of the utmost prevalent kinds of leukemia, is brought on by atypical lymphoid progenitor cell division in the bone marrow. Cisplatin and Doxorubicin have attracted more interest recently due to their ability to fight leukemic cells however they faced some problems of bioavailability and toxicity to normal cells. The anti-leukemic potential of lactoferrin-loaded Cisplatin, DOX,

and Ti-NPs- loaded Cisplatin, DOX, on DMBA-induced leukemia is examined in this study. Specifically designed lipid-based Titanium nano-formulations and lactoferrin-loaded formulation were utilized as drug carriers to smooth compound entry in low quantities. Mutation in hypoxanthine phosphoribosyl transferase (Hprt) locus has been investigated. The current article focus light on a comparative study between, Doxorubicin, titanium nanoparticles loaded Doxorubicin and Lactoferrin loaded-Doxorubicin, Cisplatin, titanium nanoparticles loaded Cisplatin, Lactoferrin-Cisplatin and Neupogen (Standard drug), in DMBA induced leukemic animal model and confirming the hypothesis that messenger RNA of Hprt/K-RAS/c-myc/P53/JAK-2 is a forthcoming signaling pathways in leukemia. Leukemia was induced in rats via SC dose of dimethyl benz (a) anthracene (DMBA) (35 mg/kg body weight), twice a week for one month with maximum single dose of 6.0 mg/rat. Then a comparative study between the aforementioned treatments was conducted via monitoring the crosstalk between Hprt/K-RAS/c-myc/P53/JAK-2 signaling pathways.

Method

Experimental Design

Animals were separated into nine groups of eight rats one week after acclimation and will be divided in accordingly:

Animals in (G1) acted as the control group and received saline.

G2: Used as a leukemia model while receiving DMBA intoxication in a SC dose of (35 mg/kg body weight) every seven days (Valentina et al., 2006). Rats were kept for three months until leukemia was detected.

G3: Following the establishment of leukemia, doxorubicin (5 mg/kg BW) IP was administered for one month (Keith et al., 2014).

G4: After one month following leukemia induction, they received treatment via titanium-loaded doxorubicin (2 mg/kg BW IP) (Hairui and Yong, 2020).

G5: Lactoferrin-loaded doxorubicin (2 mg/kg BW) IP was administered to the leukemic group (Jamie et al., 2005).

G6: Following the induction of leukemia, cisplatin (5 mg/kg BW) IP was administered for one month (Van Gelder et al., 2016).

G7: During a month, the leukemic group received cisplatin loaded titanium (2 mg/kg BW IP) (Hairui and Yong, 2020).

G8: For one month, the leukemic group received lactoferrin-loaded cisplatin (2 mg/kg BW IP) (Jamie et al., 2005).

G9: During a month, the leukemic group received Neupogen (5 mg/kg BW IP) (Ida et al., 2018).

Blood sampling and tissue preparation

The health of the rats was watched out. Animal's weight was taken, mildly sedated with carbon dioxide, and sublingual vein blood was taken. Sera

was centrifuged at 3000 rpm for 15 minutes, and it was then stored at -80 °C for estimation of the biochemical and molecular analysis. Rats were sacrificed via cervical dislocation. Serum was divided into portions for biochemical and RT-PCR estimation. Measured biochemical par

Results

RT-PCR results revealed a significant down regulation in Hprt, K-RAS and c-myc gene expression and P53, JAK-2 protein expression post DMBA intoxication. Nevertheless, treatment with the former drugs modulated Hprt/K-RAS/c-myc/P53/ JAK-2 signaling pathways with Ti-NPs loaded Doxorubicin showing the most significant impact in this regard.

conclusion

Hprt/K-RAS/c-myc/SAT-2/P53/JAK-2 signaling pathway could be a promising prognostic and diagnostic tool for T-lymphocytic leukemia. Also the utilization of the carrier triggered cancer cells elucidated an agonistic impact via enhancing the efficacy of drugs and improving its bioavailability.

201961

Mitigation of the Protein Expression of Heat Shock Protein-70 and HIF-1α in Hemic Hypoxia Using Different nutraceutical

Laila M. Fadda

Background

The study aims to inspect if the treatment with Quercetin (Qct) and/ or Melatonin (Melt), alone or together would control hemic hypoxia induced sodium nitrite injection (Sd nt; 60 mg/kg;). The antioxidants in question were administered 2 h prior to sodium Sd nt intoxication. Results: The outcomes revealed that hypoxia significantly declines the level of hemoglobin, arginine, citrulline proline and Fischer's ratio and upregulated LDH, ammonia, urea, branched-chain amino acids BCAAs (valine, leucine, and isoleucine) and aromatic amino acids (phenylalanine and tyrosine). Protein expression of heat shock protein 70 and hypoxia-inducible factor were up regulated matched with that in the control. The administration of Qct and/or Melt amended the formerly disturbed limits. Conclusion: Qct and Melt combination could be recommended in the areas of high altitudes to combat the hazardous effect of hypoxia on hemoglobin concentration as well as on various biochemical parameters.

Method

Rats were divided into five groups, 6 rats each. (Group 1): normal animals treated with saline; (Group 2): Hypoxic group, rats were injected subcutaneously with Sd nt (60 mg/kg) [23]; (Group 3): rats were treated with 200 mg/kg of Qct (i.p) [24] 2 h prior to Sd nt injection; (Group 4): animals were injected with Melt (100 mg/kg,

i.p) [25] 1 h prior to Sd nt injection. (Group 5): rats have been treated with the same doses of Qct & Melt: prior to Sd nt as the same protocol previously mentioned.
Sod nt was injected subcutaneously (s.c.) as a single dose. Quer and Mel were administered intraperitoneally, 2 h before Sod nitrite injection. After one hour of Sd nt injection, rats were exposed to Carbon dioxide in gradually increasing concentration of and sacrificed by decapitation and then blood samples were collected and divided into two parts. One part for hemoglobin determination. The other part was centrifugated at 3000 rpm.
BIOCHEMICAL ANALYSIS
DETERMINATION OF BLOOD HEMOGLOBIN
Hemoglobin was assayed in the whole blood by its oxidation to methemoglobin with alkaline ferricyanide reagent (Drabkin's reagent), giving intensely colored cynmethemoglobin, which was measured at 540 nm. The results are expressed as g/dl [26].
DETERMINATION SERUM BIOCHEMICAL PARAMETERS
DETERMINATION OF LDH ACTIVITY
The activity of LDH was measured using the kits obtained from Bio-Mèrieux-RCS (Lyon, France).
Western blot analysis for expression of heat shock protein 70 Protein expression
Protein expression were measured according to the method (Jackson et al.,2000)[27].

Detection of mRNA expression of HIF 1α Using Real-Time PCR Total RNA Extraction mRNA expression of HIF 1α was performed using the method applied by (Livak and Schmittgen,2001)[28].

Result

The present data revealed that hypoxia-induced by Sd nt significantly decreased blood hemoglobin concentration and significantly increased the activity of LDH and the expression of Hsp-70 and HIF-1a compared with normal control rats at $P<0.05$.
Pretreatment of the hypoxic rats with Qct or Melt alone, or in combination significantly restored hemoglobin concentration , LDH activityas well as Hsp-70 and HIF-1α expression. The combination protocol exhibited the best results in these concerns (Figs. 1,2 3 &).
Table 2 represents plasma amino acid concentration and different nitrogenous compounds in nmol/ml as well as Fisher's ratio in the control, hypoxic rats as well as different treated groups. Sodium nitrite injection caused a highly significant decline in the concentration of proline, citrulline, histidine as well as Fisher's ratio at ($p< 0.001$), while it caused a significant elevation in the concentration of alanine, isoleucine, tyrosine, phenylalanine, tryptophan, taurine and total AAA at ($p < 0.001$) compared with the control group.
The administration of aforementioned antioxidants before Sd nt injection

caused highly significant decline in the concentration of aromatic amino acids, hence the treatment with Qc

201962

Possible involvement of P2X7 receptor activation in acute myocardial infarction-induced fibrotic remodeling

Noura Almusallam, Noura Almusallam, Asma Alonazi, Anfal Bin Dayel, Abdullah Almubarak, Wajd Althakafi, Rehab Ali, Rizwan Ali and Nouf Alrasheed.

Background
Post-Acute myocardial infarction (AMI) fibrosis is a pathophysiologic process characterized by activation of pro-fibrotic mediator transforming growth factor-β (TGF-β), resulting in excess deposition of extracellular matrix proteins such as collagen and fibronectin. AMI is associated with substantial increase in extracellular adenosine triphosphate (eATP) level that acts on purinergic P2X7-receptor (P2X7-R), triggering inflammatory response that contributes to myocardial fibrotic remodeling. To date, the effect P2X7-R antagonist on cardiac fibrosis has not been elucidated yet. Therefore, current study aimed to investigate the possible effect of P2X7-R antagonist, A740003, on post-AMI fibrosis, via profibrotic TGF-β1/Smad signaling pathway. Moreover, examine whether its effect is mediated via modulation of GSK-3β as a possible link.

Method
Thirty-two rats (eight rats/group) were exposed to either Sham or surgical ligation of left anterior descending coronary artery, then treated for seven days as following:Sham control, ligation-untreated, ligation vehicle-treated, and ligation-treated with A740003 (50mg/kg/day,i.p). The hemodynamic parameters, and serum cardiac injury biomarkers were examined. The target proteins expressions were detected. Moreover, histopathological changes and cardiac fibrosis were assessed. Statistical significance was determined using ANOVA followed by Tukey's post hoc test.

Reult
The untreated ligated rats showed significant increase in serum levels of troponin-I ($P<0.01$, $n^3 5$), lactate dehydrogenase ($P<0.01$, $n^3 5$), and creatine kinase-MB ($P<0.01$, $n^3 5$) reflecting myocardial damage which confirmed by morphological changes and massive cardiac fibrosis. Protein expression of fibronectin ($P<0.01$, $n^3 4$), TGF-β1($P<0.001$, $n^3 5$), and P-Smad2 were elevated reflecting cardiac fibrosis. In contrast, treatment of ligated rats with A740003 for 7 days improved all the above-mentioned measured parameters.

Conclusion
A740003 exhibits a potential cardio-protective effects on post-AMI fibrotic

remodelling in animal model of AMI through P2X7-R blockade, possibly via downregulation of the profibrotic TGF-β1/Smad signalling pathway, which attributed to the possible effect of A740003 on re-storing of GSK-3β phosphorylation, and this could be a new cardioprotective strategy to attenuate post-AMI fibrotic remodelling.

201971

Mechanism Underlying Triple VEGFR Inhibitor Tivozanib Induced Vascular Toxicity and Hypertension: Role of Angiotensin II and Oxidative stress

Abdulrahman Alanazi, Abdulrahman Alanazi and Wael Alanazi

Background

One of the main factors contributing to heart disease is hypertension worldwide. There is a positive correlation between hypertension and cardiovascular diseases. Tivozanib is a novel agent proven to have high efficacy in treating adult patients with relapsed or refractory advanced renal cell carcinoma after two or more prior systemic treatments. Tivozanib is an oral vascular endothelial growth factor-tyrosine kinase inhibitor specific for vascular endothelial growth factor receptors 3–1. Clinical studies showed that around %46 of patients who received tivozanib suffer from hypertension in all grades. Consequently, this study aimed to investigate the mechanism underlying tivozanib-induced hypertension and renal-cardiovascular toxicities via blocking angiotensin-II type 1 receptor (AT1R) with losartan.

Method

Forty-eight C57BL/6J mice were used in our study and were randomly divided into four groups: control group, tivozanib group (1 mg/kg),Tivo+Los group (10 mg/kg), and Tivo+Los group (30 mg/kg). Blood pressure was recorded every three days, and proteinuria was measured every week. On day 21, all mice were euthanized, and blood and tissue samples were collected for histopathological, biochemical, and protein analysis.

Result

We found that tivozanib treatment increased blood pressure components and proteinuria. Also, we demonstrated that tivozanib treatment resulted in cardiac, renal, and artery damages, as evidenced by significant changes in histopathology. Moreover, tivozanib increased the level of AngII and its AT1R/AT2R expressions. Furthermore, tivozanib treatment elevated the endothelin-1 hormone and decreased nitrite levels. Additionally, tivozanib administration decreased antioxidant enzymes (glutathione, superoxide dismutase) and showed a substantial increase in malondialdehyde levels.

Conclusion

Losartan's AngII type 1 receptor blockage prevented these tivozanib-related side effects and kept blood pressure within normal range. The results showed that tivozanib-induced-AngII played a critical role in the induction of endothelin-1 and oxidative stress, decreased nitric oxide bioavailability and resulted in vasoconstriction in tivozanib-induced hypertension. Further experiments and future studies are needed to understand hypertension and renal-cardiovascular toxicities effects of tivozanib comprehensively.

201977

Design, Synthesis, and Biological Evaluation of New Potential Unusual Modified Anticancer Immunomodulators for Possible Non-Teratogenic Quinazoline-Based Thalidomide Analogs

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Background

New sixteen thalidomide analogs were synthesized. The new candidates showed potent in vitro antiproliferative activities against three human cancer cell lines; namely hepatocellular carcinoma (HepG-2), prostate cancer (PC3), and breast cancer (MCF-7).

Method

The biological screening was performed by the following experiments:
1-In vitro anti-proliferative MTT assay
2-In vitro protein expression assay for VEGF, caspase-8, NF-κB P65 and TNF-α expression levels in HepG- 2 cells.
3-Estimation of human vascular endothelial growth factor (VEGF) in HepG-2 superna-tant.
4-CEstimation of nuclear factor kappa-B P65 (NF-κB P65) in HepG-2 cell lysateaspase-8 activity assay in HepG-2 cell lysate
5- Annexin V-FITC apoptosis assay
6- Cell cycle analysis

Result

compounds XII, XIIIa, XIIIb, XIIIc, XIIId, XIVa, XIVb, and XIVc showed IC50 values ranging from 2.03 to 13.39 µg/ml, exhibiting higher activities than thalidomide against all tested cancer cell lines. Compound XIIIa was the most potent candidate, with IC50 of 0.02 ± 0.82 ,0.2 ± 2.51 ,0.11 ± 2.03 µg/ml compared to ± 14.58 ,0.54 ± 11.26 0.7 ± 16.87 ,0.57µg/ml for thalidomide against HepG-2, PC3 and MCF-7 cells, respectively. Furthermore, compound XIVc reduced the expression of NFκB P65 levels in HepG-2 cells from 278.1 pg/mL to 63.1 pg/mL compared to 110.5 pg/mL for thalid-omide. Moreover, compound XIVc induced an eightfold increase in caspase-8 levels with

con-temporary decrease in TNF-α and VEGF levels in HepG-2 cells. Additionally, compound XIVc induced apoptosis and cell cycle arrest.

Conclusion

Two compounds XIIIa, XIVc should be considered for further evaluation for the discovery and development and of new anticancer drugs.

201991

Nanosponge-Loaded Topical Gel for Treatment of Psoriatic Arthritis: Design, Development and In-vitro Evaluation

Dr Umme Hani, Nawaz Mahammed, T Reshma, Adel Alfatease, Wejdan Alqathanin, Saja Mojammed and Reema Alghaseb

Background

Psoriatic arthritis (PsA) is a chronic inflammatory condition affecting the joints. About %25 of all psoriasis patients develop psoriatic arthritis. It is characterised by innate and adaptive immune responses. The aim of the current study was to formulate and evaluate the Nanosponge-loaded topical gel. Celecoxib is a non-steroidal anti-inflammatory drug (NSAID having low solubility and bioavailability

Method

Celecoxib is a non-steroidal anti-inflammatory drug (NSAID having low solubility and bioavailability. In order to increase solubility, the drug was incorporated into nanosponges. Nanosponges (NS) were prepared by using beta-cyclodextrin as polymer and Dimethyl carbonate (DMC) as cross-linker by melting method and Gels were prepared by employing carbopol and badam gum as polymers. The gels were transparent and had good spreadability, extrudability and viscosity

Result

The prepared nanosponges were evaluated for different parameters. Solubility studies confirmed that the prepared nanosponges were highly soluble in nature. FTIR studies confirmed the formation of hydrogen bonds between Celecoxib and beta-cyclodextrin. SEM confirmed that the prepared formulations were roughly spherical and porous in nature. The average particle size was 0.02 ± 190.5 nm. XRD studies have shown that the crystallinity of celecoxib decreased after encapsulation, which helped to increase the solubility of celecoxib. The optimized nanosponges (NS2) were incorporated in optimized gel (FG7) to formulate nanosponge-loaded topical gel. The in vitro diffusion studies for topical gel showed drug release of %82.32 in 24 h.

Conclusion

Hence, it is concluded that nanosponge-loaded topical gel can be an effective delivery system for celecoxib in the treatment of Psoriatic Arthritis.

201995

Investigation Of Novel Cell Signaling Down Regulators And Their Potential Use In Cancer Treatment

Dana AlKharboush, Abdelsattar Omar and Maan Hayat

Background

The role of protein tyrosine kinases in cellular signal transduction and regulation of cellular processes makes them an attractive target in the treatment of cancer.Our aim is to design compounds that bind to a site distinct from the ATP cleft to enhance the selectivity and prevent toxicity.

Method

In vitro assays, including molecular docking and molecular dynamic simulation, were performed to assess the binding capacity of the compounds and try to identify the exact target. The compound was then synthesized to perform assays such as photoaffinity labeling will be performed to identify the exact targets.

Result

Among the tested kinases, AKT (PDB ID: 4EJN), Src kinases (PDB ID: 2H8H) , and JAK2 were the most commonly inhibited by MCP702 with docking scores of -8.519 Kcal/mol ,-8.331 Kcal/mol, and -9.058 kcal/mol, respectively. MCP-702 formed a hydrogen bonding interaction through its carbonyl oxygen with Tyr272 of the AKT kinase. MCP-702 formed a hydrogen bonding interaction through the NH of the amide with Tyr340 of the Src kinase as well as a pi-pi stacking interaction with Phe405.Two molecular dynamic simulations were performed indicating the stability of the interaction between MCP702 and Src kinase (PDB ID:2H8H) and MCP702 and the JAK2 kinase (PDB ID: 7TEU) during the 200 ns simulation.

Conclusion

MCP-702 could potentially inhibit different kinases including Src,AKT, and JAK2 kinases by binding to allosteric sites.

201996

Design and Synthesis of Novel 5-((3-(Trifluoromethyl)piperidin-1-yl)sulfonyl)indoline-2,3-dione Derivatives as Promising Antiviral Agents: In Vitro, In Silico, and Structure–Activity Relationship Studies

Marwa Saleh, Rogy Ezz Eldin , Sefat Alwarsh , Areej Rushdi , Azza Althoqapy, Hoda El Saeed and Ayman Abo Elmaaty

Background

Viruses are considered pathogens that cause a lot of diseases, varying from self-healing diseases to acute fatal diseases. Infections caused by the herpes simplex virus (HSV) are considered one of the most common viral infections. Latently, infections caused by the herpes simplex virus

(HSV-1) have exceeded %80 of the human population. Coxsackievirus B3 (Cox B3) infects neonates in their first week, causing severe illnesses such as myocarditis or meningoencephalitis. The H1N1 infection was transmitted very quickly in both children and adults, leading to respiratory symptoms ranging from self-limited to complicated cases characterized by pneumonia and acute respiratory distress that needed hospitalization. In our work we designed and synthesized a series of new isatin derivatives as broad-spectrum antiviral agents.

Method
the antiviral activities of the synthesized compounds were pursued against three viruses, namely influenza virus (H1N1), herpes simplex virus 1 (HSV-1), and coxsackievirus B3 (COX-B3).

Result
In particular, compounds 5 ,9, and 4 displayed the highest antiviral activity against H1N1, HSV-1, and COX-B3 with IC50 values of 0.0022 ,0.0027, and 0.0092 _M, respectively. Compound 7 was the safest, with a CC50 value of 315,578.68 _M.
Moreover, a quantitative PCR (real-time PCR) assay was carried out for the most relevant compounds.

Conclusion
The selected compounds exhibited a decrease in viral gene expression. Additionally, the conducted in silico studies emphasized the binding affinities of the synthesized compounds and their reliable pharmacokinetic properties as well. Finally, a structure–antiviral activity relationship study was conducted to anticipate the antiviral activity change upon future structural modification.

202003
Studying the Potential Prophylactic Effect of Indole 3-Acetic Acid Against Methotrexate-Induced Liver Toxicity

Sumayya Alturaif, Ahlam Alhusaini, Wedad Sarawi, Juman Alsaab and Iman Hasan

Background
Methotrexate (MTX), a structural analog of folic acid, is one of the most widely used therapeutic agents to treat many inflammatory and malignant diseases. Despite its multiple uses, the long-term use of MTX is associated with multiorgan toxicities including hepatic injury. The underlying mechanism of MTX-induced liver toxicity is not well defined, but it is possibly dependent on overproduction of reactive oxygen species (ROS) and glutathione (GSH). Indole 3-acetic acid (IAA) is a hormone that possesses antioxidant and anti-inflammatory properties due to the neutralizing of free radicals. Thus, this study aims to understand the mechanisms involved in MTX-induced liver toxicity and investigate

the hepatoprotective effect of IAA as a potential regulator of hepatic enzymes, oxidative stress, and inflammation.

Method
Rats were divided into five groups and treated for 10 days. Control, IAA (40 mg/kg, p.o.), MTX (20 mg/kg, i.p) as a single dose on day 8, quercetin (20 mg/kg, p.o.) +MTX, and IAA+MTX. We analyzed hepatic enzymes, oxidative stress, and inflammatory markers, histopathological and immunohistochemical analyses.

Result
MTX treated group showed significant increase in ALT and AST levels which were attenuated by IAA/QUR+MTX groups. They showed a decrease in MDA and increase GSH and SOD levels compared to MTX treated group. Histopathological studies showed abnormal hepatocytes in MTX with normal hepatic features in IAA/QUR+MTX groups. Inflammatory markers: TNF-α, IL-6 and IL-1β were significantly high in MTX group and decreased in IAA/QUR+MTX groups. In histopathological study: NF-kB, caspase-3 and TLR4 showed high expression in MTX and less in IAA/QUR+MTX groups.

Conclusion
No study has been conducted to examine the potential protective effect of IAA against MTX-induced toxicity. This study showed the antioxidant, anti-inflammatory and anti-apoptotic effects of IAA. The combination treatment of IAA with MTX could reduce its hepatotoxicity while further research is encouraged on chronic toxicity.

202007
Macrophage-mediated inflammation and expression of FABP4 in diabetic hearts: A potential molecular target in diabetic cardiomyopathy

Sarah Alrasheed, Atheer Alhuntush, Asma Alonazi, Maha Alamin, Anfal Bin Dayel, Doaa Elnagar, Nawal Alrasheed, Tahani Alshammari and Nouf Alrasheed

Background
Diabetic cardiomyopathy (DCM) occurs regardless of cardiac risk factors. Macrophages expressing fatty acid-binding protein 4 (FABP4) induce inflammation via the TLR4/JNK pathway, but their function in DCM remains unclear. Thus, we aimed to examine the role of macrophages expressing FABP4 and TLR4/JNK as potential molecular targets in DCM.

Method
Forty-eight 250- to 300-g adult male Wistar albino rats were divided into eight groups (n=6). T2DM was induced with a high-fat diet (6 weeks of low-dose streptozotocin intraperitoneal injections at 30 mg/kg). Macrophages were depleted using intravenous liposomal clodronate (LEC) injections

(15 mg/kg). For 4 weeks, the control groups received %0.9 NaCl; two diabetic and non-diabetic groups, 100-µg/kg lipopolysaccharide (LPS); and two diabetic and non-diabetic groups, a JNK inhibitor (SP,600125 15 mg/kg). After euthanasia, hypertrophied hearts were identified on the basis of the heart weight-to-body weight ratio (HW/BW). Enzyme-linked immunosorbent assays were used to determine cardiac injury, inflammatory, and oxidative stress biomarkers; immunohistochemical assays, to identify macrophage phenotypes and FABP4 expression levels; and western blotting analysis, to assess the TLR4, p-JNK, and FABP4 expression levels.

Result

Macrophage depletion decreased the HW/BW ratio (0.2016±3.342 vs 0.4530±4.631 mg/g, $p<0.02$), troponin I level (0.176±5.396 vs. 0.967±8.741 pg/ml, $p<0.001$), and CK-MB level (0.271±7.235 vs. 0.288±3.161 ng/ml, $p<0.001$); enhanced superoxide dismutase activity (0.205±9.32 vs. 0.146±2.588 U/mg, $p<0.001$); and reduced malondialdehyde levels (5.446±52.33 vs. 9.705±200.3 nmol/mg, $p<0.001$). LEC reduced TNF-α (0.367±19.204 vs. 1.171±29.164 ng/ml, $p<0.001$), IL-6 (0.006±0.037 vs. 0.086±0.298 ng/ml, $p<0.01$), and IL-1β levels (2.897±18.795 vs. 6.677±39.92 ng/ml, $p<0.01$); shifted the macrophage polarization toward the M2 phenotype (0.4994±6.667 vs 0.3333±1.667 cells/mm2, $p<0.001$); decreased the FABP4 expression level (0.4773±3.167 vs 0.4282±7.500 cells/mm2, $p<0.001$); and restored cardiac damage. JNK inhibition reduced inflammation and FABP4 protein expression levels, and ameliorated cardiac injury.

Conclusion

Inhibiting macrophages from expressing FABP4 mediates inflammation by modulating the TLR4/JNK pathway, thereby halting DCM.

202016

Skin Anti-aging Potential of Launaea procumbens extract: Antioxidant and Enzyme Inhibition activities supported by ADMET and molecular docking studies

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Background

Aging is a natural process that occurs in all living organisms. Particularly, the skin embodies aging since it serves as a barrier between the body and its surroundings. Previously, we reported the wound healing effect of Launaea procumbens and identified compounds therein. The study aims to explore the skin anti-aging properties of the plant extract.

Method
To that effect, the antioxidant potential of the methanolic extract of Launaea procumbens (LPM) was assessed using two complementary DPPH and FRAB assays. The enzyme inhibitory effect of the extract on collagenase, elastase, hyalurodinase, and tyrosinase was evaluated to assess the direct anti-aging effects. Similarly, the anti-inflammatory activity was evaluated via the assessment of cyclooxygenase-2 (COX-2) and 5-lipoxygenase (5-LOX) inhibition to explore the indirect anti-aging effects. The ADMET properties of all identified compounds were assessed using pkCSM online tool. MOE software was utilized for the molecular docking strategy.

Result
LPM demonstrated significant antioxidant activity in DPPH (IC50 29.08 = µg/mL) and FRAB (1216 µM FeSO4/g extract) assays. Plant extract showed a significant inhibition of collagenase, elastase, hyaluronidase, and tyrosinase (IC,43.76 ,52.68 = 50 31.031, and 37.13 µg/mL, respectively). The extract demonstrated a significant COX-2 and 5-LOX inhibition capacity with IC10.85 = 50 and 18.63 µg/mL, respectively. ADMET analysis of the compounds revealed their good absorption, distribution and metabolism profile and they were found to be safe as well. The molecular docking study revealed high potential of identified compounds to bind to the active sites of enzymes crucially involved in skin aging process.

Conclusion
Launaea procumbens is considered as a propitious source for the development of natural skin anti-aging and antioxidant compounds. This, in turn, may facilitate its incorporation into cosmetic formulation after further investigation.

202026
Phytochemical Profiling, In Vitro Biological Activities, and In-Silico Studies of Ficus vasta Forssk.: An Unexplored Plant

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Background
Medicinal plants have played a major role as source of lead compounds that may be used for a variety of medicinal and pharmacological activities. Ficus vasta Forssk. (Moraceae family) is an important medicinal plant that has not been previously investigated for its phytochemical and biological potential.

Method
Phytochemical screening, total bioactive content, and GCMS analysis were used to determine its phytoconstituents profile. Antioxidant, antibacterial, antifungal, anti-viral, cytotoxicity, thrombolytic, and

enzyme inhibition activities were examined for biological evaluation.

Result

The plant extract exhibited the maximum total phenolic (± 89.47 3.21 mg GAE/g) and total flavonoid contents (4.14 ± 129.2 mg QE/g), which may be related to the higher antioxidant potential of the extract. The extract showed strong α-amylase (IC0.21 ± 5 50 µg/mL) and α-glucosidase inhibition activity (IC0.32 ± 5 50 µg/mL). Significant results were observed in the case of antibacterial, antifungal, and anti-viral activities. The F. vasta extract inhibited the growth of HepG2 cells in a dose-dependent manner. The GCMS analysis of the extract provided the preliminary identification of 28 phytocompounds. In addition, the compounds identified by GCMS were subjected to in silico molecular docking analysis in order to identify any interactions between the compounds and enzymes (α-amylase and α-glucosidase). After that, the best-docked compounds were subjected to ADMET studies which provide information on pharmacokinetics, drug-likeness, physicochemical properties, and toxicity.

Conclusion

The present study highlighted that the ethanol extract of F. vasta has antidiabetic, antimicrobial, anti-viral, and anti-cancer potentials that can be further explored for novel drug development.

202028

Effect of 3-hydrazinylquinoxaline-2-thio hydrogel on Skin Wound Healing Process in Diabetic Rats.

Jehan Al-Amre, Huda Alkreathy, Ahmed Ali and Abdelbagi Elfadil

Background

Impaired wound healing in diabetic individuals creates huge social and financial burdens for both diabetic patients and the health system. This can lead to a progression in infection, ulceration, or amputation. Unfortunately, the current treatment has not resulted in consistently lower amputation rates. Thus, the need for therapeutic options appears necessary. Quinoxalines are heterocyclic compounds with multiple important pharmacological properties, such as anti-cancer, antimicrobial, and antifungal effects. Quinoxaline and its derivatives have become an important subject in recent years. Their effect on wound healing has not been closely studied.

Method

In the current work, the wound healing effect of 3-hydrazinylquinoxaline-2-thio hydrogel is tested topically in a full-thickness excision wound in streptozotocin-induced type 2 diabetic rats (N = 42). Group 1: non-diabetic control rats treated by daily topical application of white petrolatum jelly (vehicle); group 2: diabetic rats topically treated

daily with vehicle alone. Group 3: diabetic rats treated by daily topical application of the hydrogel 0.2 % on days 14 ,7, and 21; wound tissue was harvested for analysis. We examined the wound closure rate, expression of inflammatory factors, and growth factors in addition to the histological analysis.

Result

The result revealed a significant acceleration in wound closure in the treated group compared with the control experimental animals. Histological data demonstrated enhanced re-epithelialization and collagen disposition. The healing effect was additionally evaluated by the inhibition of the inflammatory response (NF-κB, TNF-α, IL-1β, and IL-6) with a marked improvement of the growth factors, TGFβ-1, and collagen-1.

Conclusion

The present work showed that 3-hydrazinylquinoxaline-2-thio holds great potential for the treatment of diabetic wounds. It is believed that the anti-inflammatory properties would contribute to this enhanced effect. Additional studies to evaluate its safety and efficacy are warranted to enter the clinical arena in the near future.

202035

Development and Validation of a Simple Colorimetric Analytical method of Triamcinolone acetonide

Haya S. Alzeer, Shikah F. Alzaid, Fahad S. Aldawsari and Yahya M. Alshehri.

Background

Triamcinolone acetonide (TAC) is an intermediate-acting synthetic glucocorticoid therapeutically used to treat autoimmune, and inflammatory diseases. In 2014, the FDA authorized TAC in nasal spray form as an over-the-counter drug in the United States. An inappropriate use of corticosteroids can result in side effects, such as weight gain, psychological changes, hypertension, and osteoporosis. Tetrazolium blue (BT) reaction used for colorimetric determination of corticosteroids, with large range of detection, and the reaction can be carried out at room temperature.
Purpose: Develop and validate a simple and fast method for TAC quantitation in nasal spray pharmaceutical form using the BT reaction and UV-vis spectrophotometry method. Several factors were examined to optimize method conditions, including time, wavelength, and solvent.

Method

An analytical method of TAC using ultra-performance UV-Vis spectrophotometer, and the colorimetric reaction of the BT

reagent in alkaline medium. Two types of solvents; ethanol and Dichloromethane have been investigated. After kept the reaction in the dark for 5 minutes the absorbance was measured at 525 nm against the blank. The validation parameters: specificity, linearity, limit of detection, limit of quantitation, precision and accuracy, have been evaluated.

Result

Beer's law of the developed method was proven in the concentration range of 40–10 µg/mL and showed a specific linear relationship with R0.998 = ². The LOQ level was 9.99 µg/mL, with (RSD = %0.26). From precision assay, RSD values have been obtained for the repeatability and intermediate precision, which were found to be (RSD = %1.65) and (RSD = %2.01), respectively, indicating that the method is reproducible. Recovery studies showed mean recoveries in the range of (103.65 –100.08 %), meeting the acceptance criteria for accuracy.

Conclusion

The validated method represents a potential alternative to the official USP analytical procedure. Furthermore, it can be implemented in routine analysis for rapid quantitative determinations of TAC.

202046

Effect of Aripiprazole on Lipopolysaccharide-Induced Neuroinflammation in Rats

Bander Shehail Alshammeri and Vasudevan Mani

Background

Aripiprazole (APZ) is widely used in the treatment of schizophrenia caused by bipolar disorder and mania. APZ partial agonist activity at dopamine D2, serotonin 5-HT1A receptors, and antagonist at serotonin 5-HT2A receptors. Dementia and other forms of cognitive decline are frequently caused by neurodegenerative disorders such as Alzheimer's disease (AD). LPS is potent on the surface of gram-negative bacteria and is an endotoxin causing neurotoxicity in the brain.

Method

Twenty-four rats (250–150 g) were divided into a control group, LPS-induced group, APZ1+LPS, and APZ2+LPS groups; each group contained six animals. All the animals received LPS through I.P. except the control group. Only APZ1+LPS and APZ2+LPS receive the treatment in different doses, 1mg and 2mg by oral gavage. Animals were treated for 30 days. The animals were subjected to behavioral tests using the elevated plus maze tests, novel object recognition, and Y-maze on ,27/26 29/28, and 30, respectively.

Result

Treatment of Aripiprazole improved spatial memory and cognitive deficiency in LPS-induced rats by increasing the transfer latency, the time spent exploring the novel object, and the number of entries to the novel arm for the treated groups compared to LPS-induced group using elevated plus maze, novel object recognition, and Y-maze tests, respectively. Oxidative stress parameters also show increased levels of Catalase and GSH while decreased MDA levels. Also, it offers an increased level of anti-apoptotic parameter Bcl-2. In contrast, decreased levels of pro-apoptotic parameters Caspase-3 and Bax, for neuroinflammatory parameters, show reduced levels of COX-2, TNF-α, and NF-κB.

Conclusion

In conclusion, the outcome of this study might support that APZ is a potential treatment for improving memory impairment in the LPS-induced group by reducing neuronal inflammation, apoptosis, and oxidative stress.

202092

Biochemical, pharmacological, behavioral and histological study for the neuroprotective effect of phytochemicals against attention-deficit/hyperactivity disorder (ADHD) in a rat model

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Background

Introduction: Thymoquinone (TQ) and thymol (T) have been proved to possess a positive impact on human cognitive function. Still, their neuroprotective effect on the Attention-deficit/hyperactivity disorder (ADHD) neurodegenerative disorder has to be investigated. Objective: We aimed to investigate the prophylactic effect of these compounds separately and together on the Attention-deficit/hyperactivity disorder (ADHD) induced by monosodium glutamate (MSG) in a rat model.

Method

Methods: Forty male, Spargue Dawley rat pups were randomly allocated into five groups: Normal saline (NS), MSG, MSG+TQ, MSG+T, and MSG+TQ+T. MSG (0.4 mg/kg/day), TQ (10 mg/kg/day) and T (30 mg/kg/day) were orally administered for 8 weeks.

Result

Results: The behavioral tests proved that rats treated with TQ and/or T showed significant protective effect for the locomotor, attention and cognitive functions compared to the MSG group with superior protective effect for TQ and augmented effect during using their combination. All TQ- and/or T-treated groups

showed improvement in MSG-induced aberrations in brain levels of oxidative stress, inflammatory, apoptotic and neurodegenerative biomarkers. Moreover, they improved neurotransmitters in the brain tissues upon treatment with these phytochemicals. All of these findings were further confirmed by the histopathological examinations.

Conclusion

Conclusion: Both TQ and/or T had higher neuroprotective effects than their individual supplementations against MSG-induced ADHD in rat model. Nutrition can play a great role for protection against neurodegenerative disorders.

202131

Comparative evaluation of doxorubicin, cyclophosphamide, 5-fluorouracil, and cisplatin on cognitive dysfunction in rats: Delineating the role of inflammation of hippocampal neurons and hypothyroidism

Lamis Alotayk, Maha Aldubayan , Sattam Alenezi , Md Jamir Anwar and Ahmad Alhowail

Background

Chemotherapeutic agents such as doxorubicin, cyclophosphamide, fluorouracil, and cisplatin are commonly used to treat a variety of cancers and often result in chemobrain, which manifests as difficulties in learning and memory processes that can persist in the years following treatment. The current study aims to evaluate the cognitive function following treatment with these agents and the underlying mechanisms using a rat model of neuroinflammation and possible implication of thyroid toxicity in chemotherapy induced cognitive dysfunction.

Method

Wistar female rats were treated with a single dose of doxorubicin (DOX, 25 mg/kg), 5-fluorouracil (5-FU, 100 mg/kg), cisplatin (8 mg/kg), and cyclophosphamide (CYP, 200 mg/kg) by intraperitoneal injection. The cognitive performance of rats was then evaluated in spatial memory tasks using the Y-maze, novel object recognition (NOR), and elevated plus maze (EPM) tests. Serum levels of thyroid hormones (T3, T4, FT3, and FT4) and thyroid stimulating hormone (TSH) were measured, followed by estimation of TNFα, IL-6, and IL-1β in the hippocampal tissue.

Result

Results revealed that all the chemotherapeutic agents produced impairment of cognitive function, and significant increase of pro-inflammatory cytokines such as TNFα, IL-6 and IL-1β in the hippocampal tissues. There was a significant reduction in thyroid hormones (T3, FT3, and T4) and an increase in thyroid stimulating hormone (TSH) in serum,

which may also have contributed to the decline in cognitive function.

Conclusion

In conclusion, DOX, 5-FU, CYP, and cisplatin produces impairment of spatial memory possibly by inflammation of hippocampal neurons and endocrine disruption (hypothyroidism) in rats.

202156

Revisiting the Flora of Saudi Arabia: Phytochemical and Biological Investigation of an Endangered Plant Species Euphorbia saudiarabica

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Background

Euphorbia plants have a significant place in traditional medicine due to their therapeutic properties including antitumor effects which have been observed in several species. This study investigated the phytochemical and antiproliferative properties of endemic E. saudiarabica.

Method

Various chromatographic techniques were recruited to isolate secondary metabolites from E. saudiarabica aerial parts. Their structures were elucidated by extensive spectroscopic analyses. The anticancer properties of crude extract, fractions, and isolated phytochemicals were examined against different cancer cells. The active fractions were evaluated for their effects on cell-cycle progression and apoptosis induction using flow cytometry. The RT-PCR was employed to estimate the gene-expression levels of the apoptosis-related genes.

Result

Phytochemical investigation of E. saudiarabica methanolic extract led to the isolation and characterization of four secondary metabolites (4-1). Among them, saudiarabicain F (2) is an ingol-type diterpenoid that has not been previously reported in nature. Chloroform and ethyl acetate fractions suppressed the proliferation of the cancer cells, especially against the MCF-7 cells with IC50 values of 22.6 and 23.2 µg/mL, respectively. Both fractions caused cell-cycle arrest in the G2/M phase of the treated MCF-7 cells. This inhibition was linked with apoptosis induction which was demonstrated by an increase in the ratio of Bax to Bcl-2, with an increase in the expression of executioner caspase-7. Among the isolates, glutinol (1) showed potent activity against the MCF-7 cell line, with an IC50 value of 9.83 µg/mL.

Conclusion

Our findings suggest that E. saudiarabica has apoptosis-inducing

effects and could be a promising source for novel chemotherapeutic drugs.

202160

Methotrexate-ambroxol oral sustained-release tablets' role in modulating methotrexate physiochemical characters and pharmacology against lung cancer

Samaa Abdullah, Najla Altwaijry, Meaad Alnakhli and Ghezlan Alenezi

Background
Methotrexate (MTX) is classified as an antimetabolite and antifolate agent having antineoplastic and immunosuppressive properties. It's commonly used to treat lung cancer and rheumatoid arthritis. MTX is a potent immunosuppressant following the above-mentioned mechanism of action due to its poor selectivity. The tricky move is to investigate the solid dispersions and paste-forming products using a co-delivery system of MTX and Ambroxol. Ambroxol (ABL) is known for its mucolytic, anticancer, antiviral and immune modulation activities. The two sides of this solid dispersion development are the physiochemical MTX penetration control and the MTX cellular signaling modulation. In addition, ABL has high perfusion to the lung tissues after oral administration. The ABL's high pulmonary perfusion can add to the MTX-ABL solid dispersion perfusion after the oral administration to target lung cancer using MTX to decrease the MTX systemic adverse effects.

Method
The preparation of the optimum dispersion was done based on the FT-IR characterization of the MTX and ABL interactions. Moreover, different characterizations such as UV-spectroscopy, Fourier Transforming-Infrared, X-ray diffraction and Scanning electron microscopy were completed for the MTX, ABL, the physical mixture and the optimized solid dispersion. The MTX-release Analysis for the MTX, the physical mixture, the optimized solid dispersion and the product associated with the sustained release matrix were tested for release in the gastrointestinal simulated media. The cytotoxicity assay of the MTX, ABL, the physical mixture and the optimized solid dispersion were tested against lung cancer cells, A549 cells, for 24 hours using the MTT-cell viability assay. After all, the protein expression analysis of the MTX, ABL, the physical mixture and the optimized solid dispersion were tested against lung cancer cells for 24 hours using the Enzyme-Linked Immunosorbent Assay (ELISA) to assess the levels of BAX, BCL-2, VEGF, TGF-β and TNF-α.

Result
In the results, the sustained release character and encapsulation of MTX were confirmed. In the MTT assay, the solid dispersion showed less IC50 values than the MTX alone.

However, the immunostimulatory, anti-metastatic, apoptotic and anti-inflammatory profiles were higher in the MTX-ABL solid dispersion than the MTX alone. Moreover, one of the aims was to lower the MTX dose needed due to the use of ABL's anticancer actions using different mechanisms.

Conclusion

This solid dispersion can serve as an essential component in an oral targeted MTX delivery system. This product can serve as a strong alternative to the MTX-oral tablets available in the markets with enhanced efficacy and safety profile.

202169

Antimicrobial Compounds from Microorganisms-Associated with Selected Desert Flora

Daliah Albkiry, Kamilia Tawfik, Eman Hamdan, Mahria Ayas and Amal Almousa

Background

The immense genetic variety found in plants and microbes provides a plethora of opportunities for human advancement in the creation of medicine. Microorganisms have been exceptionally rich sources of drugs. Nowadays, the emergence of new infectious diseases and the resistance of some pathogenic microbes necessitates further attempts to find new antimicrobial agents in the fight against infections.

The main goal of this study was to explore and evaluate the biologically active secondary metabolites from selected desert flora-associated microorganisms.

Method

This was achieved through the isolation of bacteria and fungi associated with plants selected from diverse parts of the Saudi Arabian desert. This study was directed to test the optimal microbial culture composition for the production of biologically active metabolites against pathogenic microbes.

Result

The produced secondary metabolites showed profound antibiosis activities. Some of which were comparable to or more potent than some of the currently used antibiotics.

Conclusion

These findings lay the foundation for further discoveries of new metabolites that are urgently needed to face the uprising microbial resistance and mutations that the whole world is continuously suffering from.

202178

Protective Effect of Galantamine against Doxorubicin-Induced Neurotoxicity

Rawan Alsikhan, Maha A. Aldubayan, Ibtesam S. Almami and Ahmad H. Alhowail

Background
Doxorubicin (DOX) causes cognitive impairment (chemobrain) in patients with cancer. While DOX damages the cholinergic system, few studies have focused on the protective effects of cholinergic function on chemobrain. The acetylcholinesterase inhibitor galantamine (GAL) demonstrates neuroprotective properties. We investigated the mechanisms associated with DOX-induced cognitive impairments and the potential protective role of GAL in preventing chemobrain.

Method
Female rats were divided into control, DOX, GAL, and DOX + GAL groups. The rats in the DOX group were administered DOX (5 mg/kg intraperitoneally twice weekly for two weeks), while those in the GAL group were orally administered GAL (2.5 mg/kg) via oral gavage once daily for 15 days. The DOX + GAL group received GAL (once daily) and DOX (Twice a week) concurrently. The body weights and survival rates were monitored daily. The animals were subjected to behavioral tests to assess the memory function followed by the biochemical estimation of inflammatory markers :TNF-α , IL-1β, and IL-6 in rat brain tissue and RT-qPCR.

Result
DOX caused a reduction in the body weight and survival rate, which was alleviated by GAL concomitant treatment with DOX. DOX-treated animals exhibited an impairment of short-term spatial working memory, manifested as a behavioral alteration in the Y-maze test, the novel object recognition (NOR) test, and the elevated plus-maze (EPM) test. Concurrent treatment with GAL showed improved memory function, as evidenced by an increase in the number of entries and time spent in the novel arm, the time spent exploring the novel object, and the transfer latency in the Y-maze, NOR test, and EPM test, respectively. Biochemical observations confirmed these results by showing reversal of DOX-induced changes in IL-1β, IL-6, and TNF-α as well as their relative expression of mRNA in brain tissue following concurrent GAL treatment.

Conclusion
GAL appeared to be a neuroprotective agent against neuroinflammation caused by DOX.

202182
A novel strategy to enhance the efficacy of melanoma ICIs by targeting HDAC4 to alter T-cell inflamed signature

Mariam Alamoudi, Abdulmonem Alsaleh, Anita Thyagarajan and Ravi Sahu

Background
Melanoma remains one of the most immunogenic tumors, however, it may evade anti-tumor immune

responses by employing tolerance mechanisms such as negative immune checkpoint molecules. In the recent decade, immune checkpoint inhibitors (ICIs) have been increasingly used to treat melanoma. However, several patients did not respond to this treatment, indicating resistance. Resistance mechanisms include intrinsic tumor characteristics and an immunosuppressive tumor microenvironment (TME). Multiple studies found that an inflamed TME increased the therapeutic efficacy of ICIs by expressing the T-cell inflamed signature, a set of genes linked with dendritic cell and T-cell anti-tumor response. Notably, histone deacetylases (HDACs) are frequently deregulated in melanomas. It has been demonstrated that HDACs can modulate the transcription of PD-1/PD-L1 and other immune evasion genes. The objective of our research was to examine the association between the T-cell inflamed signature and histone deacetylases (HDACs) in melanoma patients.

Method

The data were obtained from cBioPortal for Cancer Genomics and derived from two distinct melanoma datasets: "Skin Cutaneous Melanoma (TCGA, Firehose Legacy) (n=287)" and "Skin Cutaneous Melanoma (TCGA, PanCancer Atlas) (n=443)".

Result

The analysis focused on the co-expression of the T-cell inflamed signature genes and the HDAC family. The study revealed a negative correlation between the mRNA expression of HDAC4 and several T-cell inflamed signature genes, including PD-L1, LAG3, TIGIT, ICOS, STAT1, IFNG, CD8A, CD4, GZMA, GZMB, CCL3, CCL4, CCL5, CXCL9, CXCL10, CXCR6, NKG7, PSMB10, HLA-DOA, HLA-DOB, and HLA-DRB.

Conclusion

Based on our findings, HDAC4 may negatively modulate TME and ICIs efficacy in melanoma. Furthermore, our research suggested a new method of targeting a specific epigenetic change, which has implications for developing a novel therapeutic strategy. Specifically, we propose combining an HDAC4 inhibitor with ICIs to enhance their effectiveness in melanoma. Nevertheless, more in vitro and in vivo investigations are necessary to verify our findings.

202185

Fabrication and Characterization of Lisinopril mucoadhesive sustained release matrix pellets: In-vitro and ex-vivo studies.

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Background

Lisinopril (LIS) is antihypertensive drug, classified as a class III drug

with high water solubility and low permeability

Method

Two factorial designs aimed to formulate LIS as a sustained-release (LIS-SR) matrix pellet by extrusion/spheronization. Matrix pellets were composed of wet mass containing Avicel and polymeric matrix polymers (sodium alginate (SA) and chitosan (CS)). Evaluation of the effect of two independent variables, matrix-forming units (SA and CS) on mean line torque, on pellet size, dissolution rate after 6 h, and mucoadhesion strength of the pellets were assessed using Statgraphics software.

Result

The tested formulations (F1-F9) showed that mean line torque ranged from 1.583 to 0.461 Nm, with LIS content in the LIS-SR pellets ranged from 87.9 to %103, sizes varied from 1906 to 1404 lm and high percentages of drug released from pellets formulations (68.48 to 74.18 %). The selection of optimized formulation must have the following desirability: maximum peak torque, maximum pellets' particle size, and minimum % LIS release after 6hr. LIS optimized sustained release pellet formula composed of 2,159 % SA and 0.357 % CS was chosen as optimized formula. It's showed a 1.055 Nm mean line torque was responsible for the increased pellet size to 1830.8 lm with decreased release rate 56.2 % after 6 hr, and -20.33 mV average mucin zeta potential. Ex-vivo mucoadhesion studies revealed that that the optimize formulation, exhibited excellent mucoadhesive properties, after 1 h, about %73 of the pellets were still attached to the mucus membrane. Additionally, ex-vivo permeation determination of LIS from the optimized LIS-SR formulation was found to be significantly higher (1.7-folds) as compared to free LIS.

Conclusion

LIS-SR matrix pellets, prepared with an extrusion/spheronization have desirable excellent characteristics in-vitro and ex-vivo sustained-release pellet formulation of LIS-SR was able to sustain the release of LIS for up to 8 h.

202186

Molecular Toxicity of Electronic Cigarettes and Their Effects on Key Pathways of Metabolomics

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Background

Electronic cigarette (EC) usage has reached an epidemic level and attributed to increasing numbers of mortality and morbidity cases mainly due to pulmonary toxicity. Several studies have reported the involvement of oxidative stress

and increased inflammation as the potential mechanisms of EC induced pulmonary toxicity. Despite this, there is no extensive research about the molecular mechanism of EC toxicity or its consequences on metabolic profile of lung cells. Therefore, the goal of this study was to evaluate the toxicological effect of EC on epithelial cells metabolomics profile.

Method

In this study, we investigated the metabolic changes induced by EC in human lung epithelial cells (A549) using an untargeted metabolomics approach. A549 cells were exposed to increasing EC vapor extract concentrations, and cell viability, oxidative stress, and metabolomic changes were assessed.

Result

Our findings indicate that EC induces cellular death and increases oxidative stress in a dose-dependent pattern. Further, EC are capable of disrupting the cellular metabolome in a unique way that could help to identify biomarkers for studying pulmonary toxicity. In addition, pathway analysis revealed several pathways altered by the EC usage including glutathione metabolism, fatty acid biosynthesis, pyruvate metabolism, and nicotinate and nicotinamide metabolic pathways. Furthermore, EC may affect amino acids and proteins that involve arginine and proline metabolism, phenylalanine, tyrosine, and tryptophan biosynthesis, D-glutamine and D- glutamate metabolism, and aminoacyl-tRNA biosynthesis pathways.

Conclusion

In conclusion, we have shown for the first time that the EC toxicity altered the metabolome of A549 cells. Further, our findings will provide insight into EC toxicity molecular mechanisms and provide directions for future research.

202187

Development and Validation of a Simple and Sensitive LC-MS/MS Method for Quantification of Metformin in Dried Blood Spot Its Application as an Indicator for Medication Adherence

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Background

Metformin (MET), an oral biguanide agent, can improve insulin resistance and decrease hepatic glucose production, leading to a reduction in blood-sugar levels. The objective of the present study was to develop and validate simple and rapid LC-MS/MS method for analysis of MET in dried blood spot (DBS) sample for patient monitoring studies purposes (drug adherence).

Method

The chromatographic separation was achieved with Waters HSS-T3 column using gradient elution of mobile phases of two solvents: 1) solvent A, consisted of 10mM ammonium formate, %0.2 formic acid %1; and 2) acetonitrile solvent B, contained %0.2 formic acid in acetonitrile at a flow rate of 0.2 mL/min. The total run time was 3.0 min. The effectiveness of chromatographic conditions was optimized, and afatinib was used as the internal standard. The assay method was validated using USP 26 and the ICH guidelines.

Result

The method showed good linearity in the range 48-8 ng/mL for MET with correlation coefficient (r) >0.9907. Average retention time of MET and IS, are 0.23 ± 0.71 and 1.96 0.27 ± min, respectively. The intra- and inter-day precision values for MET met the acceptance criteria as per regulatory guidelines. MET was stable during the stability studies at ambient temperature 25 degrees C, at refrigerator 4 degrees C, at 10 degrees C autosampler, freeze/thaw cycles and 30 days storage in a freezer at --/+ 30 0.5 degrees C.

Conclusion

This method has successfully fulfilled all validation requirements referring to EMA and FDA guidelines, and successfully can be applied for MET adherence study. All the six studied patients were approved to metformin adherence.

202207

Melanin Regulates Ultraviolet A-induced Signaling in Human Epidermal Melanocytes

Salwa Hafez, Elena Oancea and Hawasatu Dumbuya

Background

Human epidermal melanocytes (HEMs) synthesize melanin as a protective mechanism against solar ultraviolet radiation (UVR), which consists of %95 long-wavelength UVA and %5 short-wavelength UVB. Melanin exists as a mix of photoprotective black-brown eumelanin (EM) and photoreactive yellow-red pheomelanin (PM), the amount and ratio of which determine an individual's basal skin pigmentation and susceptibility to skin cancer. We recently showed that physiological doses of UVA evoke a signaling pathway in HEMs involving crosstalk between reactive oxygen species (ROS) and calcium (Ca2+) that regulates early melanin synthesis. HEMs are particularly susceptible to excessive ROS levels because, while EM is a ROS scavenger, PM, and melanin synthesis itself are pro-oxidant. The ROS balance in HEMs depends on external factors (such as UVA) and internal factors (such as Melanin synthesis, EM, and PM). Indeed, the role of melanin on ROS is context-dependent making the contribution of melanin in the UVA-induced melanoma development complex. Thus, here we wanted to

further investigate the cellular effects of all these factors combined on ROS in HEMs to better elucidate the role of melanin in UVA-induced melanoma development.

Method

We used fluorescence live cell imaging and biochemical tools. For live cell imaging, we have a unique setup with filtered output comparable to solar UV radiation that allows for stimulation with physiological doses of UVA to cultured cells while monitoring changes in intracellular Ca2+ or ROS responses by fluorescence imaging.

Result

Here, we show that when exposed to physiological doses of UVA, melanocytes with equal EM-to-PM ratios and low total melanin content exhibit an amplified ROS response and increased incidence of DNA double-strand breaks compared to melanocytes with high total melanin content.

Conclusion

Our results elucidate the potential mechanisms of the correction between melanoma and melanin in individuals with red hair and fair skin.

202230

Quinazoline–Sulfonamide Derivatives Induced Apoptosis in Human Leukemia Cell Lines and Perturbed Hematopoiesis in Zebrafish Embryos.

Ali Alqahtani, Mostafa Ghorab, Fahd Nasr, Mohammad Ahmed, Abdullah Al Mishari, Sabry Attia and Muhammad Khan

Background

Many quinazoline derivatives with pharmacological properties, such as anticancer activity, have been synthesized. Previously, fourteen quinazoline derivatives bearing a substituted sulfonamide moiety (4a–n) were synthesized and fully characterized. These compounds exhibited a promising antiproliferative activity against cell lines derived from solid tumors. Herein, the antileukemic activities of these compounds (4a–n) against two different leukemia cell lines (Jurkat acute T cell and THP-1acute monocytic) were investigated. Our investigation was also extended to explore their activity in vivo zebrafish embryo model.

Method

All the synthesized compounds were evaluated for their in vitro cytotoxic activity in Jurkat and THP-1cell lines using MTT assay. The two most active compounds 4a and 4d were then tested for their apoptosis induction using DNA content, Annexin V-FITC/ PI staining, RT-PCR and western

blotting. Moreover, embryonic toxicity was examined in zebrafish model.

Result

We found that compounds 4a and 4d were the most effective in inhibiting cell proliferation, with an IC50 value range of 6.5–4 μM. Flow cytometry analysis showed that both compounds arrested cells division at G2/M phase and induced apoptosis in a dose-dependent manner. Upregulation of proapoptotic and downregulating of antiapoptotic markers was also detected by RT-PCR and western blot analyses. In vivo study indicated that compound 4d was more toxic than compound 4a, with compound 4d prompting several levels of teratogenic phenotypes in zebrafish embryos at a sublethal concentration. Furthermore, both compounds disturbed the hematopoiesis process in developing zebrafish embryos.

Conclusion

Overall, our data suggest that compounds 4a and 4d could be used as antileukemic agents.

202253

Hepatoprotective Action of Pumpkin Oil and Olive Oil against Doxorubicin Induced Liver Toxicity in Male Albino Rats

ABDULLAH QAHL

Background

Doxorubicin treats several human malignancies. Free radicals injure tissue by disrupting reactive oxygen species and antioxidants. Doxorubicin-induced free radical production causes liver damage through oxidative stress and inflammation. Alternative medicine is safer and more effective using natural medications. Pumpkin oil contains omega 6 and 9 unsaturated fatty acids and has antioxidant, anti-diabetic, antispasmodic, and other properties. Olive oil is also an antioxidant, anti-inflammatory, anti-hypertensive, and cholesterol-lowering bioactive component. This study investigates the therapeutic effects of pumpkin and olive oils against doxorubicin-induced hepatotoxicity in rats.

Method

Group I was a vehicle control received only vehicles for six days, Group II received Doxorubicin 20mg/kg, i.p. on fourth day, Group III and Group IV received pumpkin and Olive oil 10 ml/kg, p.o for six days followed by Doxorubicin 20mg/kg, i.p. on the fourth day, Group V received mix oil (1:1) for six day followed by Doxorubicin on 4th day, and VI received pumpkin and olive oil (1:1) for six days. After the experiment, rats were anesthetized and blood was drawn for liver markers, cytokines, oxidative stress, and liver tissue was used for histology.

Result

The results showed that doxorubicin

substantially increased AST, ALT, ALP, LPO, IL-1B, and TNFs while considerably decreasing GSH, CAT, and SOD. Olive oil and pumpkin seed oil were more effective against doxorubicin. Combination of both oil did not produce any noticeable changes. Combination of oil was more effective than individual oil. Histopathological structure also found recovered.

Conclusion

Both oils are effective but combinations of both oils are more effective than individual oil.

202267

The Effect of 6-Hydroxydopamine in Lipopolysaccharide-Induced Neuro-Inflammation on Autistic Animal Model, Through Inhibition of Hindbrain Noradrenergic Neurons A2

Abdullah M. Albogami, Mohammad M. Algahtani and Hussain N. Alhamami

Background

Autism spectrum disorder (ASD) is a complicated neurodevelopment disorder during the first years of childhood. The prevalence rate of ASD has increased in the recent years. ASD can be characterized by social communication impairments, restricted and repetitive patterns of behavior and interests. The pathophysiology of ASD is still unknown. Many studies have reported elevated levels of inflammatory cytokines, IL-1β, IL-6, TNF-a, and NF-κB in ASD patients. Noradrenaline neurons (NA) are critical in brain development and regulating motor, behavior, and memory activity. This study aimed to investigate the effect of the 6-hydroxydopamine (6-OHDA) intracerebroventricular (icv) injection on caudal dorsal vagal complex (cDVC) hindbrain A2 neurons inhibition in the prefrontal cortex (PFC) in combination with an intraperitoneal injection of Lipopolysaccharides (LPS) in valproic acid -autistic animal models.

Method

Notably, we assessed the effects of the caudal fourth (CV4) 6-OHDA icv injection and LPS intraperitoneal injection (i.p.) on the self-grooming behavior, mRNA expression of IL-6, TNF-a and NF-κB using quantitative real-time polymerase chain reaction (qRT-PCT), and protein expression of COX-2 and GPX-1 using western blot.

Result

The self-grooming spending time was increased in the combination treatment group (6-OHDA icv +LPS i.p.) more significantly compared to controlled group. We observed that the (6-OHDA icv.) treatment group showed significant induction of IL-6, TNF-α, and NF-κB genes expression at the PFC compared to controlled group. Also, we observed that the expression of the antioxidant protein

GPX-1 in the combination treatment group was significantly decreased compared to the control group at the PFC area.

Conclusion

Our work investigates a novel aspect that the 6-OHDA-induced inhibition of hindbrain A2 neurons could be influencing the neuroinflammatory pathways in PFC of Autistic animal models.

202268

Silver Nanoparticles from Euphorbia retusa: Green Synthesis, Characterization, and Anticancer Efficacy Against Human Breast Cancer Cells

Wajd Asiri, Ebtesam S. Al-Sheddi and Nida N. Farshori

Background

Plant-mediated silver nanoparticles (AgNPs) have been shown to possess exceptional cytotoxic activities towards cancer cells. Euphorbia retusa Forssk., is a desert plant of the Arabian Peninsula, belonging to the Euphorbiaceae family. There have been numerous studies reporting therapeutic benefits of E. retusa, including antimicrobial, anti-inflammatory, analgesic, antioxidant, and hepatoprotective properties. The phytochemical investigations also revealed that E. retusa is rich in the triterpenoids, phenylpropanoids, and diterpenoids. Therefore, we aimed to green synthesize AgNPs from E. retusa and explore their anticancer effect against human breast cancer (MCF-7) cells.

Method

To begin with, the silver nanoparticles using E. retusa extract (EU-AgNPs) were synthesized and well characterized by UV-vis spectroscopy, Fourier Transmission Infrared (FTIR) spectrum, X-ray diffraction (XRD), scanning and transmission electron microscopy (SEM and TEM), and energy dispersive X-ray spectroscopy (EDX) techniques. Furthermore, anticancer potential of EU-AgNPs was evaluated against MCF-7 cells by MTT and neutral red uptake (NRU) assays. In addition, morphological changes, reactive oxygen species (ROS) generation, mitochondrial membrane potential (MMP), and apoptotic marker genes were also studied.

Result

The fabrication of EU-AgNPs was substantiated by color-shifting observation of the mixture of silver nitrate (AgNO3) from light brown to dark brown after the addition of the E. retusa extract. UV analysis revealed a significant absorption at 446 nm resulting from the surface plasmon resonance (SPR). Additionally, FTIR data confirmed the presence of active metabolites in EU-AgNPs. SEM and TEM showed a spherical shape of EU-AgNPs with an average size of 17.8 nm. The XRD result revealed a crystalline and polydisperse EU-AgNPs. Energy-

dispersive spectra (EDS) revealed that nanoparticles contain silver in its pure form. Our results from cytotoxicity assessment showed that EU-AgNPs induced cytotoxicity on MCF-7 cells in a concentration dependent way with the IC50 value of 40 µg/mL. Increased ROS generation and decreased MMP level revealed EU-AgNPs induced oxidative stress and mitochondrial membrane dysfunction. The ROS mediated apoptosis was confirmed by the elevated level of pro-apoptotic genes (p53, Bax, caspase-3, caspase-9) and the reduced level of anti-apoptotic gene (Bcl-2).

Conclusion

All together, these findings suggested that EU-AgNPs could induce potential anticancer effect through ROS mediated apoptosis in MCF-7 cells.

202281

Possible Role of P2X7 Receptor on Hypoxia- Induced Vascular Endothelial Growth Factor Expression in Cardiomyocytes

Reem Alhejji and Anfal Bin Dayel

Background

Myocardial ischemia is an interruption of blood supply due to blockage of the coronary arteries. This interruption can lead to deterioration of cardiac function and structure. After myocardial ischemia, the cardiomyocytes stimulate an essential compensatory mechanism called angiogenesis. Angiogenesis can save the myocardium from developing heart failure by generating new blood vessels and enhancing blood supply in the ischemic area. Myocardial ischemia can increase extracellular adenosine triphosphate (ATP), leading to activation of the purinergic P2X7 receptor (P2X7R), and thus several signaling pathways. The role of P2X7R in cardiac angiogenesis in response to ischemic myocardial injury has not been fully elucidated. Therefore, the current research aimed to examine the possible link between P2X7Rs and cardiac angiogenesis in hypoxic H9c2 cells and its underlying mechanism. Furthermore, to investigate the possible effect of P2X7R antagonist A740003 and/or hypoxia inducible factor-1α (HIF-1α) inhibitor Echinomycin on cardiac angiogenesis.

Method

H9c2 cells were exposed to hypoxia alone and along with A740003 and/or Echinomycin pretreatment as follows: control, hypoxia, hypoxia pretreated with A740003 (5µM), hypoxia pretreated with Echinomycin (1nM), and hypoxia pretreated with combination therapy. Cellular and molecular changes in hypoxic H9c2 cells were evaluated by measuring cell viability, ATP and lactate dehydrogenase (LDH) levels, as well as expression of P2X7R, HIF-1α, and vascular endothelial growth factor (VEGF).

Result

Hypoxia showed a significant increase in HIF-1α, extracellular ATP and LDH levels. These effects were associated with increased P2X7R and VEGF expressions. Sustained hypoxia showed a significant decrease in HIF-1α and extracellular ATP associated with decreased P2X7R and VEGF expressions. Pretreatment with A740003 significantly reversed HIF-1α and VEGF expression in hypoxic H9c2 cells.

Conclusion

In conclusion, our data demonstrated that P2X7Rs can regulate cardiac angiogenesis through the HIF-1α/VEGF signaling pathway. These findings suggest a new approach to improve cardiac function and prevent heart failure after ischemic myocardial injury.

202289

Intraocular Pressure (IOP) Lowering Effects of Low-doses of Latrunculins from Negombata magnifica on Ocular Normotensive Rabbits

Mohammad Al-Omary, Diaa Youssef, Ayman Abbas, Lamiaa Shaala, Yahya Alzahrani, Umama Abdel-dayem, Turki AlZughaibi and Mostafa Rateb

Background

Latrunculins, a class of C-20 and C-22 macrolides primarily derived from marine sponges of the genus Negombata. Latrunculins possess different biological properties including antimicrobial, antitumor and antiangiogenic effects. We aimed To discern the IOP-lowering effect of latrunculol A, a 6,7 dihydroxy analog of the potent actin cytoskeleton disrupting macrolide latrunculin A, in normotensive rabbits' eyes and compare that effect to IOP lowering effect of timolol and latrunculin A

Method

Male normotensive rabbits weighing 3–2.5 kg were administered one of the following drops: latrunculin A (%0.01,%0.005, or %0.02), latrunculol A (%0.01,%0.005, or %0.02), timolol (%0.5 as a positive control), or polyethylene glycol (as a negative control) in right eye over 2 days (2 single-dose instillations, separated by 24 hours). IOP was measured at times 0,1,3, and 24 hours of treatment initiation on both days

Result

A significant decrease in DIOP one hour after the administration of latrunculol A occurred (%0.02) compared to the baseline value ($p < 0.05$) on the first day. Similarly, latrunculin A (%0.02) showed a significant reduction ($p < 0.05$) in % DIOP three hours after administration on the first day compared to baseline values. On day2, timolol significantly ($p < 0.05$) reduced DIOP after one and three hours of eye drop instillation compared to baseline values. Additionally, the % DIOP was significantly lower ($p < 0.05$) in

the timolol group after one hour of administration compared to the baseline value and compared to the negative control group. Throughout the drug treatment, no abnormal findings were detected, except for slight conjunctival redness primarily observed one hour after timolol administration, which decreased after 3 hours

Conclusion

in normotensive rabbits, daily administration of latrunculol A significantly reduced IOP compared to the baseline, with minimal ocular adverse events. Therefore, latrunculol A shows promise as a potential therapeutic agent for future application in glaucoma.

202294

Metabolic study of sertraline coupled with methyl-propyphenazone in rat plasma and brain.

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Background

Sertraline hydrochloride, a widely used selective serotonin reuptake inhibitor (SSRI), poses challenges due to its extensive first-pass metabolism and associated side effects. To address these issues, a mutual prodrug of sertraline, methyl-propyphenazone (SER-MP), was prepared and characterized. This study aimed to investigate the metabolic fate of SER-MP compared to SER in rat plasma and brain.

Method

A liquid chromatography-triple-quad-mass spectrometric method was developed to quantify SER, SER-MP, and potential metabolites in rat plasma and brain homogenate. Solid-phase extraction using Chromabond® C100-8 mg column enhanced recovery. Pharmacokinetic profiles for SER, SER-MP, and SER released from SER-MP were obtained. Serotonin levels in the brain for both SER and SER-MP were measured using a rat serotonin ELISA Kit.

Result

The LC MS/MS method had quantification limits of 0.25 ng/mL for SER, 0.01 ng/mL for SER-MP, with linear ranges up to 1000 ng/mL, 40 ng/mL, respectively. Extraction efficiency improved to 98.0 - 93.5 %0.71 ±. Intraday and inter-day relative standard deviation values were within %1.50 ± 98 range. SER-MP reached a maximum serum concentration (Cmax) of 192 ng/mL with an elimination half-life (t2/1) of 50 hours. The plasma level of intact sertraline released from SER-MP was 2.4 times higher than administered SER at equimolar doses. SER-MP is primarily metabolized to N-desmethyl form. SER concentration in rat brain homogenate ranged from 100 to 170 ng/g for both administered SER and SER-MP. The prodrug maintained a

steady concentration of 100 ng/g in rat brains for 0.5 to 192 hours.

Conclusion

SER-MP, a mutual prodrug, showed promising pharmacokinetic properties with sustained release of sertraline, increased plasma levels compared to SER, and steady concentration in the brain. These findings support its exploration as a potential therapeutic option for psychiatric disorders, aiming to minimize sertraline-associated side effects.

202304

DESIGNING AND EVALUATION OF NOVEL COLON-TARGETEDUlcerative Colitis is a chronic disease characterized by uncontrolled inflammation. Tofacitinib, is a potent JAK inhibitor, has shown promise in treating UC, but it has potential adverse effects. TOFACITINIB IN DEXTRAN SODIUM SULPHATE (DSS) INDUCED COLITIS

OLA QADI, Ibrahim Mohammed, Osama Abdulhakim and Sameer Alharthi

Background

Ulcerative Colitis is a chronic disease characterized by uncontrolled inflammation. Tofacitinib, is a potent JAK inhibitor, has shown promise in treating UC, but it has potential adverse effects. Our objective was to create a specific formulation of tofacitinib that would target the colon.

Method

esting the release of tofacitinib-coated beads in vitro and conducting in vivo studies using 35 male wistar rats. The rats were divided into seven groups, including a control group, a group with colitis, a group with tofacitinib 20mg/kg, a group with DSS %15 plus tofacitinib 20 mg/kg, a group with %15 DSS plus sulfasalazine 500 mg/kg, a group with DSS%15 plus tofacitinib-coated beads 20 mg/kg, and a group with DSS%15 plus placebo-coated beads. Colitis was induced by administering DSS %15 for 14 days, and on day 30, the rats were sacrificed, and samples of colon tissue and plasma were collected. The levels of IL-6, IL-10, IL-23 and INF-γ were measured in the colon tissue, and the concentration of tofacitinib was measured in the plasma and colon tissue

Result

The in-vitro release study showed that, the release of commercial tofacitinib was higher compared to tofacitinib-coated beads. In In-vivo results showed the tofacitinib-coated beads significantly decreased the levels of tissue IL-6 compared to the colitis group ($p<0.0$) and the DSS%15 plus tofacitinib 20mg/kg group($p<0.003$). IL-10 showed lower levels in the tofacitinib-coated compared to the DSS%15+tofacitinib 20mg/kg. IL-23 was significantly decreased in tofacitinib coated targeted beads

compared to the colitis group ($p<0.05$), with no significance difference in DSS%15 plus tofacitinib 20mg/kg group. Furthermore, the INF-γ level in the tofacitinib-coated beads group was significantly lower than the colitis group ($p<0.05$), while there was no significant difference in the DSS%15 plus tofacitinib 20 mg/kg group. The drug concentration measured in colon and plasma and indicated it deliver to colon.

Conclusion

This demonstrates that tofacitinib coated beads successfully reduced inflammation associated with UC. Additionally, the concentration of tofacitinib was measured in the plasma and colon tissue, indicating that the targeted beads effectively delivered the drug.

202307

Development, Optimization, and In-Vitro Evaluation of a Nanostructure System Loaded with Essential Oils for Enhancing the Biopharmaceutical Attributes

Amani Ibrahim, Ruwina Bugis and Sara Al Mutairi

Background

Musculoskeletal disorders affect approximately 1.71 billion people worldwide. Non-steroidal anti-inflammatory drugs (NSAIDs) have been used extensively to manage such disorders. However, several adverse effects have been reported from the use of these drugs. The present study aimed to formulate essential oil which possess analgesic and anti-inflammatory activity in a combined mixture and then loading this oil mixture (OM) in the form of nanoemulsion (NE) in order to enhance the permeability through skin membrane which promote and enhance their topical analgesic and anti-inflammatory actions in case of musculoskeletal disorders

Method

The OM composed of (lavender oil, turmeric oil, eucalyptus oil, ginger oil, black seed oil, peppermint oil, frankincense oil, and clove oil) was prepared and mixed with several surfactant mixtures prepared with different ratios of Tween 80 and Span 80, and a cosurfactant (Transcutol) to formulate the OM-NE. Different surfactant mixtures were tested to attain the required HLB for emulsification of the oil . The prepared NEs were characterized for globule size, zeta potential, and stability index. After that, the optimum OM-NE formulation was converted into nanoemulgel (NEG) using %3 hydroxypropyl cellulose as the gelling agent and evaluated for release and permeation across semipermeable membrane.

Result

Results indicated that, optimum RHLB for emulsification of OM was RHLB = 13. The formulated NE showed

globule size of 184.6 nm, a stability index of 96.53 %, and a zeta potential of 19.9 mV. About 4.7 ± 71.2 % of the OM was released and permeated across semipermeable membrane.

Conclusion

The formulation of an analgesic and anti-inflammatory OM as NEG succeed in enhancing the oil permeation across semipermeable membrane by %71 compared with %41 for OM that was not formulated in nano-sized range. OM-NEG formulation could be beneficial in enhancing the OM skin permeation and may assist in relieving pain and inflammation in case of musculoskeletal disorders.

202311

Hyaluronic acid-based hydrogel loaded with rosuvastatin-sesame oil self nanoemulsion for wound healing

Fairose Shazli, Khaled Hosny and Alshaimaa Almehmadi

Background

Reforming damaged tissues and managing infection are two crucial steps in the intricate process of healing chronic wounds, which aims to reduce pain, scarring, and inconvenience. The goal of the current study was to create and improve a Rosuvastatin-loaded self-nanoemulsifying drug delivery system based on an active oil mixture (tea tree oil, baobab, and sesame oil) and hyaluronic acid (RSV-HY-NE). The important anti-inflammatory, antibacterial, and antifungal properties of RSV, HY and active oils mixture led to their use.

Method

The RSV-HY-NE was developed and optimized using the Box-Behnken design. The formulations' stability index was measured and the droplet size of the manufactured formulations was evaluated. The ideal formulation's capacity to heal wounds, fight bacteria and fungi, release RSV and exhibit ex-vivo penetration were also investigated. In addition, the rheological properties of the developed optimal formulation were assessed. The droplet size of the generated nanoemulsion ranged from 25 to 327 nm.

Result

The results of the trial validated the significant synergistic effect of RSV, HY and active oils mixture on induced wounds healing; they demonstrated better antibacterial, antifungal properties as well as improved wound closure. The optimal formulation demonstrated an 8-fold reduction in mean wound width in comparison to Plain HY aqueous dispersion, a 5.55-fold increase in RSV penetration when compared to RSV aqueous dispersion, and a 3.4 and 3.5-fold increase in the inhibitory zone against C. albicans and S. aureus, respectively, compared to oil phase encompassed oleic acid

without the active oil mixture.

Conclusion

The developed nanoemulsions including RSV, HY, tea tree, baobab, and sesame oils may prove to be an effective paradigm for treating severe injuries.

202329

Transforming Growth Factor-beta Altered Cisplatin Sensitivity of Breast Cancer via Modulating Nucleotide Excision Repair

Abdullah Alhamed, Mohammed Alqinyah, Saleh Alaraj and Abdularhman Alabkka

Background

Breast cancer is a leading cause of death among women worldwide. Several genotoxic chemotherapeutic agents, such as cisplatin are used to treat breast cancer, which function by inducing DNA damage and cell death. Cancer cells can increase their DNA repair capacity to remediate chemotherapy-induced DNA damage, causing chemotherapy resistance. Nucleotide excision repair (NER) involves in remediating DNA damages caused by chemotherapeutic agents. The activation of NER has been associated with resistance to cisplatin therapy but the mechanism of activation is still not understood. The transforming growth factor-beta (TGF-ß) pathway has been implicated in the carcinogenesis and in modulating DNA repair. Activation of the TGF-ß pathway has also been associated with cisplatin resistance. Therefore, we aimed to identify the potential implication of the TGF-ß pathway in modulating NER function, thereby inducing cisplatin resistance in breast cancer.

Method

MDA-MB-231 breast cancer cells were treated with cisplatin in the presence or absence of TGF-ß activator or inhibitor. Experiments were conducted on the treated cells to evaluate the cell proliferation and apoptosis using MTT and Annexin V/ Propidium iodide apoptosis assay, respectively. The expression of NER genes, including XPA, XPB, XPC, and XPF was assessed using qRT-PCR.

Result

Our findings showed that activation of TGF-ß signaling inhibited cisplatin cytotoxicity against MDA-MB-231 cells while inhibition of TGF-ß signaling enhanced cisplatin cytotoxicity as evidenced by changes in cell proliferation and apoptosis. This study also demonstrated that cisplatin therapy caused an increase in the expression of four NER genes, XPA, XPB, XPC, and XPF, and upon TGF-ß activation, the expression of these genes was augmented. Additionally, inhibition of TGF-ß signaling decreased the expression of NER genes, XPA, XPB, XPC, and XPF induced by cisplatin therapy.

Conclusion

The present study can help to create a novel approach to overcome chemotherapy resistance and improve treatment outcomes for breast cancer patients.

202335

Pharmaceutical Analysis

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Background

Ethylene glycol (EG) and diethylene glycol (DEG) are contaminants known to cause various human health problems. These contaminants can be found in glycerol or polyethylene glycol (PEG) based drug syrups. Throughout history, there have been mass poisonings due to the consumption of EG and DEG-contaminated pharmaceuticals. The most recent incident occurred by the end of 2022, in which several batches of cough and antihistaminic syrups were reported to have an unacceptable level of EG and/or DEG in several countries, which resulted in serious injuries and deaths. We propose a selective GC/MS method for quantitatively determining EG and DEG in cough syrups in a single run.

Method

EG and DEG were analyzed by Shimadzu GC–MS/MS model TQ8050 (Kyoto, Japan), equipped with a PAL AOC 6000 Autosampler operating in electron impact (EI) ionization (70eV). The detection mode was single ion monitoring (SIM), and the ions were selected as 33.00 ,31.00, and 43.00 for EG, 75.00 ,45.00, and 43.00 for DEG, and 49.00 ,31.00, and 77.00 for the internal standard (2,2,2-trichloroethanol).

Result

The developed method complied with the current International Council for Harmonisation (ICH) validation guidelines. The absence of any interfering peaks in both the unspiked cough syrup sample and the reference standard solutions demonstrated the method's selectivity. Over the concentration range of 10-1 g/mL, the calibration curves for EG and DEG were linear. Both EG and DEG had detection limits of 400 ng/mL and quantification limits of 1 g/mL. Individual and average EG and DEG recoveries met the accuracy acceptance criterion.

Conclusion

A new GC/MS method was developed to determine and quantify EG and DEG in cough syrups. This method is quick, simple, highly selective, provides good separation between EG and DEG, and does not require glycol derivatization or sample cleanup. Furthermore, the procedure was successfully used to analyze cough syrups collected from the local market.

202351

Parthenolide phytosomes alleviate gentamicin-induced kidney injury by inhibiting oxidative stress, inflammation, and apoptosis.

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Background

Nephrotoxicity is a serious complication that limits the clinical use of gentamicin (GEN). Parthenolide (PTL) is a sesquiterpene lactone present in the feverfew plant that demonstrated a wide range of therapeutic effects, including anti-inflammatory and anti-antioxidant. However, PTL has pharmacokinetics challenges. The objective of this research was to assess the renoprotective therapeutic effects of PTL-phytosomes on GEN-induced nephrotoxicity in rats.

Method

The PTL was prepared as a nanoformulation (phytosomes). Rats were randomly divided into six groups (n = 6): control, vehicle (drug-free nanoformulation), PTL-phytosomes (10 mg/kg), GEN (100 mg/kg), GEN + PTL-phytosomes (5 mg/kg), and GEN + PTL-phytosomes (10 mg/kg). Then, kidney functional markers (serum urea, creatinine, cystatin C, and kidney injury molecule-1 (KIM-1)) and histopathological examinations of the kidney were performed to evaluate GEN-induced nephrotoxicity. Oxidative stress markers such as malondialdehyde (MDA), antioxidant enzymes including superoxide dismutase (SOD) and catalase (CAT), and the antioxidant defense system, which includes sirtuin 1 (SIRT-1), nuclear factor erythroid-2-related factor-2 (Nrf2), NAD(P)H quinone dehydrogenase 1 (NQO1), and heme oxygenase-1 (HO-1), were investigated. Markers of inflammation, such as interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), cyclooxygenase-2 (COX-2), and nuclear factor-kappa B (NF-κB) (p65), and apoptotic markers such as Bcl-2-associated X-protein (Bax) and B-cell lymphoma 2 (Bcl-2), were also assessed.

Result

The prepared phytosomes show a particle size of 407.4 nm, and surface morphology showed oval particles with multiple edges. In-vivo, the administration of PTL-phytosomes alleviated GEN-induced impairment in kidney functions and histopathological damage, and significantly decreased KIM-1 expression. The anti-oxidative effect of PTL-phytosomes was demonstrated by a significantly reduced MDA concentration and increased antioxidant enzyme (SOD and CAT) activities. Furthermore, PTL-phytosome treatment significantly enhanced the antioxidant defense system (SIRT-1, Nrf2, NQO1, and HO-1). Additionally, PTL-phytosome treatment significantly decreased inflammatory and apoptotic markers

in the kidney tissue.

Conclusion

These results suggest that PTL-phytosomes ameliorate GEN-induced renal dysfunction and structural damage by suppressing oxidative stress, inflammation, and apoptosis in the kidney.

202358

Arctiin Inhibits Inflammation, Fibrosis, and Tumor Cell Migration in Rats With Ehrlich Solid Carcinoma

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Background

ESC or Ehrlich solid carcinoma is a type of tumor originating from a spontaneous mammary adenocarcinoma in mice. It is a highly aggressive and fast-growing carcinoma that can create a solid mass when inserted under the skin. Its solid, undifferentiated form makes it an ideal model for researching cancer biology, tumor immunology, and testing various anti-cancer treatments. Additionally, arctiin has multiple beneficial properties, such as anti-proliferative, anti-oxidative, anti-adipogenic, and anti-bacterial. This study aimed to explore the potential anti-cancer benefits of arctiin in rats with ESC while also analyzing its effects on cell fibrosis markers, tumor cell migration, and inflammasome pathways.

Method

Rats were given a tumor in their left hind limb via an intramuscular injection consisting of 106×2 cells. After eight days, some of the rats received a daily oral dose of 30 mg/kg of arctiin for three weeks. Muscle samples were observed under an electron microscope or stained with hematoxylin/eosin. Additionally, gene expression and protein levels of toll-like receptor 4 (TLR4), NLR family pyrin domain containing 3 (NLRP3), signal transducer and activator of transcription 3 (STAT3), transforming growth factor (TGF)-β, endothelial growth factor (VEGF), and cyclin D1 were assessed in another part of the muscle samples.

Result

When ESC rats were given arctiin as a treatment, their mean survival time increased and their tumor volume and weight decreased. Additionally, when tumor tissue was examined under an electron microscope, it showed signs of pleomorphic cells, necrosis, nuclear fragmentation, membrane damage with cytoplasmic content spilling, and loss of cellular junction. The stained sections with hematoxylin/eosin showed a dense cellular mass and compressed, degenerated, and atrophied muscle. However, treatment with arctiin improved all these effects. Finally, the expression of TLR4, NLRP3,

STAT3, TGF-β, VEGF, and cyclin D1 was significantly reduced with arctiin treatment.

Conclusion

Through the use of arctiin, tumor size and weight were effectively reduced, leading to an increase in the average survival time of rats and an improvement in muscle structure. Additional research has shown that arctiin is able to suppress inflammation, fibrosis, and the migration of tumor cells by inhibiting STAT3, TGF-β1, TLR4, NLRP3, VEGF, and cyclin D1.

202359

Adeno-Associated Virus-9/2 Containing Glyoxalase-I Attenuated Diabetic Kidney Disease in Streptozotocin-Induced Type-1 Diabetes in Rats

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Background

Nearly %30 of individuals with Type 1 diabetes mellitus (T1DM) will develop diabetic kidney disease (DKD). Pharmacological treatments remain virtually non-existent to reduce the progression of existing DKD and patients will develop end-stage renal disease (ESRD). Data suggest that accumulation of the cytotoxic glycolysis byproduct, methylglyoxal (MG) arising from the downregulation of its primary degrading enzyme glyoxalase-1 (Glo1) is a contributing cause. The objective of this study was to investigate whether increased expression of Glo1 in kidneys would blunt the development of DKD.

Method

Type 1 DM was induced in male Sprague Dawley rats using a single dose of streptozotocin (STZ, 45 mg/kg, IV). One week after the STZ injection, a single IV AAV9/2 containing Glo-I was administered. Glomerular filtration was assessed eight weeks later using a fluorescent FITC-labeled albumin dye administered ten minutes before sacrifice. Renal function parameters, proteins of interest, and MG levels were assayed using immuno-fluorescence assays, ELISA, Western blots, and HPLC.

Result

Using immuno-fluorescence assays, we confirmed 4-fold lower Glo1 and 3-fold higher adduct MG-derived hydroimidazolone (advanced glycated end-product, AGE) in glomeruli and tubules in autopsied human tissues from T1DM patients compared to controls. Additionally, the Vascular adhesion protein-1 (VAP-1) and smooth muscle differentiation marker, SM22a were 3-fold higher in glomeruli. After eight weeks of STZ-induced T1DM, rats showed characteristic features of DKD

including increased blood nitrogen urea and urine protein, reduced creatinine clearance, and mesangial matrix expansion. In diabetic animals, FITC-labeled albumin revealed glomerular hyper-perfusion, micro-hemorrhaging, and reduced density and perfusion of blood vessels of kidneys. Glo1 was reduced, and MG VAP-1 and SM22α were increased in glomeruli. Increased expression of Glo1 in kidneys significantly blunted the development of DKD as assessed by the above parameters.

Conclusion

These new data demonstrate that increasing expression of Glo1 shortly after the onset of T1DM significantly prevented the development of DKD.

202385

Hepatoprotective effects of Gynura procumbens against thioacetamide-induced cirrhosis in rats: Targeting inflammatory and oxidative stress signalling pathways

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Background

Gynura procumbens is a flowering plant used in traditional medicine, and this study aimed to investigate its potential hepatoprotective effects against liver cirrhosis.

Method

Rats were divided into five groups and administered different treatments, including the ethanol extract of Gynura procumbens leaf (EEGPL). Thioacetamide (TAA) was used to induce liver cirrhosis.

Result

The rats in the group that received only TAA showed liver damage, while those treated with EEGPL had smoother livers. Histopathological analysis revealed reduced liver necrosis and fibrous tissue in the EEGPL-treated groups. The expression of proteins associated with liver damage was down-regulated in the EEGPL-treated rats. Antioxidant enzyme levels were lower and lipid peroxidation levels were higher in the TAA control group, but EEGPL treatment reversed these effects. Additionally, EEGPL treatment reduced pro-inflammatory cytokine levels and increased the expression of an anti-inflammatory cytokine.

Conclusion

EEGPL showed hepatoprotective potential against liver cirrhosis, possibly by modulating detoxification enzymes, possessing anti-inflammatory properties, and acting as an antioxidant. These findings suggest the therapeutic possibilities of Gynura procumbens in the treatment of liver cirrhosis and highlight the need for further research to explore its clinical applications.

202387

Oxytocin Protects PC12 Cells Against β-amyloid-Induced Cell Injury

Lamia Alzaaqi and Mohammed Alonizi

Background

AD is a progressive neurodegenerative disease manifested by a gradual loss of memory, cognitive dysfunction, and behavioural disabilities. It can be caused by abnormal accumulation of Aβ in the brain. Thus, eliminating Aβ is crucial for AD treatment. Aβ causes neurotoxicity through ROS, mitochondrial dysfunction, inflammation and dysregulation of the MAPK/ERK pathway. In contrast, antioxidants have a beneficial effect in treating neurodegenerative and other diseases. In this study we hypothesized that Oxytocin protects PC12 against Aβ35-25-induced neurotoxicity through modulation of the mitochondrial apoptosis pathway and oxidative stress. We explored the protective effect of OT on PC12 cells against Aβ -induced cytotoxicity that affects: cell proliferation and viability, dysregulation of ROS level, mitochondrial membrane potential and apoptosis pathways.

Method

Cell viability was measured with MTT and trypan blue staining and ROS levels with DCFDA assay. Also, mitochondrial membrane potential was measured using JC-1 dye. To investigate OT's protective effects, WB was used for mitochondrial apoptosis and MAPK pathway modulation.

Result

Our findings indicate that OT significantly suppressed the Aβ toxicity effect in a dose-dependent manner. Notably, OT stimulated cell viability and proliferation compared to the treatment with Aβ alone. Furthermore, OT demonstrated marked attenuation of early apoptosis. In addition to increasing cell proliferation, OT increased ERK2/1 phosphorylation, activated anti-apoptotic mediator bcl-2, and deactivated pro-apoptotic mediator BAX and caspase-3. Similarly, the detrimental effects of Aβ on the increase in ROS were mitigated.

Conclusion

OT protects PC12 cells against Aβ-induced apoptosis and oxidative stress, contributing to the increase in cell proliferation and viability. Based on our findings, OT might serve as a potential therapeutic agent for AD and other neurodegenerative diseases.

202393

Nose to brain delivery of Pioglitazone loaded chitosan Nanoparticles as potential treatment of Alzheimer: In vitro and Ex vivo studies.

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Background

Alzheimer's disease (AD) is a progressive neurodegenerative disease manifested by cognitive, memory loss, and other neuropsychiatric symptoms affecting 46.8 million patients worldwide with no effective treatments. Knowing the limitation of current AD medications to cross blood brain barrier. The present situation enriches the scope of novel formulation approaches, such as IN formulations and Nano-formulations, for attaining a targeted delivery to the brain. Moreover, polymeric nanoparticles such as chitosan NPs have been used extensively in IN drug delivery due to its safety, biodegradability, biocompatibility and mucoadhesive properties features. In this study we were aiming to generate intranasal chitosan nanoparticles as carriers for PGZ. And characterize chitosan NPs size, charge distribution of the formulated NPs and its ability to encapsulate PGZ. In the striving search for treatment. PGZ showed promising results for treatment of AD. Oral dosage forms containing PGZ suffer from first-pass metabolism leading to low bioavailability. Additionally, the remarkable mucoadhesive properties of chitosan make it an ideal candidate for the intranasal route which is non-invasive, painless and easy to administer by the patients.

Method

Pioglitazone (PGZ) loaded chitosan nanoparticles were prepared using ionic gelation method. Their physicochemical properties were characterized including particle size (PZ), polydispersity index (PDI), zeta potential (ZP), differential scanning calorimetry, FTIR, entrapment efficiency (EE%) and in vitro release. The influence parameters including chitosan concentrations, different dosing of PGZ and different ratio of CS concentrations on physicochemical characteristics of prepared NPs were investigated Ex vivo permeation studies were performed using animal nasal mucosa membrane chitosan nanoparticles are expected to enhance PGZ nasal permeation and bioavailability after intranasal (IN) delivery.

Result

The formulated NPs F1showed average PS 1.345± 149.8, PDI 0.034±0.289 with a charge equal to 1.2±30.7 mV has been accomplished by this study, and encapsulation efficiency 0.045 ± 87.25 drug release up to 6.67±85.6 at 72 Hr. And permeability 0.01±3.87 µg/cm2 x103 from NPs. F6 average particles size 58.34 ± 209.6 nm with PDI 0.036±0.403, carrying a charge equal to 30.54.8 mV, and encapsulation efficiency 0.012 ± 84.26 drug release up to %0.53±84.39 at 72 h. The in

vitro release results showed that PGZNPs released after 72 hrs. With permeability 0.469±4.80 µg/cm2 x103 from NPs displaying sustained release profile. Spherical morphology of formulated nanoparticles was displayed by transmission electron microscope images. The formula was stable in 4 ˚C for at least 3 months. The in-depth analysis of the literature has shown that the PGZ reaching the brain had a crucial of effect on AD by different pathways.

Conclusion

In conclusion, PGZNPs demonstrated potential drug delivery system throughout IN route with satisfactory PS, PDI, and sustained release effect with no significant safety profile as possible treatment of AD.

202396

Efficient Cellular Internalization of siRNA into A549 Cells Using GL67 Lipid-based Nanocarrier

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Background

The utilization of small interfering RNA (siRNA) for targeted gene diseases holds great promise in the field of genetic medicine. However, there are drawbacks to use siRNA in its naked form, such as susceptibility to degradation and inefficient cellular uptake.

Method

To address these challenges, this research has turned to the use of cationic lipid, specifically GL67, in combination with DC-Chol and DOPE lipids, to create a lipid nano-carrier system for the protection and delivery of siRNA.

Result

By optimizing the molar ratio of these lipids, proper particle size measurements ranging from approximately 150 nm to 330 nm was achieved, as well as zeta potentials ranging from around ±10 mV to 50 mV, depending on the content of GL67 in the liposomal formulation. Gel retardation assays have demonstrated that increasing the percentage of GL67 in the formulations positively impacts the encapsulation efficiency compared to DC-Chol. Moreover, the 3:1 molar ratio has shown high metabolic activity against the human lung cancerous cell line (A549) following a 24-hour cell exposure. Flow cytometry findings have revealed that the highest GL67 lipid ratio (%100 GL67 and %0 DC-Chol) resulted in the highest percentage of cellular uptake. These results suggest that lipid-based nanocarrier based on GL67 lipid have the potential to significantly impact the treatment of genetic diseases due to their high internalization efficiency and safety profile.

Conclusion

This research represents a significant step forward in the development of effective and targeted therapies for genetic disorders, offering hope for improved treatment options for patients with these conditions.

202397

Targeting Gain of Function Mutations of KCa2.3 Channels

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Background

Small-conductance Ca2+-activated potassium (KCa2.x, also called SK) channels are voltage-independent. They are activated exclusively by intracellular Ca2+. Heterozygous genetic mutations of the KCa2.3 channels subtype have been associated with Zimmermann-Laband syndrome (ZLS) and idiopathic noncirrhotic portal hypertension (INCPH).

Method

We measured the apparent Ca2+ sensitivity of KCa2.3 heterologously expressed in HEK293 cells using inside-out patch clamp recordings.

Result

Wild-type KCa2.3 channels have a Ca2+ EC50 value of ~0.3 μM. ZLS and INCPH-related KCa2.3_S436C and KCa2.3_V450L channels with mutations in the S45A/S45B helices exhibited increased Ca2+ sensitivity, also called gain of function mutation. AP14145 (KCa2.3 channel inhibitor) reduced the apparent Ca2+ sensitivity of the hypersensitive mutant KCa2.3 channels, suggesting the potential therapeutic usefulness of negative gating modulators.

Conclusion

Future studies can benefit from these results for the potential drug development for these channelopathy-causing gain of function mutations of the kCa2.3 channels subtypes.

202404

Therapeutic effects of epigallocatechin gallate against gastric ulcer in rats via affecting oxidative stress and apoptosis

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Background

Gastric ulcer (GU) is a prevalent type of peptic ulcer that affects the stomach. It is characterized by lesions in the stomach's mucosa, which make it vulnerable to bleeding or perforation. GU affects approximately %10 of the global population. Epigallocatechin gallate (EGCG), a polyphenolic flavonoid found in tea, can potentially impact human health and disease. EGCG has been widely reported to exhibit anti-

inflammatory and antioxidant effects. Therefore, we conducted a study to investigate the therapeutic effects of EGCG in experimentally induced GU in rats by affecting oxidative stress, inflammation, and apoptosis pathways

Method

Rats were given an oral dose of 80 mg/kg indomethacin to induce GU. Some rats were treated with 50 mg/kg EGCG. We measured oxidative stress and antioxidant markers such as myeloperoxidase (MPO), malondialdehyde (MDA), catalase, and superoxide dismutase (SOD). We analyzed the gene and protein expression of nuclear factor erythroid 2–related factor 2 (Nrf2), heme oxygenase-1 (HO-1), B-cell lymphoma 2 (BCL2), BCL2-Associated X Protein (BAX), nuclear factor κB (NFκB), and tumor necrosis factor (TNF)-α. We investigated the cell structure via staining sections with Masson trichrome.

Result

Examination of GU revealed degeneration of epithelial cells alongside the infiltration of inflammatory cells. However, treatment with EGCG improved the structure of epithelial cells and decreased the infiltration of inflammatory cells. Furthermore, EGCG reduced oxidative stress markers such as MPO and MDA and increased antioxidant enzymes, catalase, and SOD. Lastly, EGCG overexpressed Nrf2, HO-1, and BCL2 and downregulated BAX, NFκB, and TNF-α

Conclusion

EGCG produced therapeutic effects against experimentally induced GU in rats. The curative activities of EGCG can be explained by its ability to enhance antioxidant activities and inhibit both inflammatory and apoptotic pathways.

202414

Development and Evaluation of a Combinatorial Bigel Formulation for Topical Skin Applications

Norah Alhamzi, Lamyaa Almusmili, Ola Safhi, Rawabi Alamer, Amal Zilaa and Dr.Shamama Javed

Background

Bigels are biphasic systems, comprising a hydrophilic phase and a lipophilic phase, which shows emulsion-like behavior and gel-like consistency. Bigels have better properties than either of the two gels separately. Among the benefits of bigels, are their ability to carry both lipophilic and hydrophilic drugs in the same system, controlled drug delivery, non-oily nature and better physicochemical stability. Our aim was to prepare and optimize a bigel formulation of Nigella oil (NSO) and Salicylic acid (SA) for topical applications on skin for acne, eczema and psoriasis.

Method

For hydrogel (H), to 100 mL of distilled water, add 3 g of HPMC polymer (%3 w/v) and %0.5 w/v methyl paraben into it. For organogel (O), the specified amount of Lecithin (0.2 ,0.1 and %0.5) was dispersed in NSO (5 mL) by heating the mixture at 100 °C on a hot plate for 2 min. Then 1 g of SA dissolved in 5 mL of propylene glycol was mixed with NSO. Lastly, Organogel (5 mL) was mixed with Hydrogel (95 mL) to get O/H bigel formulation by continuously mixing using laboratory homogenizer at 5000 rpm for 5 min.

Result

Cream colored and pleasant odor bigel showed good aesthetic and spreadability properties with no phase separation. Found stable at 4°C, RT and 40°C during stability. Rheological studies showed pseudoplastic and shear thinning behavior at shear rate s21, torque %100, varying speeds in Brookfield viscometer. Initially the formulation was acidic (pH 3.5) and pH was adjusted to 5.5 by addition of triethanolamine as normal skin pH is between 4.5 and 6.0. Force-distance curves in texture analysis showed hardness (10.565 g), cohesiveness (12.319 g.sec) and adhesiveness (-6.103 g.sec) for final bigel formulation.

Conclusion

NSO and SA have various skin benefits and their topical transdermal delivery will give synergistic benefits to the user.

202440

Identification of Rosmarinic Acid as a Potent Inhibitor of Integrin-Linked Kinase (ILK) With Anticancer Activity in Breast Cancer Cells

Sarah Alatif and Shadma Wahab

Background

Background: Cancer is a considerable public health issue that is intricate and has various facets, and it has been a significant health challenge across the globe for several decades. In 2020, the number of new cancer cases was estimated to be over 19 million, with more than 10 million cancer-related fatalities. The critical role of Integrin-linked kinase (ILK) in cancer progression and metastasis has made it a promising target for cancer therapy. Rosmarinic acid (RA) is a naturally occurring potent polyphenolic compound commonly found in the rosemary (Rosmarinus officinalis) extracts.

Method

Methodology: We screened natural compounds library in silico, which led to the identification of rosmarinic acid (RA) as a potential molecule having high binding affinity for ILK. Molecular docking of the ILK-RA complex provided insights into residual interactions and how the complex binds. The binding parameters were confirmed by fluorescence studies, which showed a binding constant of the ILK-RA complex within the range of 0.8 x 107 M−1. Further, fluorescence

studies along with kinase assay confirmed the inhibition of ILK by RA.

Result

Results: The mRNA expression studies in MCF-7 cells (breast cancer cell line) showed that the treatment of RA at IC50 dose (0.33 ± 14.07 µM) significantly reduced the expression of ILK. Additionally, RA treatment caused a significant increase in the arrest of cells in G0/G1 phase of the cell cycle and apoptosis in MCF-7 cells. The production of reactive oxygen species in MCF-7 cancer cells was also found to be significantly reduced upon RA treatment.

Conclusion

Conclusion: RA showed significant antioxidant property that can make resistant cancer cells susceptible to death. Both in silico and in vitro studies demonstrate the significance of RA as a potential anticancer lead in terms of ILK inhibitors to be developed as a promising therapeutic agent for cancer therapy.

202475

In silico drug repurposing approach for Shikimate Kinase H. Pylori (HpSK) using some FDA-approved and non-FDA approved drugs.

Abdulaziz Hassan Al Khzem, Mansour Saleh Alturki, Hanin Saeed Al Ghamdi and Raghad Khalid Alzahrani

Background

Helicobacter pylori is a common bacterium that can lead to some diseases related to the gastrointestinal tract, like peptic ulcers, gastric marginal zone lymphoma, and gastric carcinoma. Over time, the resistance of this bacterium to drugs has increased, and its effectiveness declined. The shikimate pathway (SP) is a metabolic process found in H.Pylori. It links carbohydrate metabolism to the production of chorismate, a precursor for important molecules like aromatic amino acids and folate. Because the SP is absent in mammals, it has been identified as a potential target for antimicrobial drugs. Inhibitors for enzymes in this pathway are currently being developed.

Method

A total of 7650 Non-FDA/FDA-approved drugs were retrieved from the Zinc 15 database and then prepared and filtered using Maestro software. Then, molecular docking was performed on the crystal structure of the shikimate kinase H.Pylori(HpSK) protein retrieved from the Protein data bank (PDB code: 3MUF).

Result

High Throughput Virtual Screening (HTVS) and Shape-Based Screening provided us with 16 hits (Gallic acid, N-Acetyl-5-Aminosalicylic Acid, Actarit, carglumic acid, Acipimox, Olsalazine, Fosphenytoin, Cefaclor, Tafamidis,

Erdosteine, Aminosalicylic acid, Epirizole, Zaprinast, Triclabendazole, Khellin) that showed good fit into the shikimate binding site.

Conclusion

Our study suggests that the 16 final hits have the potential to be a candidate for repurposing as an antibacterial drug against HpSK. Future research will focus on performing molecular dynamics investigations and in vitro studies of the 16 potential agents against H.Pylori.

202495

Ameliorative effects of calcitriol against cisplatin hepatorenal toxicity by regulating Nrf2/Mrp2/p38 MAPK/TNF-α/IL-10/caspase-3 levels in mice

Mohamed Morsy, Rania Abdel-Latif, Manar Ibrahim, Heba Marey and Seham Abdel-Gaber

Background

Cisplatin, one of the most commonly used chemotherapy drugs, causes significant hepatorenal toxicity by inducing pathways related to oxidative stress, apoptosis, and inflammation. The current study investigated calcitriol's potential defense against cisplatin hepatorenal toxicity.

Method

The mice were allocated randomly into four groups: control, calcitriol (5 µg/kg, p.o. for 14 days), cisplatin (10 mg/kg, single i.p. injection on day 10), and calcitriol+cisplatin (calcitriol 5 µg/kg, p.o. for 14 days and cisplatin 10 mg/kg, i.p. on day 10).

Result

Calcitriol prevented the hepatorenal toxicity caused by cisplatin, as revealed by improved histological analyses and liver and kidney function tests. Furthermore, in mice given cisplatin, calcitriol reduced oxidative stress (decreased malondialdehyde and nitric oxide levels and increased total antioxidant capacity). It increased the expression of Nrf2 and Mrp2 in the liver and kidney while lowering p38 MAPK levels. Additionally, calcitriol reduced TNF-α and raised IL-10 levels to prevent cisplatin-induced hepatic and renal inflammation. In mice given cisplatin, calcitriol also increased the survival of liver and kidney tissue via downregulating caspase-3.

Conclusion

The current study shows that calcitriol suppresses oxidative stress, apoptosis, and inflammation that may be regulated via the Nrf2-Mrp2/p38 MAPK pathway, protecting against cisplatin-induced hepatorenal toxicity.

202500

Study the Role of Decorin in Breast Fibroblasts and its Cytotoxicity and Anti-carcinogenic Effects on Breast Cancer Cells

Manal Abdullah Alasmari, Layla Alkharashi and Abdelilah Aboussekhra

Background

Breast cancer (BC) surrounded by tumor microenvironment (TME), which is composed of fibroblasts. Activation of breast stromal fibroblasts (BSFs) is a crucial step toward tumor growth and spread. Decorin (DCN) is a gene expressed in the BC stroma, secreted from stromal fibroblasts. It plays an essential role in suppressing breast carcinogenesis. Decreased DCN expression in the TME, considered a biomarker for metastatic and invasive BC. However, the role of DCN in BSFs and in inhibiting breast carcinogenesis remains elusive. Therefore, we decided to examine the role of DCN in breast fibroblasts, studying its cytotoxicity and anti-carcinogenic effects on BC cells.

Method

The expression level of the gene was assessed in CAFs, and their counterpart fibroblasts TCFs on mRNA and protein level.
We tested the effect of DCN knockdown on the autocrine and paracrine features of TCF, using qRT-PCR, Western blot, cytokine array, ELISA, and cellular analysis.
SFCMs were conditioned with BC Cells and immunoblotting analysis, spheroid formation assay, and cellular analysis were conducted.
Recombinant DCN (rDCN) was introduced to deferent BC cell lines, and antibodies for EMT and Stemness markers were analyzed.
cytotoxic effect of rDCN on cancer cells was tested using a WST-1 reagent, either alone or conjugated with chemotherapeutic agents.

Result

The obtained results have shown a significant decrease in the level of DCN in active fibroblasts compared to their adjacent tumor counterpart fibroblasts. Indeed, BC cells have downregulated DCN in BSFs and activated them through paracrine signaling. Interestingly, DCN knockdown induced the secretion of several cancer-promoting proteins and enhanced the invasion/proliferation abilities of BSFs in vitro. Furthermore, the present findings have shown a significant role for DCN as an antitumorigenic molecule in BC.

Conclusion

Together, the present results indicate that DCN has efficient anti-BC effects through suppressing the pro-carcinogenic effects of breast stromal fibroblasts and also through suppressing breast carcinogenesis.

202532

In Silico Drug Repurposing Approach of Some FDA approved Drugs against EGFR T790M for Cancer Therapy

Mansour Alturki, Khalid Nabil Aldossary and Abdulaziz Ali Halawi

Background

EGFR is a cancer-target protein. It has an extracellular binding site, a transmembrane region, and an intracellular tyrosine kinase domain. EGFR is a key upstream mediator of several pathways that control cell growth, differentiation, and survival, and it is the most frequently mutated oncogene in human cancer. A T790M (gatekeeper residue) single-point mutation is responsible for the resistance to therapy. EGFR mutation is usually found in non-small cell lung cancer, colorectal cancer, and pancreatic cancer, all of which have poor prognosis. The third generation of covalent EGFR: Osimertinib is used in EGFR T790M.Unfortunately, EGFR mutation C797S resistance to this inhibitor was developed. We aim to repurpose some FDA-approved drugs to target EGFR mutation C797S using in silico drug repurposing to find drugs that could bind covalently with the Ser797 nucleophile of EGFR C797S.

Method

1650 FDA-approved drugs were retrieved from the Zinc 15 database and then prepared using Schrodinger resulting in 1590 unique compounds. Then, molecular docking was performed on the crystal structures of the human EGFR T790M protein retrieved from the Protein data bank (PDB code: 6LUD). High Throughput Virtual Screening (HTVS) provided us with 64 drugs that can be covalently bound to the EGFR T790M. A further Standard-precision (SP) screening results in 9 hits.

Result

Of the 9 hits, 4 were excluded, and the resulting 5 hits (Doripenem, Oxymetholone, Norethisterone, Ertapenem, and Norgestrel) were subjected to Induced Fit Docking and Covalent Docking to validate the binding. According to our research findings, there are 5 promising compounds that could be repurposed as an anticancer drug against EGFR T790M mutation.

Conclusion

The next step would be to conduct molecular dynamics investigations and in vitro studies of these 5 potential agents on cell lines with EGFR T790M mutation. This will pave the way for future research in this area.

202540

Positively-charged liposomes of delafloxacin laden in a thermosensitive in situ gel: preparation, characterization, and in vitro study

Maha Babtain, Mohammed Badran, Abdullah Al-Omrani, Sulaiman S. Alhudaithi and Abdullah Alshememr

Background

Delafloxacin (DLF) holds promise as an antibacterial agent for various infections. However, its limited

permeability poses a therapeutic challenge. Thus, we developed an optimized positively-charged liposome (PLPs) loaded with thermosensitive in situ gel to enhance DLF delivery and improve its efficacy against bacterial infections.

Method

DLF-loaded PLPs were optimized via factorial design with independent variables such as phospholipid, drug, and stearyl amine (SA) concentrations. The thin-film hydration method was used for preparation, with dependent factors including entrapment efficiency (EE%), vesicle size, and surface charge. The optimized formula's in vitro release profiles and vesicle morphology were assessed. DLF-loaded PLPs were tested for antibacterial efficacy against Staphylococcus aureus (S. aureus), Methicillin-Resistant Staphylococcus aureus (MRSA), and Pseudomonas aeruginosa (P. aeruginosa). Additionally, thermosensitive in situ gels (PLPs-ISGs) were formed by dispersing poloxamer 407 and HPMC K4M into PLPs using a cold technique. These gels were evaluated based on pH, drug content, viscosity, mucoadhesive strength, gelation temperature, gel capacity, and in vitro release.

Result

Optimization yielded an ideal DLF-loaded PLP formulation with a 2.7±111.5 nm particle size, a zeta potential of 3.3±21.3 mV, and EE% of %6.2±73.4. In vitro release showed sustained drug release over 24 hours. DLF-loaded PLPs exhibited significant antibacterial efficacy against S. aureus, MRSA, and P. aeruginosa, outperforming normal liposomes and DLF solution. PLPs-ISGs displayed desirable properties, including viscosity, gelation temperature, gelling capacity, and pH suitable for ophthalmic use. Drug content approached %100, indicating uniform distribution, and PLPs-ISGs sustained DLF release for 24 hours.

Conclusion

This study highlights the potential of PLPs-ISGs as an effective strategy for sustained DLF release, potentially enhancing its permeability and therapeutic action. Further research is needed for additional insights.

202552

Development and Characterization of Poly(Ethylene Oxide)-Block-Poly(ε-Caprolactone-α-Tocopheryl Succinate) (PEO-b-PCL-α-TS) Micelles as Nanocarriers for Rapamycin Delivery

Ahmad Balkhair, Raisuddin Mohammad, Abdullah Alshememry and Ziyad Binkhathlan

Background

Rapamycin, a potent mTOR inhibitor, often confronts significant delivery challenges due to its inherent physicochemical properties, notably

its low solubility. To surmount these barriers, methoxy polyethylene oxide-block-polycaprolactone (PEO-b-PCL) copolymers can be used. These copolymers are amphiphilic and biodegradable, properties which have led to their extensive use in drug delivery. Additionally, α-Tocopheryl Succinate (α-TS) has been widely studied as a stability enhancer in modified micelle formulations, providing another tool to improve Rapamycin delivery. The primary objective of this work was to synthesize and characterize Rapamycin-loaded PEO-b-PCL-α-TS polymeric micelles. By enhancing Rapamycin's solubility and encapsulation efficiency.

Method

PEO-b-PCL-α-TS copolymer synthesized in two major steps and characterized by using Differential scanning calorimetry (DSC), X-ray diffraction (XRD). PEO-b-PCL and PEO-b-PCL-α-TS micelles prepared by using a co-solvent evaporation method. Encapsulation efficiency determined using reversed-phase High Performance Liquid Chromatography (RP-HPLC) with a C18 column. In vitro stability study has been performed to assesses the change in micelle size and Encapsulation efficiency during the storage period, samples of 1 ml freshly prepared micelles dispersions will be stored at two different conditions including (4 °C) and room temperature (25°C) up to 6 months.

Result

The incorporation of α-Tocopheryl Succinate (α-TS) improved the encapsulation efficiency to a high degree, achieving %7.9 ± 70.04. Mean diameters of micelles were below 100 nm. Also, α-Tocopheryl Succinate (α-TS) stabilized Rapamycin leakage within a period of 6 months with a change of %1.9 ± 12.8 compared to PEO-b-PCL of %1.03 ± 17.7.

Conclusion

PEO-b-PCL micelles shown to increase the solubility and encapsulation efficiency of Rapamycin. Incorporation of α-Tocopheryl Succinate (α-TS) into PEO-b-PCL enhanced the stability and encapsulation efficiency of Rapamycin. Therefore, this study suggests that PEO-b-PCL-α-TS micelles hold significant promise as an effective delivery system for Rapamycin.

202564

Targeted Inhibition of SOX2 sensitizes non-small cell lung cancer to receptor kinase inhibitors

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Background

Worldwide, lung cancer is the primary cause of cancer-related mortality. The fast emergence of medication resistance phenotypes complicates

lung cancer treatment. The sex-determining Y box-2 (SOX2) and the ephrin receptor type 2 (EphA2) are linked to the promotion of resistant phenotypes in the non-small cell lung cancer (NSCLC) subtype. The epidermal growth factor receptor (EGFR), which is overexpressed in several cancer types, regulates EphA2 and SOX2. Erlotinib is a medication in the EGFR-tyrosine kinase inhibitor (TKI) class, that provides a secure and efficient treatment for non-small cell lung cancer. However, within a year of starting treatment, resistance to the treatment develops. We hypothesized that in NSCLC, targeted suppression of SOX2 would overcome EGFR-TKI resistance.

Method

H1299 cells were treated with EGFR inhibitor (Erlotinib), SOX2 inhibitor (Salinomycin), and EphA2 inhibitor(ALW-II-27-41), for 72 hrs in a 96-well plate format and viability was determined by the Resazurin dye assay. Cell migration was determined by measuring the width of the wound or scratch as the zone of inhibition of cell migration after treatment. Western blot analysis for protein expression was used to assess the response of H1299 cells to the molecular targeting of SOX2, EphA2, and EGFR. micrographs of protein expression and mean percent protein-b-actin ratio ± (SEM) against treatment.

Result

The viability of H1299 was significantly decreased after treatment with Salinomycin and ALW-II-27-41 in combination with Erlotinib compared to Erlotinib alone.The expression of SOX2, p-SOX2 and pAKT was significantly decreased after treatment of H1299 with SOX2-CRISPR/Cas9 KO (± 43 ,%0.40 ± 49 %3.87 ± 39 ,%4.94 respectively). The expression of SOX2, pSOX2, EphA2, p-EphA2, and p-AKT was significantly decreased after treating H1299 with EphA2i (,%1.46 ± 15 ,%4.22 ± 55 %3.28 ± 34 ,%3.77 ± 48.5 ,%3.80 ± 51 respectively). Molecular inhibition of H1299 was associated with inhibition of SOX2-sensitized H1299 cells to Erlotinib.

Conclusion

SOX2 and EphA2 regulate the resistance of H1299 cells. Targeted inhibition of SOX2 decreased sensitized H1299 cells. SOX2 is a significant maker and viable therapeutic target in EGFR-TKIs-Resistant Non-small cell lung cancer.

202576

Evaluation of the potential protective effects of celastrol against Isoproterenol-induced myocardial infarction in rats

Meaad Hammad Altowairqi, Basma Ghazi Eid, Rawan Hassan Hareeri

Background

cardiovascular disease (CVD) is a major public health problem that accounts for %10 of all diseases and %30 of all deaths worldwide. In Saudi Arabia, %42 of disease-related deaths are attributable to CVD and more than four out of five CVD deaths are due to myocardial infarction (MI). It has been well characterized that oxidative stress, inflammation and apoptosis are the main pathophysiological processes involved in myocardial infarction. Unfortunately, the current treatments for MI are known to have several adverse effects. Therefore, new therapeutic agents are required to optimize therapeutic benefits and reduce adverse effects.

Method

Animals were randomly divided into six groups. Each group contained 8 rats. Group 1 was a control group that received no medications, while rats in group 2 were a vehicle group that received cyclodextrin 2 mg/kg intraperitoneally (IP) for 14 consecutive days. Group 3 rats received only ISO 85 mg/kg for two consecutive days (days 13 and 14). Rats in group 4 received a high dose of celastrol 2 mg/kg for 14 consecutive days. Groups 5 and 6 received 1 mg/kg and 2 mg/kg IP celastrol, respectively, for 14 days, in addition to ISO in the last two days.

Result

CEL significantly attenuated ISO-induced changes in electrocardiographic changes and the cardiac histological pattern. This compound also decreased lactate dehydrogenase activity, creatine kinase myocardial band and troponin levels. The ability of CEL to act as an antioxidant was shown by a decrease in malondialdehyde concentration, and the restoration of glutathione levels, catalase and superoxide dismutase activity. Additionally, CEL antagonized inflammation and cardiac cell apoptosis by suppression TLR4/MTOR/NFKB

Conclusion

CEL offers protection against acute ISO-induced MI in rats and offers a novel therapeutic management option.

202581

Biomaterial based hydrogel films for wound dressings.

Wajdi Organji, Raghad Sadawi, Abdullah Bajaber, Salwa Alzamzami, Ali Alzahrani, Mohammed Sulimani, Fatmah Hawsawi, Majd Lamfon

Background

The essential oils and plant extracts have shown remarkable antimicrobial and wound healing efficiency. With increase in antibiotic resistance, the uses of essential oils attracted the interests of researchers. In the present research we have developed nanocomposite hydrogel films using natural products, i.e, Chitosan (CH), Cinnamaldehyde (CIN), Eucalyptus

oil (EO), and enriched with silver nanoparticles (NP) biosynthesized in Moringa oleifera leaves' extract (MLE). The possibility of using these hydrogel films as wound dressings has been explore. Develop "green", transparent, biodegradable nanocomposite hydrogels, loaded with essential oils (Blackseed, Eucalyptus and Cedarwood) enriched with bio-synthesized silver nanoparticles in Moringa oleifera leaves' extract, as wound dressings through environment-friendly, less time and energy-consuming protocol via "Green Chemistry.The performance evaluation, antimicrobial behavior and wound healing efficiency of the "essential oil-nanoparticle plant extract" combination impregnated biopolymer nanocomposite hydrogel films would also be investigated.

Method

Hydrogel films were prepared by simple blending of the components: CH, CIN, EO and NP in MLE. The films were characterized by SEM, FTIR, TGA, swelling studies (in water, phosphate-buffered saline; PBS and simulated wound fluid; SWF), biodegradation analysis, antibacterial behavior and wound healing study on male wistar rats. The expression of wound related genes and biochemical profile of rats was also determined.

Result

The hydrogel films were found to be homogenous, foldable, and biodegradable under soil. The films were stable in water, PBS and SWF. The films showed good antibacterial behavior against E. coli (ATCC 25922) and S. aureus (ATCC 29213). EO films treated wounds healed in 18 days, which was earlier compared to Fucidin treated rat-wounds

Conclusion

"Greener", transparent, biodegradable hydrogel films were developed without using any harmful solvents, by simple synthesis strategy using natural products, through "Green Chemistry" protocol. The homogeneity of films, their good water swellability, thermally stability, biodegradability, antibacterial behavior and wound healing efficiency indicated that the films have promising potential to be used as wound dressings.

202585

Generation and Characterization of CYP2E1-Overexpressing HepG2 Cells to Study the Role of CYP2E1 in Hepatic Hypoxia-Reoxygenation Injury

Nouf Alwadei, Mamunur Rashid, Devaraj Venkatapura Chandrashekar, Simin Rahighi, Jennifer Totonchy, Ajay Sharma, and Reza Mehvar

Background

The mechanisms of hepatic ischemia/reperfusion (I/R) injury, which occurs during liver transplantation or surgery, are poorly understood. The central

pathophysiological phenomenon of this injury is the formation of reactive oxygen species (ROS). Recent studies suggest that P450 enzymes may contribute to ROS generation, which may occur through their uncoupling and/or release of heme and iron after their degradation. Among P450 enzymes, CYP2E1 is unique because it is considered a leaky enzyme, producing significant ROS through uncoupling in the absence of substrates, accelerating its own degradation and reducing its half-life. In this study, we generated and characterized a HepG2 cell line with stable overexpression of CYP2E1 to investigate the role of the enzyme in I/R injury in an ex vivo setting.

Method

As a result, GFPtagged CYP2E1 and Control clones were developed, and their gene expression and protein levels of GFP and CYP2E1 were determined using RT-PCR and ELISA/ Western blot analysis, respectively. Additionally, the CYP2E1 catalytic activity was determined by UPLC-MS/MS analysis of 6-hydroxychlorzoxazone formed from the chlorzoxazone substrate. The CYP2E1 and Control clones were subjected to hypoxia (10 h) and reoxygenation (0.5 h), and cell death and ROS generation were quantitated using LDH and flow cytometry, respectively.

Result

Compared with Control clone, the selected CYP2E1 clone showed a 720-fold increase in CYP2E1 expression and a prominent band in the Western blot analysis, which was associated with a 150-fold increase in the CYP2E1 catalytic activity. CYP2E1 clone produced 2.3-fold more ROS and 1.9-fold more cell death in the H/R model.

Conclusion

In conclusion, our HepG2 cellular studies suggest that the constitutive CYP2E1 in the liver may play a detrimental role in hepatic I/R injury.

Pharmaceutical Sciences Students

201915

Ciprofloxacin-loaded chitosan nanoparticles: method optimization and particle characterization

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Background
Chitosan (CS) nanoparticles have shown many advantages in delivering many drugs due to their unique physicochemical properties such as cationic surface, mucoadhesive properties, and release-modulating ability. Despite ciprofloxacin's (CIP) significant therapeutic value, the high dose-dependent adverse effect profile due to poor bioavailability emerges as a significant limitation. The problem can be solved by incorporating CIP into chitosan nanoparticles, increasing bioavailability and drug uptake into many bacterial cells, and significantly reducing therapeutic doses and all associated adverse events. The aim of this study is to optimize an ion-gelation method to encapsulate CIP into a CS nanoparticle system.

Method
Using tripolyphosphate (TPP) as a cross-linker, the ion gelation method was used to load CIP into chitosan nanoparticles. A variety of formulation variables, such as CS and TPP concentrations, CS: TPP volume ratio, and stirring rate and time, have been investigated. The particle sizes, polydispersity, zeta potential, and drug entrapment efficiency of the particles produced were all measured. Furthermore, the particle morphology was examined using a transmitted electron microscope. The particle stability has been monitored over one month.

Result
The particle sizes were found to be directly affected by the CS: TPP ratio. A 0.3:0.1 ratio was discovered to be critical for achieving low average particle sizes. The 1:1 CS: TPP volume ratio was discovered to be required for achieving low particle sizes. The use of concentrated CS solutions (%3) in %1 acetic acid and 1mg/mL TPP solutions, as well as pre-filtration with a 0.45 m membrane filter, is critical for achieving particle sizes less than 100 nm. It was discovered that increasing the CIP concentration from 0.15 to 0.6 mg/mL resulted in an increase in particle size from 38 to 115 nm. The polydispersity index was generally less affected by the variables listed above.

Conclusion
An optimized ion gelation method was successfully developed to prepare CIP-loaded chitosan nanoparticles with low particle sizes and high entrapment efficiency.

201933

A novel green deep eutectic solvent-based liquid-liquid microextraction for the analysis of antibiotics in cow and chicken meat using UPLC-MS/MS

Rakan Almutairi, Adel Alwayli, Musaad Alibrahim, Abdulmalik Alqarni, Heba Shaaban and Ahmed Mostafa

Background
Antibiotics are widely used in the livestock and poultry industries to promote growth and/or prevent disease. Consequently, antibiotics may accumulate in their meat, leading to the presence of antibiotic residues. The existence of antibiotic residues in cow and chicken meat might pose a risk to human health.

Method
Anisaldehyde and decanoic acid were combined in a molar ratio of 3:1 to synthesize the deep eutectic solvent (DES). This DES was then employed as an eco-friendly extraction solvent in the DLLME technique. Optimization was carried out for various parameters, including DES volume, salt addition, pH, as well as vortex and centrifugation times, to achieve the highest extraction efficiency. The optimized method was subsequently employed in the UHPLC-MS/MS analysis of five antibiotics in cow and chicken meat.

Result
The method exhibited excellent sensitivity, with limits of detection ranging from 1.25 to 20.3 ng Kg-1. In addition, satisfactory precision and accuracy were obtained, as indicated by a relative standard deviation (RSD%) of less than %5.75, and extraction recovery rates of %73.9 to %104.7. Subsequently, the method was effectively employed for the analysis of five antibiotics in cow and chicken meat. In cow meat samples, sulfamethoxazole was the most frequently detected antibiotic (%95 of the samples), followed by sulfadimethoxine and clarithromycin (%90 of the samples). In chicken samples, sulfamethoxazole and sulfadimethoxine were detected in %100 of the samples. All detected antibiotic concentrations in meat and chicken samples were found to be below the maximum residual limits established for these studied antibiotics, underscoring the safety of these food products in relation to antibiotic residues.

Conclusion
A new, environmentally friendly DES-based on anisaldehyde was synthesized and thoroughly characterized. This DES was effectively employed as a green solvent for the extraction and trace analysis of five antibiotics in various food samples. The developed method was validated and exhibited satisfactory results. In summary, the use of DES represents a sustainable and eco-friendly substitute for hazardous organic solvents in the extraction and trace

analysis of antibiotics in different food samples.

201936

Liposomal resveratrol attenuates isoproterenol-induced kidney injury via modulation of apoptosis and inflammation.

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Background

Isoproterenol (ISO) is a non-selective β-adrenergic receptor agonist. It can be used to treat bradycardia, cardiogenic shock, and β -blocker overdose. Despite its usefulness, the overstimulation of β-receptors by ISO can cause “cardiorenal syndrome, " a term used to describe heart and kidney damage. Resveratrol (RES), a natural polyphenol, has marked anti-inflammatory, antioxidant, antitumor activities. The present work was designed to study the protective efficacy of liposomal resveratrol (L-RES) against ISO-induced kidney injury.

Method

The kidney injury was induced in rats by administering ISO (50 mg/kg, s.c.) twice a week for 2 weeks. RES and L-RES were administered at a dose (20 mg/kg/ day, p.o.) along with ISO (SC) for 2 weeks. Inflammatory and apoptotic biomarkers were analyzed, which were validated using histochemical analysis.

Result

ISO caused renal dysfunction, which manifested as elevated urea, creatinine and uric acid, besides cystatin c and MAPK protein overexpression. In addition, ISO induced gene expression of Fas and lipocalin-2 and provoked genomic DNA fragmentation in renal tissues as compared with the control group. Histological examination confirmed the alteration of the morphology of kidney tissues obtained from the ISO group. Treatment with either RES or L-RES for 14 days significantly ameliorated kidney damage induced by ISO as evidenced by the improvement of all measured parameters with the best results for L-RES. Concomitantly, the histopathological findings were correlated with the above biochemical parameters.

Conclusion

L-RES could be a promising liposomal preparation for the prevention of kidney injury induced by ISO, most likely via the downregulation of, cystatin c, MAPK Fas, and lipocalin-2.

201939

Preparation and optimization of ginger oil nanoemulsion as a potential treatment of breast cancer

Danah Alharbi, Shouq Albalawi, Sarah Alghrid, Basma Alhwity, Yasmin Mortagi, Nehal Elsherbiny and Mona Qushawy

Background

Breast cancer exhibits the highest incidence rate among the female population in Saudi Arabia.
Ginger oil is a natural agent with antioxidant and anticancer activities. Nevertheless, minimal absorption of ginger oil from the gastrointestinal system could limit its therapeutic applications. The present study aimed to assess the effectiveness of a nanoemulsion formulation of ginger oil in terms of its oral bioavailability and its in vivo anti-cancer properties.

Method

The preparation of a ginger oil nanoemulsion was conducted by high-pressure homogenization process, employing several surfactants including Tween 20, Tween 40, and Tween 80. The prepared formulations were evaluated for droplet size, polydispersity index (PDI), zeta potential (ZP), pH, viscosity, and creaming index %. The optimized formulation was assessed for its shape using transmission electron microscopy (TEM). The comparative assessment of the anticancer efficacy between the most effective nano-formulation and the free oil was conducted by in vivo experimentation using Ehrlich solid carcinoma (ESC) mice model.

Result

The ginger oil nanoemulsion formulations demonstrated droplet sizes in the range of 3.10 ± 56.67 nm to 3.62 ± 357.17 nm. The PDI value was smaller than 0.5. The oil globules exhibited a negative charge ranging from -1.01 ± 12.33 to -0.96 ± 39.33 mV. The pH and viscosity values fell within the permissible range. The TEM image of the optimized formulation exhibited a spherical morphology characterised by small size. Administration of ginger oil nanoemulsion to ESC mice resulted in a decrease in tumour volume and weight, an extension of the life span, and an improvement in liver and kidney function. The observed effects were more significant when compared to free ginger oil.

Conclusion

Collectively, the present study indicates that nanoemulsion formulation of ginger oil might promote oral absorption and therefore improve its in vivo anti-proliferative efficacy.

201949

Dispersive liquid-liquid microextraction based on a novel deep eutectic solvent followed by UPLC-MS/MS for trace analysis of bisphenols in beverages

Sarah AlQahtani, Shahad AlKahlah, Arjwan AlQarni, Najd AlMutairi, Heba Shaaban and Ahmed Mustafa

Background
Bisphenol A is a synthetic substance that is widely utilized in the production of a wide range of plastic and metallic products. Human exposure to bisphenol A occurs on a regular basis, primarily through the consumption of bisphenols-contaminated food products. Substituting bisphenol A with alternative analogues such as bisphenol S and bisphenol F may impose potential health risks due to their potential synergistic effects. Therefore, it is crucial to investigate the levels of bisphenols in food products. The aim of this study is to develop and optimize a rapid, sensitive, and reliable UPLC-MS/MS method for simultaneous determination of bisphenol A, bisphenol S, and bisphenol F in popular beverages available in the Saudi market.

Method
Dispersive liquid-liquid microextraction (DLLME) using a green deep eutectic solvent (DES) composed of anisaldehyde and decanoic acid (molar ratio of 3:1) was employed for sample extraction. Various DLLME parameters including dispersing solvent type, DES molar ratio, DES volume, pH, centrifugation time, vortex time, salt concentration, and sample volume were optimized.

Result
Satisfactory recoveries in the range of 97.8 to %99.5 with relative standard deviations not exceeding %8.5 were obtained. The calibration curves exhibited coefficient of determination values ≥ 0.999. The detection limits were in the range of 0.003-0.02 µg/L. Bisphenol A was detected in %74 of the samples at concentrations ranging from below the limit of detection to 16.6 µg/L.

Conclusion
The developed DLLME-UPLC-MS/MS method was sensitive, environmentally friendly, cost-effective, making it suitable for routine analysis of the studied bisphenols in beverages. The findings of this study could provide up-to-date information on the presence of bisphenol A and its alternatives in beverages from the Saudi market.

201955
Pharmacological Studies of the Potential Protective Role of Piceatannol Against Cisplatin-Induced Ovarian Toxicity in Rats

Abeer Alorabi, Basma G. Eid, Lenah Binmahfouz, Amina M. Bagher, Rasheed A. Shaik, and Ashraf B. Abdel-Naim.

Background
Premenopausal women diagnosed with cancer may suffer from ovarian toxicity, which affects their quality of life. Chemotherapeutic drugs cause ovarian toxicity, such as menstrual disorders, early menopause, and

infertility. Cisplatin (CIS) is one of the most important and effective chemotherapeutic drugs that belong to the family of platinum derivatives, commonly used for different types of tumors. However, CIS has been reported to cause ovarian toxicity. Piceatannol (PIC) is a naturally occurring polyphenolic stilbene that became an exciting research field due to its known antioxidant, anti-inflammatory, and anti-apoptotic activities.

Method

Thirty female rats were divided randomly into five groups. (1) Control, (2) PIC (10 mg/kg), (3) CIS (6 mg/kg), (4) low dose PIC (5 mg/kg) + CIS (6 mg/kg), and (5) high dose PIC (10 mg/kg) + CIS (6 mg/kg).

Result

Pretreatment with PIC (5 and 10 mg/kg) significantly prevented the CIS-induced histopathological alterations, inhibited follicles loss, and inhibited the decrease in serum anti-Mullerian hormone (AMH). PIC exhibited antioxidant activity by significantly preventing MDA production and the depletion of GSH and antioxidant enzymes (CAT and SOD) in ovarian tissues in a dose-related manner. Additionally, PIC markedly decreased the immunostaining expression of inflammatory markers (iNOS, TNF-α, and NF-κB) in ovarian tissues. Furthermore, PIC significantly attenuated the phosphorylation of ERK, JNK, and p38 induced by CIS. Finally, PIC significantly increased the expression of Bcl-2 while decreased Bax and CASP3.

Conclusion

PIC can protect against CIS-induced ovarian toxicity through its antioxidant, anti-inflammatory, and anti-apoptotic activities. These results indicate that PIC could be developed as a natural supplement for preventing and treating CIS-induced ovarian toxicity.

201958

Anti-MRSA metabolites from Asphodelus microcarpus: Phytochemistry, In vitro testing and In silico studies

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Background

This research investigates the therapeutic potential of natural sources, particularly plants, in addressing diseases that are resistant to conventional treatment methods. The study focuses on the genus Asphodelus, a plant rich in phytochemicals known for its antibacterial, anti-inflammatory, and antihypertensive properties.

Method

The research involved the isolation and characterization of four

compounds from Asphodelus, namely asphodelin, chrysophanol, 2-acetyl-1,8-dimethoxy-3-methyl naphthalene, and -sitosterol. These compounds were found to exhibit strong inhibitory effects against methicillin-resistant Staphylococcus aureus (MRSA), a drug-resistant bacterial strain.

Result

The researchers utilized advanced analytical techniques such as NMR and HRESIMS to identify and isolate these bioactive compounds from the plant. The antimicrobial activity of these compounds was assessed using an agar well diffusion assay, and their effectiveness was compared to the positive control antibiotic, Vancomycin. The results demonstrated that these compounds displayed significant sensitivity against MRSA, indicating their potential as effective antibacterial agents. To gain insights into their mode of action, a docking study was conducted to predict and elucidate how these compounds interact with target enzymes, contributing to their anti-MRSA activity.

Conclusion

In conclusion, this study underscores the importance of exploring natural sources, particularly plants like Asphodelus, for their potential in combating drug-resistant bacterial infections. By isolating and characterizing these four compounds, the research sheds light on promising alternatives for treating MRSA and other antibiotic-resistant bacteria, contributing to the ongoing efforts to address this global health concern.

201968

Development and Validation of a High-Throughput and Green Method for Assessing Metformin in Tablet Form by Using a 96-Microwell Plate Spectrophotometer Assay

Wujud Althomali, Mohammed Alqarni, Deema Alsheqihy, Shahad Alshehri, Raghad Alharthi and Shahad Dirbah

Background

Metformin (MET) is a widely used oral insulin sensitizer and anti-diabetic medication belonging to the class of drugs called biguanides. It serves as a first-line treatment for managing type 2 diabetes mellitus in patients with hyperglycemia. However, current spectrophotometric assays for measuring MET in pharmaceutical formulations have limitations in terms of throughput and suitability for quality control laboratories. Therefore, there is a need for a new method that can address these limitations and provide efficient analysis.

Method

This method uses charge-transfer complexes (CTCs) with Chloranilic Acid (CLA) and 2,3-Dichloro-5,6-dicyano-1,4-benzoquinone (DDQ) to analyze MET in complex formulations. The method utilizes a 96-microwell

plate spectrophotometer for high-throughput analysis. The formation of colored complexes resulting from the reaction of MET with CLA and DDQ is measured at 530 nm and 460 nm, respectively, using an absorbance microplate reader.

Result

The developed method was validated and demonstrated good correlation coefficients (0.997 ,0.996) with CLA and DDQ, respectively. Limit of detection of MET with CLA and DDQ were determined to be 18.12 µg/mL and 15.17 µg/mL, respectively, Limit of quantification of MET with CLA and DDQ were 54.90 µg/mL and 45.89 µg/mL, respectively. The precision of the method was high, with a relative standard deviation (RSD) not exceeding %2.17. The accuracy of the method was assessed by the recovery percentage, which fell within the acceptable range of ±%5. The method was successfully applied to accurately and precisely quantify MET in tablet dosage forms. The green assessment using an AGREE tool showed that the "greenness" score was 0.62. This result indicates an acceptable level of environmental friendliness for this method.

Conclusion

The developed method, utilizing a 96-microwell plate spectrophotometer for MET analysis, demonstrated several advantages. It showed linearity, simplicity, ease of use, high precision, and accuracy within an acceptable range. Moreover, the method was environmentally friendly, straightforward, and cost-effective. These findings suggest that the proposed method can be a reliable analytical technique for assessing MET in pharmaceutical formulations and can serve as an alternative to current methods in routine MET analysis in quality control laboratories.

201969

Enhancement of Water Solubility of Atorvastatin Calcium's Solubility Using Nicotinamide as a Co-Former: A Potential Solution for Enhanced Oral Delivery

Wujud Althomali, Mohammed Alqarni, Deema Alsheqihy, Shahad Alshehri, Raghad Alharthi and Shahad Dirbah

Background

Oral drug administration is a common route for drug delivery, but one of its challenges is the low water solubility of many drugs, including Atorvastatin calcium (ATO). ATO belongs to the Biopharmaceutical Classification System (BCS) Class II, indicating its poor water solubility. The bioavailability of ATO is only %14, which is a limitation of its oral administration. To address this, the study aims to improve the water solubility of ATO by using nicotinamide (NIC) as a co-former. This study developed an RP gradient

HPLC method to detect and quantify ATO in an aqueous solution.

Method
The RP gradient HPLC method was developed and validated according to the guidelines set by the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH). The evaluation of ATO in the presence and absence of NIC was performed at different temperatures (4°C, 25°C, and 40°C) and pH (6.8 .4.7 ,1.1).

Result
Results: The developed RP gradient HPLC method was found to be linear, specific, accurate, and precise. The linearity of ATO and NIC was determined to be 0.999. The limit of detection (LOD) for NIC and ATO was found to be 0.39 and 1.58 µg/ml, respectively. The limit of quantification (LOQ) for NIC and ATO was determined to be 1.18 and 4.78 µg/mL, respectively. For ATO, the mean recovery percent was %101.05, while for NIC, it was %101.6 (n=3). The relative standard deviation (RSD%) for ATO and NIC was less than %2 for both inter-day and intra-day precision.

Conclusion
Conclusion: In the presence of NIC at a 5 M concentration, the solubility of ATO was found to be 16 times higher compared to ATO alone. This indicates that NIC can effectively enhance the water solubility of ATO. The developed RP gradient HPLC method proved to be a reliable technique for the quantification of ATO with NIC. These findings suggest that using NIC as a co-former could be a promising approach to improving the oral bioavailability of ATO and overcoming the limitations associated with its low water solubility.

201972
Therapeutic potential of Thuja Occidentalis: in-vitro biological, and in-silico Activities of Leaves and Stem Extracts.

Rawabi Alhathal, Kareem Younes, Rahaf Albsher and Sarah Alfaleh

Background
Thuja occidentalis is an evergreen coniferous tree, which belongs to family Cupressaceae. It is a well-known medicinal plant can be used in treatment of many diseases. In this study, the leaves and stem of T. Occidentalis were examined for their phytochemical composition, as well as their cytotoxic and in-silico docking properties.

Method
The investigated extracts' phytochemical composition was determined using gas chromatographic-mass spectrometric method. In addition, its in-vitro cytotoxicity versus cancer cell lines

such MCF-7, HepG-2, HCT-116, and A-549 was
investigated using MTT assay method. Moreover, certain phytochemical compounds
were identified by GC-MS analysis and afterwards in-silico evaluated against anticancer
molecular targets. Also, other biological activities were assessed such as; antiviral and
antioxidant.

Result

: Plant extracts showed good cytotoxic activity against both A-549 and HCT-116 cancer cell lines. With an IC50 value of 18.45µg/ml for leaves' extract and 33.6µg/ml for stem extract
that led to apoptosis and S-phase arrest in A-549 cells, cytotoxicity data confirmed effectiveness of
both extracts against these cancer cells. In addition, leaves' extract demonstrated effective antiviral activity, with suppression rates of 17.7 and %16.2 for HSV-2 and H1N1, respectively. Moreover, plant extracts exhibited good antioxidant activity, which confirmed by DPPH and ABTS methods.
Upon GC-MS analysis, it revealed presence of bioactive components such as Podocarp-7-en-3-ol, Megastigmatrienone, Cedrol, and Docosanol that are relevant to investigated biological activities.

Conclusion

Our findings suggest that methanolic extracts of T. occidentalis may have potential therapeutic uses as anticancer against A-549 cells in addition to its antiviral and antioxidant properties, which opens up further avenues for investigation into its industrial applications.

201976

Fenofibrate reduces the rat model of letrozole-induced polycystic ovarian syndrome through PPAR and TNF/CD95 pathway regulation.

Ibtihal Alkhudhayr, Mohamed Morsy and Katharigatta Venugopala

Background

Polycystic ovarian syndrome (PCOS) is a prevalent endocrine health problem during the childbearing period that seriously affects fertility in females. Fenoibrate, a peroxisome proliferator-activated receptor-alpha (PPARα) agonist, showed beneicial effects in models of endocrine disturbances.Thus, we evaluated the potential therapeutic effect of fenoibrate in experimental PCOS.

Method

Rats received oral fenofibrate (300 mg/kg/day) for three weeks following a three-week PCOS induction regimen using oral letrozole (1 mg/kg/day). We determined the changes in body weight, levels of serum testosterone, insulin, anti-Müllerian hormone (AMH), ovarian malondialdehyde (MDA), superoxide dismutase (SOD), and tissue tumor

necrosis factor-alpha (TN) and CD95 protein expressions. The tissue expression of interleu-kin-10 (IL10) and PARa genes was determined.

Result

Letrozole-treated rats showed successful induction of PCOS, confirmed by his-topathology and significantly increased body weight, testosterone, insulin, AMH, and MDA, and decreased SOD. Ovaries of untreated PCOS rats showed increased TNa and CD95 and decreased PARa and IL10 expression. Administration of fenofibrate ameliorated the letrozole-in-duced PCOS changes.

Conclusion

Fenofibrate-mediated amelioration of PCOS in rats is attributed partly to its antioxidant, anti-inflammatory, and anti-apop-totic properties and activation of PARa.

201978

The beneficial effects of indole-3-acetic acid and chenodeoxycholic acid on kidney injury induced by valproate: Role of Nrf2/HO-1 and cytoglobin signaling.

Danah Aljubeiri, Noor Mukhtar, Ahlam Alhusaini and Iman Hassan

Background

Valproate (VPA) is an antiepileptic drug that is widely used in many psychiatric and neurological disorders. Its use is generally safe; however, the chronic administration may lead to kidney injury. Mechanisms underlying VPA-induced kidney injury are not fully examined. This initiates our interest to investigate a new molecular signaling pathway involved in VPA-induced kidney injury and the way to ameliorate such toxicity by using indole-3-acetic acid (IAA) and chenodeoxycholic acid (CDCA).

Method

Kidney injury was induced in rats by daily administration of VPA (500 mg/kg, i.p.). The rats were treated with IAA (40 mg/kg, orally) or/and CDCA (90 mg/kg, orally) one hour post VPA dose for three weeks. The effects of those compounds were examined in kidney tissues focusing on their antioxidant and anti-inflammatory properties using biochemical, histopathological and immunohistochemical examinations.

Result

Rats received VPA exhibited a high level of oxidative stress which can be proved by the significant reduction in renal glutathione (GSH) level and superoxide dismutase (SOD) activity, and the elevation of malondialdehyde (MDA) level. Similarly, tumor necrosis factor-α (TNF-α), interleukin-1beta (IL-1β), and interleukin-6 (IL-6) were significantly increased. The immunohistochemical analysis demonstrated a significant decline in the immunoreactivity of nuclear factor erythroid 2-related factor (Nrf2), heme

oxygenase-1 (HO-1) and cytoglobin antigens in renal cells. However, treatment with either IAA or CDCA significantly ameliorated the altered parameters including Nrf2/HO-1 and cytoglobin.

Conclusion

IAA and CDCA provided a protective activity against VPA-induced kidney injury by downregulating the activity of inflammation and upregulating the capacity of endogenous antioxidant in renal tissue.

201984

FORMULATION AND EVALUATION Of Gastric Floating In Situ Gelling System Of Levofloxacin And Luteolin Combination To Eradicate H.pylori Infection

Dalal AL-Qahtani, Mohammed Jafar, Zainab Al Hashem, Rayan Mushtaq and Mohd Sajjad Ahmad Khan.

Background

Helicobacter pylori (h. pylori) infection is a leading cause of gastric ulcer and cancer-related deaths worldwide. To combat this pathogen, combining antibiotics with phytoconstituents has been found to be an effective approach. This combination can reverse antibiotic resistance and improve efficacy, making it a promising strategy for eradicating h.pylori.

Method

Considering this fact, we developed a gastric floating stimuli responsive in-situ gel with levofloxacin and luteolin combos. Thermo-responsive plutonic, an ion-sensitive gellan gum polymers, and a floating agent calcium carbonate were employed to prepare the gastric floating in-situ gels of levofloxacin and luteolin. DSC and FTIR measurements were conducted before the preparation of in-situ gel to study the compatibility between the drugs and the polymers. Physical appearance, solution viscosity, in-vitro gelation, in-vitro floating, in-vitro drug release, and ultimately in-vitro anti h. pylori activity were all evaluated for the prepared floating in-situ gels.

Result

DSC and FTIR studies revealed that the drugs and the polymers were compatible to each other. Results indicated that the in-situ gel formulations of gellan gum had good appearance, excellent pourability (5.57±139 mPa to 3.51±165 mPa), good gel strength, low floating lag time (2 to 7 seconds), and long floating duration (>24 hours). They also demonstrated sustained in-vitro drug release. The in-situ gels prepared with pluronics polymer were excellent in every physical aspect except for gel strength, hence further work was not conducted on them. The gellan gum formulation of luteolin has robust and sustained release antibacterial activity against h. pylori as well as synergistic interaction with levofloxacin (FICI

values 0.122 to 0.375), according to the in-vitro anti h. pylori study.

Conclusion

The conclusion reached was that prolonged floating in an acidic medium and the synergistic levofloxacin activity brought by the floating in-situ gel of levofloxacin and luteolin combination would be preferable for obliterating h. pylori infection.

201985

Concurrent use of methanolic extract of celery (Apium graveolens L.) leaf and calcium channel blocker (amlodipine) in animal model of dexamethasone-induced hypertension.

Zainab Alshakhs, Zakaria Al Hassan and Ali Al Jabr

Background

Celery (Apium graveolens L.) has been used by locals along with conventional antihypertensives as part of their daily management of hypertension. This study evaluates the concomitant use of methanolic extract of celery leaf on blood pressure and lipid profile in a rat-hypertensive-model.

Method

48 Sprague Dawley rats were initially divided into two groups, 6 rats in control group and 42 rats receiving 0.3 mg/kg Dex for 6 weeks. Hypertension was confirmed with blood pressure (BP) > 200 mmHg. Hypertensive rats were grouped into 7 treatment groups of 6 rats each; Dex (0.3mg/kg) untreated; Dex-amlodipine (10 mg/kg) treated; Dex-amlodipine-low dose (100 mg/kg) celery; Dex-amlodipine-high dose (200 mg/kg) celery; Dex-low dose celery and Dex-high dose celery treated groups. BP (SBP and DBP) heart rate were measured. Lipid profiles were determined by auto-analysis.

Result

The SBP and DBP in the Dex group increased significantly compared to control group ($p<0.01$). However, treatment with the combination of amlodipine-celery high dose showed lower SBP and DBP compared with amlodipine only. Also, celery methanolic extract alone reduced BP in a dose-dependent fashion. Heart rate in all the groups showed no significant difference. Lipid profile measurement in the Dex group showed a significant increase except HDL levels, while the combination and celery only groups had a significant decrease ($p<0.05$).

Conclusion

This study showed that combination of amlodipine and celery extract produced a better BP lowering than either amlodipine or celery extract alone. A better lipid profile was also seen, justifying their use by locals.

201988

Studying the Effect of Procyanidin B2 on Methotrexate-Induced Liver Injury in Rats

Juman Alsaab, Dr.wedad sarawi, Dr.ahlam alhusaini and Dr.eman hussain

Background

Methotrexate (MTX), a potent chemotherapeutic and immunosuppressive agent, is widely used for malignancies, such as leukemia and autoimmune diseases. MTX-induced hepatotoxicity is a well-recognized adverse response, even at relatively low doses. The mechanisms through which MTX can cause liver damage are not fully understood; however, it can inhibit the antioxidant defense mechanisms in hepatocytes and induce cell death. Procyanidin B2 (PCB2) is a phenolic compound that possesses beneficial effects against liver inflammation, oxidative stress, and fatty liver. Notably, no studies have previously been employed to examine the hepatoprotective action of PCB2 on MTX-induced liver toxicity in rats. As a result, this work aims to investigate the possible protective effects of PCB2 on MTX-induced hepatotoxicity.

Method

Rats were allocated into five groups: control group, MTX-intoxicated group (20 mg/kg/IP), MTX+ quercetin group (20 mg/kg/p.o), and PCB2 treated groups (40 mg/kg/p.o), with and without MTX. All treatments were administered daily for ten days, while MTX was injected as a single dose on day 8.

Result

MTX induced elevation in serum transaminases and liver tissue malondialdehyde (MDA) levels. On the contrary, glutathione (GSH) levels and superoxide dismutase (SOD) activity were significantly decreased in liver tissue. The inflammatory cytokines, tumor necrosis factor-α (TNF- α), interleukin-1β (IL-1β), and interleukin 6 (IL-6) were markedly upregulated in MTX intoxicated rats. Additionally, the expressions of nuclear factor kappa B (NF-κB), toll-like receptor 4 (TLR4), and caspase-3 were significantly increased in MTX rats. The use of PCB2 significantly ameliorated the deleterious effect of MTX on previous parameters by restoring oxidant/ antioxidant balance, decreasing the inflammatory markers and normalizing the expression of NF-κB, TLR4 and caspase-3. In conclusion, this study uncovered the potential role of PCB2 on MTX-induced hepatotoxicity, confirmed its antioxidant, anti-inflammatory and antiapoptotic effects and further supported its use as a protective therapy against such toxicity.

Conclusion

PCB2 has a hepatoprotective effect against MTX-induced liver damage by reducing liver enzymes. It also offers antioxidant, anti-inflammatory and

anti-apoptotic effects and positively impacts some parameters over QUER particularly liver enzymes and oxidative stress markers. Moreover, PCB2 restored the oxidant/antioxidant balance and reduced liver inflammation after MTX-induced liver injury in the liver. It showed a remarkable improvement in caspase 3, NF-κB and TLR4 after MTX-induced liver injury. Based on the presented results, it is highly potential that PCB2 treatment can offer a novel therapeutic agent for preventing hepatotoxicity induced by MTX use.

201993

Exploring Solithromycin's Repurposed Role as an Antivirulence Agent Against Staphylococcus aureus and Resistant Variants

Rihaf Alfaraj, Lama AlAmri and Najd Nassar

Background

Antimicrobial resistance (AMR) is an escalating global health crisis, rendering conventional antibiotics increasingly ineffective. Staphylococcus aureus, especially methicillin-resistant S. aureus (MRSA), stands out as a notorious pathogen with extensive resistance. Amid this challenge, the study seeks to repurpose solithromycin, traditionally used against bacterial infections, as an antivirulence agent to combat S. aureus and its resistant variants. The rationale behind this approach is to address the virulence factors of bacteria, which are often overlooked and constitute a promising alternative therapeutic target.

Method

The research employs a multifaceted approach. It initiates with the validation of solithromycin's bactericidal activity against S. aureus, MRSA, and AgrA mutant strains through determining the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC). Further exploration involves quantifying the impact of solithromycin on biofilm production by these strains using a quantitative biofilm formation assay. Molecular techniques, including conventional PCR, are applied to detect virulence genes' expression, unraveling the mechanisms underlying the inhibition of these genes. Statistical analyses, employing One-Way Anova tests, will scrutinize the detection of virulence factors and biofilm formation in the presence and absence of solithromycin.

Result

Preliminary findings indicate that solithromycin exhibits promising antimicrobial activity against the target strains, as evidenced by MIC and MBC determinations. Moreover, solithromycin significantly hinders biofilm formation in these strains. Molecular analysis reveals a notable downregulation of virulence genes in the presence of solithromycin,

highlighting its potential as an antivirulence agent.

Conclusion
This study's early results underscore the potential of solithromycin as an antivirulence agent, inhibiting the virulence mechanisms of S. aureus, MRSA, and AgrA mutants. Repurposing antibiotics to tackle AMR by targeting virulence factors could revolutionize the approach to combat multidrug-resistant bacterial infections. Further research and clinical trials are warranted to substantiate these findings and explore solithromycin's clinical utility, bringing us closer to innovative strategies against AMR.

201997

Screening of anti-cancer and antioxidant activity of Mercurialis annua extracts

Ibtihal Alkhudhayr and Katharigatta Venugopala

Background
Mercurialis annua has been traditionally used by native people for its diuretic, laxative, antiemetic and antioxidant activity in addition to its usefulness in the treatment of warts, eye problems and microbial infections. The goal of this work is to study the different extracts of aerial parts of Mercurialis annua and test them for possible antioxidant, cytotoxic and antiangiogenic activities.

Method
One kilogram of the dried powdered aerial parts of M. annua, was extracted by maceration with -hexane, ethyl acetate, and ethanol (96 %), respectively. Flavonoids were detected and identified by UV spectrophotometer, TLC, NMR, Mass, and melting point in comparison with the standard. The brine-Shrimp cytotoxicity /Lethality test was performed to measure the LGso for all M. annua extracts, using Colchicine and chloroform as positive control and negative control, respectively. Both the ethanolic extract and ethyl acetate extract of M. annua were tested for DPPH radical scavenging activity (antioxidant activity). The ethanol extract was evaluated for possible antiproliferative activities against human leukemia (K562), breast cancer (MCF-7), cervical cancer (Hela), lung cancer (A562), and fibroblast cell lines. All the three extracts from M. annua were also evaluated for possible antiangiogenic activity using the ex vivo Rat Aortic assay.

Result
The ethanolic extract has shown mild cytotoxic activity, especially on the MCF-7 breast cell lines as compared to ethyl acetate and hexane extract. In addition, the ethanolic extract resulted in the highest radical scavenging activity (%61.3 inhibition), while all extracts have shown negligible antiangiogenic activities.

Conclusion

The study shows that the ethanolic extract of Mercurialis annua could serve as a possible source for developing anticancer and antioxidant drugs in the future.

201998

Hybrid system of Phenytoin with Mg-Al-layered double hydroxide for dissolution enhancement

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Background

Phenytoin (PHT) is an antiseizure BCS class II drug, presenting low solubility and high permeability. These characteristics make it difficult for it to be absorbed, necessitating the use of high doses. Therefore, the usage of nano-hybrid molecules like Layered double hydroxide (LDH) can help overcome this problem and improve the bioavailability of the drug.

Method

Preparation of Mg-Al-LDH, Intercalation of PHT in Mg-Al-LDH, Design and formulation of Mg-Al- PHT-LDH-tablets, Evaluation of formulated Mg-Al-PHT-LDH -tablets. The prepared Mg-Al-LDH was characterized by Fourier-transform infrared spectroscopy (FTIR), Differential scanning calorimetry (DSC), Thermogravimetric analyses (TGA), X-ray diffraction (PXRD), and scanning electron microscopy (SEM). The intercalated component also characterized by FTIR, DSC, TGA, PXRD, SEM, and transmission electron microscopy (TEM).

Result

The outcomes of the FTIR and PXRD studies confirm the intercalation of phenytoin in the LDH system. Later, this system was used in the formulation of tablets which exhibited excellent quality control characteristics. The in-vitro evaluation proved highly superior results for phenytoin intercalated LDH tablets as compared to unprocessed phenytoin tablets. Also, the pharmacokinetic study proved the superiority of the developed formulation over unprocessed phenytoin tablets in terms of absorption and bioavailability.

Conclusion

LDH technique can be effectively utilized as a tool for solubility enhancement for poorly water-soluble drugs.

202004

Investigations on the cytotoxicity and antimicrobial activities of terezine E and 14-hydroxyterezine D

Sultan Sab, Mariam Mojally, Randa Abdou, Wisal Bokhari, Mohammed Dawoud and Amgad Albohy

Background
The microscopic species known as endophytes inhabit inter- and intracellular spaces of tissues of advanced plants without causing harmful effects to their host plants. They have been recognized as a rich source of bioactive natural products. Investigation of the medicinal plant Centaurea stoebe for its endophytes resulted in the isolation of a bioactive mucor species from which terezine E and 14-hydroxyterezine D were isolated as new natural products.

Method
Terezine E and 14-hydroxyterezine D were tested for cytotoxicity against three cancer cell lines (human ductal breast epithelial tumor cells (T47D)-HCC1937, human hepatocarcinoma cell line (HepG2)-HB8065, and human colorectal carcinoma cells (HCT-116)-TCP1006). Additionally, their antimicrobial activities were investigated and the affinity for binding to the active site of histone deacetylase (PDB ID: 4CBT) and matrix metalloproteinase 9 (PDB ID: 4H3X) were evaluated by molecular docking using AutoDock Vina software.

Result
Cytostatic effects were exhibited by both natural products, with 14-hydroxyterezine D showing higher antiproliferative activity and terezine E exerting higher cytotoxicity. As well as, molecular docking results supported the high cytotoxicity of terezine E and showed higher binding affinity with 4CBT with an energy score of 9 kcal/mol. Terezine E showed higher antibacterial and antifungal activities than 14-hydroxyrerezine D: MIC values were 15.45 and 21.73 µg/mL against S. aureus and 8.61 and 11.54 µg/mL against P. notatum, respectively.

Conclusion
The isolated endophytic metabolites terezine E and 14-hydroxyterezine D showed promising results. Terezine E demonstrated higher cytotoxicity against the tested cell lines than 14-hydroxyterezine D. Molecular docking for the target compounds terezine E and 14-hydroxyterezine D on the target enzymes supported the high cytotoxicity results of terezine E by showing high binding affinity with histone deacetylase with an energy score of -9 kcal/mol. Terezine E also showed higher antibacterial and antifungal activities than 14-hydroxyrerezine D.

202017
A Novel Role for Nonactin: Interfering with G-Quadruplex in RET-Driven Medullary Thyroid Cancer.

Meshari Aloumi, Tariq Alqahtani, Arwa Alsubait, Abdulrahman Alamer, Sahar Alghamdi and Ghala Alomari.

Background
Medullary Thyroid Carcinoma (MTC) is closely associated with mutations

in the RET proto-oncogene, placing the activated RET protein at the center of MTC pathogenesis. Existing therapeutic solutions, primarily tyrosine kinase inhibitors such as selpercatinib, vandetanib, and cabozantinib, have shown moderate efficacy but are accompanied by increased risks of side effects and resistance. This research introduces nonactin, a previously known antibacterial agent, as a potential treatment for MTC by targeting specific G-quadruplex region within the RET proto-oncogene.

Method

In this research, high-throughput screening was conducted using a luciferase reporter-based cellular assay. The MTC TT cell line was treated with nonactin for 24 and 48 hours. Immunoblotting and RT-PCR were employed to measure the protein and RNA levels of RET and its downstream stream proteins. The cell cycle was analyzed using FACS, and caspase activity was measured to indicate the activation of apoptosis.

Result

Nonactin was identified to significantly reduce luciferase activity driven by the RET promoter. A deeper exploration revealed nonactin's remarkable selectivity against tumor cell lines harboring RET mutations, effectively inducing apoptosis. Nonactin was also found to bind to the G-quadruplex region on RET.

Conclusion

The findings highlight the compound's therapeutic potential, emphasizing its mechanism of inducing apoptosis in active mutant RET cell lines by interacting with G-quadruplex structures. This novel insight opens avenues for a potentially effective treatment for MTC, potentially bypassing the challenges associated with current TKIs.

202022

Formulation and evaluation of Piroxicam nanosponge for improved internal solubility and analgesic activity

Danah Alzughaibi, Reema Aloqla, Rafa Aljumah, Jenan Alali, Sara Alkhalifah, Dalia Gaber, Mahasen A Radwan and Siham A Abdoun

Background

Cyclodextrin nanosponges are solid nanoparticles, designed by cross-linking of cyclodextrin polymer; it has been used widely as a good delivery system for water insoluble drugs. The aim of this study is to enhance the solubility of Piroxicam (PXM) using β-Cyclodextrin based nanosponges formulations.

Method

PXM nanosponge (PXM-NS) formulations were prepared using β-cyclodextrin and carbonyldiimidazole as a cross linker, three ratios of β-cyclodextrin to

crosslinker in addition to three drug to nanosponges ratios were tested. Piroxicam nanosponge formulations were characterized for its particle size, zeta potential, physical compatibility and in vitro release. Stability studies at three temperatures (4°C, 25°C and 40°C) were done for optimal formula. Finally, the in vivo analgesic activity and pharmacokinetic parameters of the optimal formula were conducted.

Result

The optimized PXM-NS formula (PXM-NS10) showed particle size (14.06±362nm), polydispersity index (0.0518), zeta potential (1.05±17mV), and %EE (4.33±79.13). The dissolution study showed a significant increase in the amount of PXM dissolved compared with the unformulated drug. Stability studies confirmed that nanosponge showed accepted stability for 90days at 4°C and 25°C.

Conclusion

In vivo analgesic studies verified that there was a significant enhancement in the analgesic response to PXM in mice, and 1.42 fold enhancement in the relative bioavailability of PXM-NS10 as compared to commercial tablets. Nanosponge prepared under optimal conditions is an encouraging formula for increasing the solubility and therefore the bioavailability of Piroxicam.

202024

Echinacoside ameliorates hepatic fibrosis and tumor cell invasion in rats with hepatocellular carcinoma, exhibiting chemotherapeutic and hepatoprotective effects.

Ajwan Albalawi, Ajwan Albalawi , Shekha Alatawi, Areej Alatawi and Lama Alhwyty.

Background

Primary liver cancer, specifically hepatocellular carcinoma (HCC), accounts for %90 of all cases and impacts around 800,000 people globally annually. Although treatment options for HCC have improved, there is still a pressing need to discover new drugs that do not result in resistance. One potential drug is echinacoside, a natural caffeic acid glycoside found in phenylethanoid glycoside and extracted from Echinacea angustifolia. Echinacoside has demonstrated antioxidant, anti-inflammatory, antidepressant, and antidiabetic properties. Therefore, we conducted this study to investigate the ability of echinacoside to produce antitumor activity against HCC in rats via ameliorating hepatic fibrosis and tumor invasion.

Method

Rats were given thioacetamide to induce HCC and some rats were also given echinacoside twice a week for 16 weeks via oral gavage at a dose of 30 mg/kg. The liver impairment was assessed by measuring serum

α- fetoprotein (AFP) levels and examining liver sections stained with Masson trichrome or anti-TGF-β1 antibodies. The hepatic expression of mRNA and protein levels of TGF-β1, β-catenin, SMAD4, MMP9, and fascin were also analyzed.

Result

Echinacoside improved the survival rate of rats by decreasing the levels of serum AFP and hepatic nodules. Additionally, our examination of micro-images stained with Masson trichrome indicated that echinacoside can reduce fibrosis in hepatic tissues. Lastly, echinacoside lowered the expression of TGF-β1, β- catenin, SMAD4, MMP9, and fascin genes.

Conclusion

Echinacoside has been found to have anti-tumor properties and can help prevent the development of HCC, as evidenced by an increase in survival rates and a decrease in the number of tumors and AFP. Echinacoside has been shown to inhibit the pathway of hepatic tissue fibrosis by reducing the expression of TGF-β1, β-catenin, and SMAD4. Additionally, it has been found to inhibit tumor invasion by suppressing MMP9 and fascin.

202036

Discovery of Dual-Target Natural Inhibitors of Meprins α and β Metalloproteases for Inflammation Regulation: Pharmacophore Modeling, Molecular Docking, ADME Prediction, and Molecular dynamics studies

Sama Alanzi, Dr Lina Eltaib, Dr Abdelrahim Alzain and Rakan Alanzi

Background

Meprins, zinc-dependent metalloproteinases belonging to the metzincin family, have been associated with various inflammatory diseases due to their abnormal expression and activity.

Method

In this study, we utilized pharmacophore modeling to identify crucial features for discovering potential dual inhibitors targeting meprins α and β. We screened four pharmacophoric features against a library of 270,540 natural compounds from the Zinc database, resulting in 84,092 matching compounds. Molecular docking was then performed on these compounds, targeting the active sites of meprins α and β.

Result

Docking results revealed six compounds capable of interacting with both isoforms, with binding affinities ranging from -10.0 to -10.5 kcal/mol and -6.9 to

-9.9 kcal/mol for meprin α and β, respectively. Among these compounds, ZINC000008790788 and ZINC000095099469 displayed superior docking scores and MM-GBSA binding free energy compared to reference ligands. Furthermore, these two compounds exhibited acceptable predicted pharmacokinetic properties and stable interactions with meprin α during molecular dynamics simulations.

Conclusion

This study presents a comprehensive approach for identifying potential dual inhibitors of meprin α and β, offering insights into the development of therapeutic interventions for inflammatory diseases associated with meprin dysregulation.

202042

Solid Lipid Nanoparticles Embedded Hydrogels as a Promising Carrier for Retarding Irritation of Leflunomide

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Background

Leflunomide (LEF), a disease-modifying anti-rheumatic drug, has been widely explored for its anti-inflammatory potential in skin disorders such as psoriasis and melanoma. However, its poor stability and skin irritation pose challenges for topical delivery. The objective of this study was to prepare LEF-loaded solid lipid nanoparticles (SLNs) integrated with hydrogels and evaluate in vitro.

Method

SLNS were developed by microemulsion techniques and evaluated for particle size, zeta potential, entrapment efficiency, and drug content. FTIR and XRD studies were carried out to characterize the product. In vitro anti-inflammatory activity, and stability of optimized formulation was checked and formulated into a gel. The gel was further characterized for pharmaceutical characteristics.

Result

LNs developed by were found ellipsoidal with 273.1 nm particle size and −0.15 mV zeta potential. Entrapment and total drug content of LEF-SLNs were obtained as ± 65.25 %0.95 and %1.72 ± 93.12, respectively. FTIR and XRD validated the successful fabrication of LEF-SLNs. The higher stability of LEF-SLNs ($p < 0.001$) compared to pure drug solution was observed in photostability studies. Additionally, in vitro anti-inflammatory activity of LEF-SLNs showed good potential in comparison to pure drugs. Further, prepared LEF-SLNs loaded hydrogel showed ideal rheology, texture, occlusion, and spreadability for topical drug delivery. In vitro release from LEF-SLN hydrogel was

found to follow the Korsmeyer-Peppas model. To assess the skin safety of fabricated lipidic formulation, irritation potential was performed employing the HET-CAM technique.

Conclusion

The findings of this investigation demonstrated that LEF-SLN hydrogel is capable of enhancing the photostability of the entrapped drug while reducing its skin irritation with improved topical delivery characteristics.

202058

Ameliorating Effect of Thymoquinone Against Cyclophosphamide Induced Nephrotoxicity in Rat

Atheer Alameer, Mohammad F. Alam, Ahmad S. Alrashah and Abdulmajeed M. Jali

Background

Cyclophosphamide (CYP) is a medication used to treat autoimmune disorders and variety of cancer such ovarian cancer, breast cancer, lung cancer, and multiple lymphomas. The majority of patients get severe side effects from cyclophosphamide during chemotherapy. It is advised to switch it out with medications that are less harmful because of its hazardous nature. In this case, frequent and routine laboratory testing is necessary to track kidney function and other toxicity. The utilization of safer medicinal substances to reduce or eliminate renal toxicity is the main focus of current studies. For this investigation, thymoquinone (TQ) was chosen as safe and effective due to its wide range of pharmacological actions, which include nephroprotective actions.

Method

The rats were divided into four groups, such as the normal control (only vehicle daily for 7 days), the negative control (only cyclophosphamide 150 mg/kg ip on the 4th day), the positive control (only thymoquinone 20 mg/kg p.o. daily for 7 days), and the treatment group (cyclophosphamide + thymoquinone) for 7 days. Each group consisted of six rats. This experiment was designed for a week. At the end of the experiments, rats were anesthetized, and blood and tissue were collected for biochemical analysis.

Result

The findings showed that an acute dose of CYP (150 mg/kg body weight) effectively induced kidney damage by elevating blood markers such as creatinine, uric acid, and bilirubin. Additionally, CYP contributed to the elevation of oxidative stress markers such as lipid peroxidation (LPO), inflammatory markers like TNFα and IL-1β, and the reduction of glutathione (GSH). The oxidative stress, inflammatory cytokines, and serum markers were all markedly and significantly ($p<0.05$) reduced by TQ

therapy. There were no changes in the positive control vs. the normal control.

Conclusion
TQ will thus be utilized in the future in addition to cyclophosphamide as an adjuvant treatment.

202067
Red sea sponge Xestospongia testudinaria Inhibitory effect on MCF7 breast cancer

Samaher Almoalim, Manal Madani and Lujain Habis

Background
Breast cancer is one of the most prevalent life-threatening diseases worldwide. Xestospongia testudinaria sponge is from the Red Sea contains a diverse range of chemical compounds, including sterol esters, sterols, indole alkaloids, and brominated polyunsaturated fatty acids. These compounds have demonstrated promising biological properties including, antioxidant, anti-inflammatory, and anticancer.

Method
The cytotoxic effect of Xestospongia testudinaria was assessed by MTT assay and morphological alterations in the MCF- 7 cell line to detect the inhibitory doses of extract. The same concentrations was also used on 3T3 normal cells.

Result
A significant decline in the percentage of cell viability of MCF-7 cells in a concentration-dependent manner was detected with IC-39.8 50 ng/mL.

Conclusion
These results demonstrated that Xestospongia testudinaria extract has an inhibitory effect on breast cancer cell and No effects on the normal cells thus, it holds great promise as a potential treatment for breast cancer.

202084
Mechanistic insights into the neuroprotective role of Probiotics and/or physical and mental activities against Major depressive disorder (MDD) in rat pups

Abdullah Abalhassan, Raghad Aljehani, Fai Alsherif and Ahmed Hamdan

Background
Introduction: Major depressive disorder (MDD) is a common, serious, life-threatening mental illness, whose incidence is high, affecting 120 million people around the world.
Objective: We aim to provide different mechanistic insight for the protective effect of Lactobacillus rhamnosus and/or Physical and Mental Activities (Ph&M) for ameliorating the depression-like behavior in rat model.

Method
Methods: We induced MDD using social isolation (SI) for five weeks. Seventy male Spargue Dawley rat pups were arbitrarily assigned into seven groups; for control, separate and combined treatments. Each group received treatment for eight weeks. Behavioral studies displayed that rats exposed to such treatments either separately or combined demonstrated enhanced attention, locomotor, and cognitive abilities compared to the depression SI-induced group.

Result
Results: All co-treated depression SI-induced groups showed significant neuroprotective effects against depression SI-induced abnormalities in brain monoamines and glutamate, oxidative stress, inflammation, and apoptosis along with histopathological findings. In addition, Lactobacillus rhamnosus and Ph&M either separately or combined activated PI3K/AKT/CREB/BDNF/TrkB, AMPK/SIRT-1/m-TOR, and PERK/CHOP/GRP78/Bcl-2, while hampered HMGB1/RAGE and JAK-2/STAT-3 pathways compared to depression SI-induced group. Nevertheless, the combination of Lactobacillus rhamnosus with Ph&M elicited more favorable anti-depressant effects in all measured parameters compared to other treated groups.

Conclusion
In conclusion, our study provides an evidence-based proof for the neuroprotective effects of nutrition and/or Ph&M for treating MDD.

202087
Current and future prospective of pharmaceutical manufacturing in Saudi Arabia

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Background
The pharmaceutical industry is a Multi-billion dollar global industry that have a significant economic impact and play a major role in human health and wellbeing.
Previous studies showed that the number of registered pharmaceutical industries in KSA exceeds the 40 manufacturers covering only %25-20 of the Kingdom's need of dispensed medicines.

Method
This observational descriptive study that was carried out with the objective of exploring the contribution of the local pharmaceutical industry to the Saudi drug security. Using a drug formulary provided from the Saudi Food and Drug Authority, containing all registered pharmaceutical

products available in Saudi Arabia We have extracted information about drug classes, dosage forms types, country and place of manufacturing, and price.

Result

The results obtained from this study has provided information about the most pharmaceutical products that needs to be locally manufactured or increase their production in the kingdom to rise the contribution of local pharmaceutical industries in Saudi drug security.
In fact, localizing the manufacturing of drugs and pharmaceutical items will be vital for drug security and the healthcare system, so should be supported by the government, pharmaceutical companies, and other related stakeholders.

Conclusion

The small contribution of Saudi pharmaceutical companies in local drug security makes a large additional burden on the Kingdom's annual budget as a result of the overdependence on medicine from abroad.
This study is undertaken to support 2030 ambitious vision through encouraging the contribution of local pharmaceutical industries in Saudi drug security to fulfill the needs of our community.

202090

Intranasal Administration of Dolutegravir-Loaded Nanoemulsion-Based In Situ Gel for Enhanced Bioavailability and Direct Brain Targeting

Fatemah Alqattan, Anroop B. Nair and Sunita Chaudhary

Background

Dolutegravir's therapeutic effectiveness in the management of neuroAIDS is mainly limited by its failure to cross the blood–brain barrier. However, lipid-based nanovesicles such as nanoemulsions have demonstrated their potential for the brain targeting of various drugs by intranasal delivery. Thus, the purpose of this study was to develop a Dolutegravir-loaded nanoemulsion-based in situ gel and evaluate its prospective for brain targeting by intranasal delivery.

Method

Dolutegravir-loaded nanoemulsions were prepared using dill oil, Tween® 80, and Transcutol® P. Optimization of the nanoemulsion particle size and drug release was carried out using a simplex lattice design. Formulations (F1–F7 and B1–B6) were assessed for various pharmaceutical characteristics. Ex vivo permeation and ciliotoxicity studies of selected in situ gels (B1) were conducted using sheep nasal mucosa. Drug targeting to the brain was assessed in vivo in rats following the nasal delivery of B1.

Result

The composition of oil, surfactant, and cosurfactant significantly ($p < 0.05$) influenced the dependent variables (particle size and % of drug release in 8 h). Formulation B1 exhibits pharmaceutical characteristics that are ideal for intranasal delivery. The mucosal steady-state flux noticed with BI was significantly greater ($p < 0.005$) than for the control gel. A histopathology of nasal mucosa treated with BI showed no signs of toxicity or cellular damage. Intranasal administration of B1 resulted in greater Cmax (~six-fold, $p < 0.0001$) and AUC0−α (~five-fold, $p < 0.0001$), and decreased Tmax (1 h) values in the brain, compared to intravenous administration. Meantime, the drug level in the plasma was relatively low, suggesting less systemic exposure to Dolutegravir through intranasal delivery.

Conclusion

The promising data observed here signifies the prospective of B1 to enhance the brain targeting of Dolutegravir by intranasal delivery and it could be used as a feasible and practicable strategy for the management of neuroAIDS.

202091

Effects of Arctiin on Alzheimer's disease in rats by reducing oxidative stress, inflammation, and apoptosis

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Background

Memory loss, language problems, and other neural function issues are some symptoms that people may experience as they develop Alzheimer's disease (AD). This condition affects around 50 million people globally and is expected to triple by 2050. Arctiin, a well-known lignan, is found in Arctium lappa L plant. Arctiin possesses anti-proliferative, anti-oxidative, anti-tumor, anti-adipogenic, and anti-bacterial effects. Our study aimed to explore the potential therapeutic effects of arctiin on rats with AD. We examined the underlying molecular mechanism by evaluating inflammasome pathway (TLR4 and NLRP3), cell fibrosis pathway (STAT3 and TGF-β), and cell cycle proteins (cyclin D1 and CDK2).

Method

AD was induced in rats by administering 70 mg/kg of aluminum chloride through intraperitoneal injection daily for six weeks. After inducing AD, some rats were treated with 25 mg/kg of arctiin daily for three weeks through oral gavage. To examine the brain tissue structure, hippocampal sections were stained with Masson trichrome, and anti-TLR4 antibodies. The collected samples were analyzed for gene expression and protein levels of TLR4, NLRP3, STAT3, TGF-β, cyclin D1, and CDK2.

Result
In behavioral tests, rats showed a significant improvement in their behavior when treated with arctiin. Micro-images stained with Masson trichrome showed that arctiin helped to improve the structure and cohesion of the hippocampus, which was previously impaired by AD. Furthermore, arctiin reduced the gene expression of TLR4, NLRP3, STAT3, TGF-β, cyclin D1, and CDK2.

Conclusion
Arctiin can enhance the behavior and structure of the hippocampus in rats with AD. This is achieved through various mechanisms of action, such as its ability to reduce the expression of both NLR4 and NLRP3, hence inhibiting the inflammasome pathway. Furthermore, Arctiin can improve tissue fibrosis by regulating STAT3 and TGF-β. Lastly, it can block the cell cycle proteins, cyclin D1 and CDK2.

202094
Recent advances in gene therapy for cardiovascular diseases: a systematic review of pre-clinical studies

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Background
Gene therapy holds immense promise for revolutionizing the treatment of cardiovascular diseases. By introducing genetic material into cells, gene therapy can correct the underlying genetic defects that contribute to cardiovascular disorders. This approach has the potential to provide long-lasting, if not curative, therapies for a wide range of cardiovascular conditions. Our aim is to evaluate the efficacy and potential of these genomic alteration technologies in treating cardiovascular disorders and identify potential areas for further research.

Method
Three databases; PubMed, Web of Science, and Science direct were used to search for relevant previous studies. Keywords for search included “gene therapy” and “cardiovascular diseases”. Publications dates were restricted to the last five years (2019 to 2023). For each article, at least two team members independently decided its eligibility for inclusion. The selected articles were evaluated according to predetermined criteria for article quality.

Result
The numbers of papers that satisfied the inclusion criteria were 36 articles. They were included in the final analysis out of the 1,661 unique non-duplicated articles that were screened. Heart failure, myocardial ischemia, and vascular illnesses

were included in %60 of these studies, which covered the majority of cardiovascular diseases. RNA-based therapy, gene replacement therapy, and CRISPR-Cas9 gene editing therapy are the most often utilized genomic modification technologies. Studies used a variety of animal models, the most common being mice (%65). Adeno-associated viruses (AAVs) account for %64 of the delivery mechanisms that have been employed. Different genes per a disease were investigated in the different studies.

Conclusion

Despite the presence of some challenges, the field of gene therapy for cardiovascular diseases is rapidly advancing. With continued research and development, gene therapy has the potential to revolutionize the treatment of cardiovascular diseases and improve the lives of millions of patients.

202099

Protection against the cisplatin-associated nephrotoxicity: Role of mulberrin

Faisal Alnomari, Khaled Alqahtani, Faisal Alsaadi, Mohammed almalki and Omar Alosaimi

Background

Cisplatin is a potent anticancer drug that is currently used to cure a variety of malignant tumors. A major heath concern that limits the therapeutic use of cisplatin is the associated nephrotoxicity. Cisplatin induces nephrotoxicity mainly through changing the redox status of the renal tissues and eliciting inflammatory cascades. Mulberrin is a natural compound that is present in the root bark of the medicinal plant Ramulus Mori and has shown strong anti-inflammatory and antioxidant properties in a range of experimental paradigms. The current study was, thus, devoted to explore the possible protective capability of mulberrin against the cisplatin-associated nephrotoxicity.

Method

Male Wistar rats were randomly allocated into four experimental groups; the normal control, the mulberrin control, the cisplatin, and the cisplatin and mulberrin co-treatment groups. At the end of the experimental work, blood and renal tissue samples were obtained under phenobarbital anesthesia. Spectrophotometric and ELISA techniques were employed to evaluate nephrotoxicity in the four experimental groups.

Result

The results of the current study indicated the ability of mulberrin to significantly improve the renal functions in the cisplatin-treated rats as indicated by decreased serum urea and creatinine levels compared to the cisplatin-only treated group.

Oxidative tissue damage was also suppressed by mulberrin as indicated by reduced lipid peroxidation, and DNA and proteins oxidative modifications. Additionally, levels of the antioxidant reduced glutathione was efficiently enhanced. Moreover, it down-regulated the levels of the pro-inflammatory cytokines IL-1β and IL-6 in the renal tissues of the cisplatin-treated group as compared to the cisplatin-only treated group.

Conclusion

Collectively, the findings of the current study underscore the potential ability of mulberrin to ameliorate the cisplatin-associated nephrotoxicity and turn attention to the possible therapeutic application while clinical studies are warranted.

202106

In vitro and in vivo study-based discovery of a new combination of BTZ-043 and isoniazid to shorten tuberculosis therapy.

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Background

Long-term tuberculosis (TB) therapy is not patient-compliant and is also the reason for TB drug's side effects including hepatotoxicity. Therefore, creating a TB therapy with a shorter treatment duration is one of the priorities to develop TB treatment.

Method

Firstly, the MIC values of BTZ-043 and INH were determined against Mycobacterium tuberculosis (Mtb) utilizing in vitro assays. Secondly, the effect of the combination of different sub-MIC concentrations of BTZ-043 and INH were quantified through a checkerboard assay. Thirdly, the in vivo effect of the combination of BTZ-043 (10 mg/kg) and INH (10 mg/kg) was assessed utilizing the mouse infection model and Guinea pig infection model of TB.

Result

BTZ-043 and INH did not hinder the growth of Mtb at 0.8 nM and 1.6 nM concentrations, respectively. However, their combinations (0.2 nM of BTZ-043 0.4 + nM of INH; 0.2 nM of BTZ-043 0.8 + nM of INH; 0.2 nM of BTZ-043 1.6 + nM of INH; 0.4 nM of BTZ-+ 043 0.4 nM of INH) inhibit the growth of Mtb. The in vivo studies revealed that the combination of BTZ-043 and INH completely cleared lung bacterial load in three months, whereas the combination of INH, rifampicin (RIF), pyrazinamide (PZA), and ethambutol (EMB) required more than four months to clear lung bacterial load.

Conclusion

The combination of BTZ-043 and INH is synergistic and shortens TB therapy duration.

202108

Evaluation of the Cyclooxygenase-2 Inhibitory Activity of Some Pyridazine Derivatives

MUHANNAD ALSHAMMARI, MOHD IMRAN, ABIDA MOHD and NAWAF AL-OTAIBI

Background
Cyclooxygenase-2 (COX-2) inhibitors are an important class of anti-inflammatory agents. However, recent studies have demonstrated that a few COX-2 inhibitors are cardiotoxic.

Method
Thirty-three pyridazine-based compounds, numbered 1 through 33, were conceptualized. The in silico investigations were carried out so that predictions could be made regarding their toxicity, docking scores (DS), pharmacokinetic characteristics, and drug-likeness compared to celecoxib. Spectral analysis was performed to confirm the chemical structures of the synthesized compounds based on the safety and efficacy data received from in silico research. The compounds synthesized were numbers 16 ,12 ,7, and 24. In addition, the COX-2 inhibiting activity of these four compounds was investigated using in vitro testing.

Result
Eleven different compounds were hypothesized not to be toxic to humans. Celecoxib had a DS value of -9.15, which was less than the DS values of four other compounds: 7 (DS = -9.72 kcal/mol), 12 (DS = -10.48 kcal/mol), 16 (DS = -9.71 kcal/mol), and 24 (DS = -9.46 kcal/mol). In addition to exhibiting promising drug-like qualities, these compounds (,12 ,7 16, and 24) displayed superior oral absorption than celecoxib (%79.20). Each of these compounds achieved an absorption rate of %83.53. In comparison to celecoxib (%100; p 0.05), the compounds 7 (%101.23; p 0.05), 12 (%109.56; p 0.05), 16 (%108.25; p 0.05), and 24 (%103.90; p 0.05) all displayed a higher level of COX-2 inhibition.

Conclusion
Compounds 16 ,12 ,7, and 24 are all useful lead compounds that can be used to develop medications to treat various disorders in which high levels of COX-2 are implicated.

202111

Formulation, design, and optimization of sterosomal gel for topical delivery of miconazole nitrate: In vito and In vivo study

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Background
Miconazole nitrate (MN) is a broad-spectrum antifungal drug used for cutaneous candidiasis treatment. However, MN shows poor skin permeability. Thus, this study aimed

to formulate and statistically optimize sterosomal formulations of MN to enhance skin permeability and antifungal activity.

Method

The study was designed using a central composite rotatable design using Design-Expert® software. The independent variables were sonication time and cholesterol, while the dependent variables were vesicle size (VS) ranging within 684 – 368 nm, zeta potential (ZP) that was between 41.5 – 32.7 and encapsulation efficiency (EE%) range was 90.3 - % 73.5 %. The numerical optimization process resulted in an optimum formula composed of 100 mg of stearylamine,140.858 mg of cholesterol, and a sonication time of 9.6 min. It showed a VS of 77.410 nm, ZP of 40.822, and EE% of %475.787.

Result

The optimum formula was characterized for in vitro drug release, in vitro antifungal activity, and in vivo antifungal activity evaluation. The in vitro drug release of the optimum formula was higher compared to MN suspension. Furthermore, the in vitro antifungal activity of the optimum formula showed remarkable growth inhibition to C. albicans at concentrations ranging from 0.00244 – 5mg\ml with MIC = 0.00122 mg\ml as compared to %2Daktarin cream. Moreover, the in vivo antifungal activity evaluation of the optimum formula revealed a skin and plasma bioavailability enhancement compared to %2Daktarin cream. Additionally, the investigation of the optimal formula on skin tissue through histopathology demonstrated the efficacy of the treatment, as evidenced by a histological appearance like the standard treatment histological picture in terms of lowering the microorganisms, reestablishing tissue regulation, and normal distribution of collagenic materials.

Conclusion

Therefore, the ideal MN-sterosomal formula showed antifungal effectiveness at a lower concentration than %2 Daktarin cream, and it may be considered a promising carrier to improve MN's drug delivery and skin permeability.

202112

Macrophage depletion alleviates immunosenescence of diabetic kidney disease by modulating GDF-15 and Klotho

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Background

Cellular senescence is a hallmark of aging. Evidence links macrophage-mediated inflammation with diabetic kidney disease. We investigated

whether GDF-15 upregulation and Klotho expression mediate macrophage depletion–attenuated immunosenescence.

Method

Twenty-four Wistar albino rats were divided into two non-diabetic and two diabetic groups (6 rats/group). Streptozotocin (30 mg/kg) and high-fat diet induced Type 2 diabetes. Liposomal clodronate (CL, 15 mg/kg) depleted kidney macrophages. All groups received %0.9 NaCl. ELISA assessed diabetic nephropathy, oxidative stress, inflammatory, and adhesion molecule biomarkers. Western blotting and immunohistochemistry detected M1 (CD86) and M(163) 2 macrophage phenotype, P16INK4a senescence marker, klotho, and GDF-15 expression. Histological staining was performed.

Result

CL-treated diabetic rats exhibited reduced kidney weight to body weight ratio (0.29 ± 2.93 vs. 0.42 ± 7.85 mg/g, $p<0.001$). Diabetic nephropathy biomarkers decreased (blood urea: 1.34 ± 6.961 vs. 2.37 ± 19 mg/dl, $p<0.001$; BUN: 0.59 ± 2.87 vs. 0.68 ± 9.8 mg/dl, $p<0.001$; serum albumin: 0.64 ± 3.62 vs. 0.40 ± 6.55 g/dl, $p<0.001$; serum creatinine: 0.19 ± 2.04 vs. 1.1 ± 6.74 mg/dl, $p<0.001$). Inflammatory biomarkers increased for IL-10 levels (0.60 ± 19.1 vs. 0.29 ± 7.68 pg/ml, $p<0.001$), and decreased for IL-6 and TNF-α levels (0.39 ± 4.19 vs. 0.27 ± 8.71 pg/ml, $p<0.32 \pm 17$;0.001 vs. 1.74 ± 26.5 pg/ml, $p<0.01$, respectively). Antioxidant enzyme levels (GPx: 1.40 ± 22.4 vs. 0.75 ± 7.05 U/mg, $p<0.01$; SOD: 62.39 2.88 ± vs. 3.15 ± 25.53 U/mg, $p<0.001$) increased while malondialdehyde levels decreased (1.46 ± 48.29 vs. 149.2 5.70 ± U/g, $p<0.001$). CD86, MCP-1, P16ink4a, and GDF-15 expression decreased while CD163 and klotho expression decreased. Hematoxylin & Eosin and acid Schiff staining indicated lower immunosenescence.

Conclusion

Macrophage depletion combats diabetes-accelerated kidney senescence by modulating klotho and GDF-15 signalling pathways. Immunosenescence and related GDF-15 and Kloth axis are potential novel targets in diabetic nephropathy treatment.

202115

Guardians of health: assessing the long-term impact of non-caloric sweeteners on hepatic, cardiac, and cerebral functions, and the protective role of astaxanthin in a rat model

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Background

Obesity and diabetes pose significant global health risks, prompting exploration into combatting these

issues through non-caloric sweeteners like aspartame and stevia. However, the long-term implications of their consumption on health and behavior remain inadequately understood. We aimed to investigate the hepatic, insulin resistance, cardiac and neuronal problems occurred during long-term administration of the daily acceptable amounts of sweeteners on rat model.

Method

In this eight-week study, we examined the chronic effects of sucrose (%10 W/W), aspartame (40 mg/kg), and stevia (200 mg/kg) on the hepatic, cardiac, and cerebral functions in a rat model. Our comprehensive assessments included biochemical, pharmacological, behavioral, and histopathological analyses. Additionally, we investigated the protective potential of astaxanthin (50 mg/kg).

Result

Significant disruptions in lipoprotein metabolism and tissue functions across all sweeteners were noticed compared to the control group. Aspartame exhibited the most adverse effects, while stevia demonstrated the least harm. Remarkably, astaxanthin demonstrated substantial prophylaxis against these detrimental effects.

Conclusion

Our study underscores the detrimental impact of aspartame on heart, liver, and brain tissues, while highlighting relative safety of stevia. Moreover, astaxanthin emerges as a promising preventive agent against the adverse effects of sweeteners on various tissues, providing valuable insights for future health considerations.

Keywords: Artificial sweeteners; Stevia; Aspartame; Cardiotoxicity; Neurotoxicity; Oxidative stress.

202134

7 ,5 dihydroxyflavone protects the liver against the iron overload-induced damage

ABDULELAH ALTOWAIRQI, ATHEER ALHARTHI, SHAHAD ALZAHRANI, SHOMOKH ALTHAGAFI and REEMA ALOTAIBI

Background

Iron overload is a common finding in several diseases including sickle cell anemia and thalassemia because of the repeated blood transfusion. Liver damage associates these diseases because it is a major iron storage organ. Iron overload triggers liver damage through induction of oxidative stress and inflammatory responses. 7 ,5 dihydroxyflavone (DHF) is a naturally-occurring compound that is present in propolis and honey. Potent antioxidant and anti-inflammatory activities for DHF have been reported in a variety of experimental models. The current study was, therefore, performed to investigate the potential protective

ability of the DHF against the iron overload-induced liver damage using rats as a mammalian model.

Method
Male Wistar rats were randomly divided into four groups; the normal control, the DHF control, the iron treated, and the iron and DHF co-treated groups. At the end of the experiment, rats were anesthetized to collect blood and liver tissue specimens which were subjected to the biochemical, ELISA, and Western blotting analysis.

Result
The results revealed the ability of DHF to significantly inhibit the iron-induced liver necrosis as indicated by significant reduction in the activity of liver enzymes ALT and AST in the sera of the co-treatment group compared to the iron-treated group. Equally important, the apoptotic cell death was suppressed as demonstrated by decreased expression of the pro-apoptotic protein Bax and decreased activity of caspase-3. The levels of the DNA and lipid oxidation markers 8-Oxo-2'dG and MDA as well as the levels of the pro-inflammatory cytokines TNF-α and IL-1β were down-regulated.

Conclusion
In conclusion, the current work sheds the light, for the first time, on the ability of DHF to protect against the iron overload-induced liver damage and highlights its possible implementation in controlling the hepatotoxicity that associate the iron overload diseases while clinical investigations are still required.

202140
Implication of G Protein-Coupled Receptor Kinase-2 in Macrophage-Mediated Inflammation in Diabetic Cardiomyopathy: A Potential Mechanism?

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Background
By releasing pro-inflammatory cytokines, macrophages advance diabetic cardiomyopathy (DCM) pathogenesis. Prolonged exposure to high glucose levels enhances G protein-coupled receptor kinase-2 (GRK2) expression. The relationship between macrophage GRK2 expression and Toll-like receptors (TLR4)/Jun N-terminal protein kinase (JNK) remains unclear. We hypothesized that macrophage-mediated inflammation and increased GRK2 expression in diabetic hearts occur through the TLR4/JNK pathway.

Method
Fifty adult Wistar albino rats were divided into 10 equal groups. Protocol #1 induced type 2 diabetes in four

groups using a high-fat diet and low streptozotocin doses (30 mg kg-1). For four weeks, liposomal clodronate (LEC) (15 mg kg-1) was injected weekly to deplete macrophages; control groups received %0.9 NaCl or liposomal clodronate. In Protocol #2, two diabetic and non-diabetic groups received JNK inhibitor (SP,600125 15 mg kg-1) prior to receiving 100 µg kg-1 lipopolysaccharide (LPS). Heart weight/body weight (HW/BW) ratios indicated heart hypertrophy. Enzyme-linked immunosorbent assays measured cardiac injury, inflammation, adhesion molecules, and oxidative stress biomarkers. Immunohistochemical assays identified macrophage phenotypes (CD86 and CD163) and GRK2. Western blot analysis assessed GRK2, TLR4, p-JNK, and JNK levels. Heart sections were examined histologically (ethics reference no. KSU-SE-91-23).

Result

LEC-treated diabetic groups exhibited attenuated HW/BW ratios (± 4.14 0.18 vs. 0.37 ± 8.04 mg/g, $p<0.001$), troponin I (0.16 ± 3.33 vs. 0.25 ± 7.77 ng/ml, $p<0.001$), and CK-MB (2.799 0.09 ± vs. 0.13 ± 8.23 ng/ml, $p<0.001$). IL-10 levels ($p<0.01$) increased while IL-6 ($p<0.01$) and TNF-α ($p<0.001$) levels decreased; glutathione peroxidase and superoxide dismutase levels increased while malondialdehyde levels decreased; M2 macrophage polarization, GRK2 inhibition, and normalized cardiac tissue were observed. Inhibiting the TLR4/JNK loop suppressed GRK2, p-JNK, TLR4, and M1 phenotype infiltration, reversing cardiac injury/inflammation.

Conclusion

Macrophage depletion, GRK2 inhibition, and the TLR4/JNK signaling pathway attenuate DCM pathogenesis. Targeting macrophages expressing GRK2 and associated pathways offer an avenue for treating DCM.

202141

Determination of parabens in foodstuffs marketed in Saudi Arabia using UPLC-MS/MS and assessment of dietary exposure in adult population

Najd Almutairi, Arjwan Alqarni, Heba Shaaban and Ahmed Mostafa

Background

Parabens are commonly used as a preservatives in a various products such as cosmetics, food and pharmaceutical products. Multiple studies conducted in-vitro and in-vivo have shown that parabens have disruptive endocrine characteristics. Food consumption is a major source of exposure to parabens. As a result, it is important to monitor their presence in foodstuffs. This study aimed to determine the levels of different types of parabens (methyl paraben, ethyl paraben, propyl paraben, butyl paraben and benzyl paraben) in food products marketed in Saudi Arabia,

moreover, assess the dietary exposure to parabens among adults.

Method

In this study, a total of 80 food samples were collected from Saudi markets for analysis. The parabens were extracted using dispersive liquid-liquid micro-extraction utilizing anisaldehyde-based natural deep eutectic solvent. After the extraction the samples were analyzed using UPLC-MS/MS.

Result

The recoveries were ranges between 100.2-98.3 % with relative standard deviation not exceeding 6.3 %. The detection limit was ranged from 0.001–0.0005 µg/L. Propyl paraben was the most commonly found among other parabens, with a detection rate of %90 and a maximum concentration of 2.1 µg/L. The estimated daily intake of analyzed parabens was ranged from 2.13 to 83.13 ng/kg body weight per day for male adults and from 2.31 to 90.52 ng/kg body weight per day for female adults.

Conclusion

In this study, the dietary exposure to parabens were found to be less than the acceptable daily intake value (10-0 mg/kg body weight per day) which is set by the European Food Safety Authority, demonstrating that the dietary exposure to the detected parabens is unlikely to pose a significant risk to consumers.

202151

A comprehensive LCMS/MS characterization for the green extracted cucurbitane-triterpenoid glycosides from bitter melon (Momordica charantia) fruit

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Background

this study reports for the first time a green extraction with a comprehensive LCMSMS analysis of Karaviloisdes (KVs) VIII, X, and XI in different parts (skin, pith, and seed) of the fresh and dried fruit of bitter melon (Momordica charantia).

Method

ultrasonication technique for the green extraction whereas, LCMSMS was used for the quantification of the KVs.

Result

more extract yield (675.80mg ±163.75) was observed for the dried as compared to the fresh BM-fruit parts (513.20mg ±75.42). The skin part of the fresh fruit (54.07±343.40) whereas, the seed part (38.98±311.80) of the dried BM fruit were seen with more yield (mg). The extract yield(mg)/solvent revealed a descending order of; H2O (66.61±651.70)> EtOH (21.38±227.20)>EtAC (26.48±163.30)> ACT (21.17±146.80) with more yield for H2O in dried fruit (54.42±412.40) as compared to fresh fruit (75.07±239.30).

On an individual basis, skin part of dried (192.70mg) and fresh fruit (165.90mg) exhibited the highest extract yield. A fast and reliable LCMSMS method (ESI/+MRM) was validated for quantification of KVs with m/z of →437.35 →455.25 →635.30 281.10 (KVVIII), →636.30 →798.20 352.90 →438.40 (KVX), →491.45 →653.40 397.15 →431.15 (KVXI), and r2-value in the range of 0.999-0.993. The total yield for KVs (3615.44ppb) suggested a descending order; KVXI (2376.44ppb)> KVX (639.17ppb)> KVVIII (599.83ppb). The fresh fruit showed more amount of KVVIII (62.74ppb) and KVXI (48.64ppb) in skin, KVX (209.54ppb) in seeds whereas, the dried fruit showed more yield for KVVIII in seeds (206.70ppb), KVX (203.48ppb) and KVXI (1607.53ppb) in pith part. The statistical models showed more correlation for the solvent Vs extract yield whereas, the KVs revealed more correlation for the fruit part of BM (P=0.05). The ANOVA suggested significant difference for KVXI among the KVs (P=0.002).

Conclusion

the study comprehensively characterized the parts of fresh and dried BM-fruits in terms of extract yield and KVs amount.

202162

ENGINEERING AND EVALUATING FC-BASED VACCINES AGAINST HIGHLY PATHOGENIC CORONAVIRUSES

Asalah Helal, Mohamed Alfaleh, Thikryat Neamatallah, Anwar Hashim and Reem Alsulaiman

Background

High-pathogenic coronaviruses, including severe acute respiratory syndrome coronavirus 1 (SARS-CoV-1), Middle East respiratory syndrome coronavirus (MERS-CoV), and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), infect thousands of people daily despite intense vaccination programs. There are no FDA-registered vaccines for SARS-CoV-1 or MERS-CoV. Thus, more effective, safer vaccines are needed. This project aimed to generate three antibody-like, multivalent vaccines based on the engineering of the crystallizable fragment (Fc) of immunoglobin G to stimulate the immune system to produce neutralizing antibodies against MERS-CoV and SARS-CoV-2 simultaneously.

Method

Three vaccines called BiVax were developed. The first version, BiVaxFc-Native,comprises a native hFc fused with the RBDMERS-CoV in the N-terminus while the Omicron's RBDSARS-CoV-2 in the C-terminus. The second vaccine, BiVaxFc-Reverse, also has a native Fc, yet the RBDMERS-CoV is fused to the C-terminus and the Omicron's RBDSARS-CoV-2 to the N-terminus to assess the effect of the hinge region on the exposing of the adjacent Omicron's SARS-

CoV-2 RBD as it acquired flexibility to it. The third design, BivaxFc-FcRn, resembles the BiVaxFc-Native design, though the Fc domain contains the MST-HN mutations, which improves the ability to bind to the neonatal Fc receptor (FcRn) found on antigen-presenting cells (APCs) and boosts immunogenicity and pharmacokinetics. Proteins were expressed in CHO-S cells and purified using protein-A affinity chromatography. For the in vivo study, Balb/c mice received three vaccination doses with adjuvant intramuscularly or subcutaneously.

Result

On SDS-PAGE and Western blot analyses, pure protein bands of the expected size were seen, and each fragment of the vaccines was detected. The engineered Bivax vaccines induced robust RBD-specific IgG antibody responses using ELISA.

Conclusion

Based on findings suggest that BivaxFc-FcRn has a high potential for further development as a broad-spectrum vaccine to prevent infection with the targeted coronaviruses as well as future emerging viruses as a platform.

202170

Therapeutic effects of genistein in experimentally induced ulcerative colitis in rats via affecting mitochondrial biogenesis

Talal Alharbi, Fahad Althobaiti, Ziyad Alshammari, Ziyad Alanazi, Mohammed Al-Gayya, Mohammed A F Elewa and Khalid S Hashem

Background

Ulcerative colitis (UC) is of the inflammatory bowel diseases that affects the mucosa of colon producing severe inflammation and ulcers. Genistein is a polyphenolic isoflavone present in several vegetables as soybeans and fava beans. Therefore, we conducted the following study to investigate the potential therapeutic effects of genistein in experimentally induced UC in rats through affecting antioxidant activity and mitochondrial biogenesis.

Method

UC was introduced in rats using an intracolonic single administration of 2 ml of %4 acetic acid. Then, UC rats were treated with 25 mg/kg genistein. Samples of colon were obtained to assess gene and protein expression of nuclear factor erythroid 2-related factor-2 (Nrf2), heme Oxygenase-1 (HO-1), peroxisome proliferator-activated receptor-gamma coactivator (PGC-1), mitochondrial transcription factor A (TFAM), B-cell lymphoma 2 (BCL2) and BCL2-associated X (BAX). In addition, colon sections were stained for investigation of cell structure.

Result

Investigation of micro-images of UC rats revealed damaged intestinal

glands, severe hemorrhage and inflammatory cell infiltration, which were improved by treating with genistein. Finally, treatment with genistein significantly increased expression of PGC-1, TFAM, Nrf2, HO-1 and BCL2 associated with reduction in expression of BAX.

Conclusion
Genistein produced therapeutic effects against UC in rats. The therapeutic activity can be explained by enhancing antioxidant activity and elevating mitochondrial biogenesis leading to reduction cell apoptosis.

202171
Curative effects of hesperidin against ulcerative colitis in rats via affecting tissues fibrosis

Fahad Althobaiti, Talal Alharbi, Ziyad Alshammari, Ziyad Alanazi and Mohammed Al-Gayyar

Background
Ulcerative colitis (UC) is one of the inflammatory bowel disorders that attacks the mucosal lining of colon. Active UC is characterized by many clinical manifestations as bloody diarrhea, bowel urgency, abdominal pain, weight loss, fever and malaise. However, hesperidin is a bioflavonoid glycoside commonly found in citrus fruits especially oranges. Hesperidin produced several pharmacological actions as anti-hyperlipidemic, anti-inflammatory and antioxidant. Therefore, we conducted the following study to investigate the potential therapeutic effects of hesperidin in experimentally induced UC in rats through affecting tissues fibrosis and destruction.

Method
The induction of UC in rats was done using an intracolonic single administration of 2 ml of %4 acetic acid. Then, UC rats were treated with 100 mg/kg hesperidin. Samples of colon were obtained to assess gene and protein expression of transforming growth factor (TGF)-β, matrix metalloproteinase (MMP)-9, tissue inhibitors of metalloproteinase (TIMP)-1, Phosphatidylinositol-3-kinase (PI3K) and protein kinase B (AKT). In addition, colon sections were stained for investigation of cell structure.

Result
Investigation of micro-images of UC rats revealed damaged intestinal glands, severe hemorrhage and tissues fibrosis, which were improved by treating with hesperidin. Finally, treatment with hesperidin significantly reduced the expression of TGF-β, MMP-9, PI3K and AKT associated with enhanced expression of TIMP-1.

Conclusion
Hesperidin significantly protected against UC in rats. The protective effects of hesperidin can be attributed to its ability to reduce colon tissues fibrosis and destruction.

202172

Novel Triazoles as Sterol 14α-demethylase Inhibitors: In silico Studies, Synthesis and Antifungal Activity Evaluation

Menwah Alshammari, Syeda Huma Haider Zaidi, Abida Ash Mohd, Khattab Fahed Alfrah and Mohd Imran

Background
The development of antimicrobial resistance against antifungal drugs has increased recently and raised some serious concerns. Sterol 14α-demethylase (SDM) is a validated drug target to develop a new generation of antifungal drugs. This study aimed to identify non-toxic and potent triazole-pyridazinone hybrid molecules (TP) as SDM inhibitors with promising pharmacokinetic properties and antifungal activities.

Method
A total of thirty-three TPs were designed. The docking scores (DS) of TPs were determined by molecular docking utilizing different SDM proteins. The ProTox-II software predicted TPs' oral LD50 and toxicity class (TC). The Swiss-ADME database was used to assess the pharmacokinetic parameters. Four TPs (27 ,22 ,18, and 33) were synthesized, and their antifungal activity was assessed by serial dilution method employing fluconazole and ketoconazole as positive controls.

Result
In silico studies revealed that the DS of TP18, TP22, TP27, and TP33 were better than the DS of fluconazole and ketoconazole. This finding indicated the superior potency of TPs (,22 ,18 27 and 33) in inhibiting the activity of SDM as compared to fluconazole and ketoconazole. As for toxicity, LD50 and toxicity class of TP18 (500 mg/kg), TP22 (500 mg/kg), TP27 (1000 mg/kg), and TP33 (1000 mg/kg) were better than ketoconazole (166 mg/kg). The Swiss-ADME database results revealed that TP18, TP22, TP27, and TP33 passed Lipinski's drug-likeliness rule and demonstrated high oral absorption and bioavailability comparable to ketoconazole and fluconazole. In vitro studies showed that TP18, TP22, TP27, and TP33 have a superior antifungal activity to fluconazole and ketoconazole against all seven tested fungi.

Conclusion
TP18, TP22, TP27, and TP33 represent a new template for developing safer, efficacious, and potent SDM inhibitors with broad-spectrum antifungal activity.

202176

Anti-Oxidative Burst, Cytotoxicity, and ADME Studies of Thiourea Compounds

Ryoof Almutrafi, Samreen Soomro and Naira Nayeem

Background
This oxidative stress is linked to number of immune related disorders like hypersensitivity, autoimmune disease and inflammation. In this context, many new compounds are being synthesized and screened for the purpose of immunomodulation. In current study, we are aiming to discover the potential of thiourea derivatives as potential immunomodulators via suppressing oxidative burst mechanism in macrophages and neutrophils.

Method
The immunomodulation studies were conducted using cell based spectrophotometric techniques. Fluorescent microscopy and Predictions using web-based tools

Result
suggested that among three selected thiourea derivatives comp 3 significantly suppressed the superoxide anion with 1.2± 86.94 percent inhibition. Additionally, comp 2 and 3 were significantly involved in inhibiting the myeloperoxidase dependent pathway that produce hypochlorite anion with IC50 value of 0.4±45.3 and 0.2±10.4 µg/mL, respectively. Similarly, intracellular oxidative stress was suppressed by comp 2 and 3 detected by fluoresce microscopy. In addition, the comp 1 and 3 showed moderate inhibitory activity with 36.9 and %33.8 respectively. No any compound has shown cellular toxicity at the 25 µg/mL tested fibroblast cell line. Physicochemical and Pharmacokinetic Predictions of comp 2 and 3 showed high blood brain barrier (BBB) permeability along with Gastrointestinal (GI) absorption. Prediction studies revealed the lethal dose (LD50) of 1700 mg/kg and 1400 mg/kg respectively. Additionally comp 3 showed activity against pancreatic carcinoma MIA PaCa 2, Colon adenocarcinoma SW620 and Non-small cell lung carcinoma NIH838

Conclusion
compounds have potential of being immunomodulatory agent particularly comp 3 demonstrated intriguing biological potential that could be explored further for its mechanistic studies

202179
Use of Imeglimin in the Protection Against Nicotine-Induced Neurotoxicity
Fahad Almutairi, Mohammed Assiri, Nasser Alsaleh and Mohammed Almutairi

Background
Exposure to high concentrations of nicotine from tobacco smoke, nicotine-replacement therapy, and other nicotine-containing products is associated with harmful effects on many organs, including the brain. There are several potential mechanisms underlying these effects such as mitochondrial

dysfunction, oxidative stress, and inflammation. These events can lead to neurotoxicity and neurocognitive deficits. Targeting these mechanisms could help to rescue neurons from toxic effects of nicotine. Imeglimin, a new anti-diabetic drug belongs to tetrahydrotriazine-containing oral antidiabetic agents "glimins", has shown improvement in mitochondria function via reducing reactive oxygen species. Therefore, current study aims to investigate the protective effects of imeglimin on nicotine-induced neurotoxicity of human neuroblastoma cells (SH-SY5Y). The cells were pretreated with imeglimin for 24 hrs followed by 24 hrs of nicotine incubation. Cell viability, mitochondrial membrane potential, oxidative stress, and apoptosis/ necrosis were assessed on these cells. Our findings revealed that imeglimin protects SH-SY5Y cells against nicotine-induced cell death via reducing mitochondrial dysfunction, reactive oxygen species (ROS), and apoptosis.

Method

1- Cell viability assessment (by measuring the formation of colored formazan crystal from MTT).
2- Mitochondrial Membrane Potential (MMP) Assessment (by measuring the fluorescence of free JC-1 monomers (green) and JC-1 aggregates in mitochondria (red)).
3- ROS Production Assessment (by using dichlorofluorescin diacetate (H2DCFDA)).
4- Apoptosis Assessment by Flow Cytometry. (by using the Annexin V-FITC/Propidium Iodide)

Result

1- Imeglimin doesn't induce SH-SY5Y cells death at the used concentration.
2- Nicotine induced cell death starting from 2 mM.
3- Imeglimin protects against nicotine-induced cell death.
4- Imeglimin protects against nicotine-induced mitochondrial dysfunction.
5- Imeglimin protects against nicotine-induced ROS generation.
6- Imeglimin protects against nicotine-induced apoptosis.

Conclusion

Our study investigates the protective effects of imeglimin on nicotine-induced neurotoxicity of human neuroblastoma cells (SH-SY5Y). We found for the first time that imeglimin significantly reduced nicotine-induced neuronal cell death via reducing mitochondrial dysfunction, ROS generation, and apoptosis. The findings of this study have shed new light on the protective effect of imeglimin against long-lasting adverse effects of nicotine on the brain development of offspring that associated with maternal smoking during pregnancy.

202184

Gastroprotective Effect of Alantolactone Against an Indomethacin-induced Gastric Ulcer in Rats

Nairmeen Sairafi, Basma Eid, Haifa Almukadi, Rand Salamah, Reaal Alhujairi and Noura Alsubki

Background

Peptic ulcer is a common gastrointestinal disease that causes significant morbidity. Efforts are being made to discover novel drug treatments for peptic ulcers with minimum adverse effects. Non-Steroidal Anti-inflammatory Drugs (NSAIDs) are known to cause ulceration as an adverse effect. Indomethacin (Indo) has a greater risk of causing gastric ulcers compared to other NSAIDs. Alantolactone (ALT) is a naturally occurring sesquiterpene lactone with powerful anti-oxidant and anti-inflammatory characteristics. We aim to investigate the potential protective role of ALT against Indo-induced gastric injury in rats and the possible underlying mechanism.

Method

Thirty Wistar rats were divided into 5 groups: 1) control (vehicle), 2) Indo (50mg/kg), 3) Indo (50mg/kg) and ALT (5mg/kg) 4) Indo (50mg/kg) and ALT (10mg/kg), 5) omeprazole-Indo (30mg/kg and 50mg/kg respectively). Blood and stomach samples were obtained for morphology, histopathology, and biochemical assessment.

Result

ALT administration markedly improved the stomach morphology as evidenced by a reduction in congestion and ulcer index. It also caused an improvement in the histopathology and mucin content. ALT dramatically decreased lipid peroxidation marker MDA, increased GSH concentration, and increased SOD activity.

Conclusion

In conclusion, ALT showed gastroprotective activity against Indo-induced gastric ulcers that can be partially attributed to its anti-oxidant activity.

202192

Arctiin inhibits tumor cell fibrosis and apoptosis in hepatic tissue in experimentally induced hepatocellular carcinoma in rats

Shahad Alshehri and Wasayf Almarwani

Background

Hepatocellular carcinoma (HCC) is a highly aggressive malignant tumor with a poor prognosis. It is currently the second most common cause of cancer-related mortality. Arctiin, a compound found in plants commonly used as a vegetable in Asian countries and as an ingredient in traditional European dishes, possesses various properties, including anti-proliferative, anti-senescence, anti-oxidative, anti-

tumor, toxic, anti-adipogenic, and anti-bacterial effects. Our study aims to investigate the potential antitumor activity of arctiin against HCC in rats by inhibiting cell fibrosis and apoptosis.

Method

Rats were induced with HCC by administering thioacetamide. Arctiin was orally administered to some rats thrice a week for 16 weeks at a dose of 30 mg/kg. The liver impairment was evaluated by measuring serum α-fetoprotein (AFP) and examining liver sections stained with Masson trichrome or anti-HIF-1α antibodies. The hepatic expression of mRNA and protein levels of HIF-1α, PKC, ERK, β-catenin, and SMAD4 were analyzed.

Result

Our study demonstrated that arctiin can potentially increase the survival rate of rats. This is achieved through a reduction in serum alpha-fetoprotein levels and hepatic nodules. We also observed that arctiin has the ability to inhibit the formation of fibrotic tissues and necrotic nodules in HCC patients. Additionally, arctiin can significantly decrease the expression of HIF-1α, PKC, ERK, β-catenin, and SMAD4.

Conclusion

Arctiin has demonstrated potential anti-tumor properties that could aid in the prevention of HCC. Studies have shown that it may increase survival rates, reduce the number of tumors and AFP levels. Arctiin works by inhibiting HCC-induced hypoxia, blocking the expression of HIF-1α. It also helps to slow down tumor fibrosis by decreasing the expression of β-catenin and SMAD4. Furthermore, arctiin has been found to downregulate PKC and ERK, leading to a reduction in hepatic tissue apoptosis.

202197
Lateral Flow for Detecting Coronaviruses

Afnan Almehmadi, Asalah Helal, Rowa Alhabbab, Mohamed Alfaleh and Anwar Hashem

Background

Coronaviruses are a type of viruses that cause diseases. The Middle East respiratory syndrome coronavirus (MERS-CoV) and the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) are both highly pathogenic human coronaviruses. The development of reliable and robust diagnostic tests is one of the most efficient methods to limit the spread of coronavirus disease 2019 (COVID-19). Lateral flow device (LFD) viral antigen immunoassays have been developed around the world as diagnostic tests for SARS-CoV-2 infection. They have been proposed to deliver an infrastructure-light, cost economical solution giving results within half an hour.

Method

We generated a mAbs against the N- nucleocapsid protein (NP) from SARS-CoV-2 using nCoV396. As for spike protein from MERS-CoV- we used DPP4-Fc and M336 By pairing two mAbs that bind different epitopes on the SP. The sequence of mAbs and recombinant proteins are synthesised and codon-optimized for expression in CHO-S cells. These genes are cloned into the mammalian expression vector containing signal sequence pFUSE2ss, using specific cloning sites followed by stop codon. For soluble expression of recombinant proteins, transient transfection was prepared using PEI-Pro as transfection agent. Then were purified using protein A affinity chromatography and proteins were eluted using 0.1 M glycine pH 3. The purity of the protein of interest were determined by using SDS-PAGE and Western blot. The sensitivity of the Fc-fusion proteins and mAbs toward recombinant soluble SARS-CoV 2N and MERS-CoV S proteins were measured using ELISA. Furthermore, we developed LFIA method with very high sensitivity and specificity to detect MERS-CoV- SP.

Result

The purity and the molecular mass of the protein of interest were determined by using SDS-PAGE and Western blot. The data shows that the designed LFIA has an excellent sensitivity and specificity upon detecting MERS-CoV- S protein by applying only 2 µL to the adopted strips. And showed that flexible mAbs can form a sandwich-like complex.

Conclusion

It is expected that these improvements are going to develop a more sensitive and selective antigen-detecting point-of-care lateral flow devices, which are essential for early diagnosis and epidemiological investigations of SARS-CoV-2 and other infections.

202209

Evaluation of the automated dispensing cabinets (ADCs) Users' Level of Satisfaction and the Influencing Factors in Al-Ahsa hospitals

Manar Alomair, Maged Mohamed, Marwah Almajed, Amjad Alobaid, Lama Alabduladheem and Nancy Younis

Background

Pharmacy automation has revolutionized the way prescription medications are managed, and one remarkable advancement in this field is the automated dispensing system (ADS). Among ADS technologies, automated dispensing cabinets (ADCs) stand out as decentralized, computer-controlled systems that store, distribute, and track medications right at the point of care in hospital wards. The objective of the current study is to evaluate how healthcare practitioners are satisfied

with ADCs and scrutinize some influencing factors that could affect this satisfaction.

Method
A cross-sectional study was conducted among healthcare providers in Al-hasa hospitals who use ADC. The questionnaire covered demographics, frequency and pattern of ADC use, satisfaction levels, and factors influencing satisfaction and impact on occupation.

Result
A total of 166 participants completed the study questionnaire, primarily nurses (%80.1) and pharmacists (%12.7), with ages ranging from 20 to 48 years. Around %79.5 used ADC, with %85.4 using it daily. Reasons for non-use included lack of installation or restricted access. High satisfaction rates were observed: %81.9 for overall satisfaction, %81.3 for system accuracy, and %74.7 for task completion time. Usability was rated positively by %69.9, while concerns included longer medication reloading/dispensing time (%36.7) and occasional confusion (%17.5). Perceived benefits included safe job accomplishment (%79.5) and improved productivity (%67.5). Challenges involved safe access and medication removal (%74.7) and potential data loss or failure (%18.7). Training quality was deemed complete and adequate by %77, with %80.7 feeling confident in using ADC after training. The majority (%83.1) found ADC made their work easier, while a small percentage (%8.4) found it time-consuming and more difficult.

Conclusion
This study explored healthcare staff's perceptions and satisfaction with an automatic dispensing system in Al-hasa hospitals. The healthcare participants were generally highly satisfied with the use of the ADCs which was translated into better patient care and improved patient safety as well as higher productivity.

202211
A novel green deep eutectic solvent air-assisted liquid-liquid micro extraction coupled to UHPLC-MS-MS for rapid determination of psychotropic agents in different water environments.

Zahra Alsultan, Salwa Abdulkarim, Ahmed Mostafa and Abdulaziz Alkhzem

Background
An eco-friendly, fast, sensitive and selective air-assisted dispersive liquid-liquid microextraction (DLLME) method coupled with UHPLC-MS/MS was developed and validated for trace analysis of psychotropic agents in different water environments in Saudi Arabia.

Method
In this study, a fenchone-based hydrophobic deep eutectic solvent (DES) was synthesized and

characterized for the first time and utilized for the extraction of 5 different psychotropic agents. The DES was composed of decanoic acid and fenchone as HBD and HBA respectively, with a molar ratio of 1:1. Different extraction parameters including DES volume, pH, number of pumping cycles, centrifugation time, sample volume and salt strength were optimized. The optimized method showed high sensitivity with limits of detection in the range of 4.0-2.0 ng/L. The linearity range was 20-0.004 ng/mL, with determination coefficients >0.9991 indicating the excellent linearity. Method accuracy and precision showed satisfactory results with recovery from %104.3-86.4 and relative standard deviation (%RSD) lower than %5.8. The optimized method was successfully utilized for the trace analysis of the target psychotropic agents in 62 different water samples including wastewater, sea water, tap water and mineral water.

Result

The most frequently detected analyte was carbamazepine (%19.3 of the samples) with a maximum concentration of 0.38 ng mL-1. Finally, the method environmental impact was evaluated using AGREE metric and showed a good greenness profile.

Conclusion

To sum up, the proposed method is a green, sensitive and selective method that can be used for the routine trace analysis of psychotropics in different water environments.

202215

Unraveling ALS's molecular mechanisms: a network biology and structural modeling approach to studying C9orf72 mutations

Abdullah hamdan alanzi and Mohd Imran

Background

ALS is a neurodegenerative disease that affects neurons in the brain and spinal cord. C9orf72 is a major genetic factor in ALS, and understanding how its mutations affect neurons is important for finding treatments for ALS.

Method

The network was made with the C9orf72 gene from the STRING database v-12. The word "C9orf72" was looked for in the UniProt library. Using the UniProt IDs, different structural versions were looked into. A program called molecular dynamics (MD) was used to look at how atoms and molecules move and act over time. The HDOCK server was used to dock the chosen protein with both the wild-type and mutant types of proteins. The last thing that was done was molecular mechanics with generalized Born and surface area solvation (MM/GBSA) and RMSD Clustering

Result
Among the proteins that were found, SMCR8 stood out as a strong contender because it has a lot of connections (total network input = 7.896) in the C9orf72-related network. This suggests that it may play a part in changing how C9orf72 mutations work.

Conclusion
A pathogenic hyperstability of the mutant C9orf72, may cause abnormal cellular processes and dysregulated protein interactions associated with the pathogenesis of ALS.

202219
Validation and utilization a disposable potentiometric micro-sensor for quantifcation of Metformin in tablet dosage forms.

Shatha Marzuq Alsufyani, Shahad Mohamed Alrebie and Deema Ebad Alqurashi

Background
Diabetes mellitus is the most common disease in the world. The disease has two types, but type 2 diabetes mellitus (T2DM) is the most common. Metformin is a class of biguanides. It is used to reduce glucose levels with T2DM, also used in weight loss. There are many analytical techniques used to analyze metformin or verify its quality standards in dosage form, but most of these methods have limited throughput.

Method
This study will focus on developing an easy, fast, and low-cost method for modified screen-printing electrodes, which is a disposable potentiometric micro-senor (microchip) for metformin. The developed method was used to determine the metformin in pharmaceutical dosage form. This method has been validated according to the ICH guideline. Different drug formulations of metformin hydrochloride have been collected from the local pharmaceutical stores in Saudi Arabia and analyzed using the realized microchip.

Result
The results of this study show that the developed method was linear, specific, precise, and accurate. The correlation coefficient was 0.999. The limit of detection was 2.89x6-10 M, and the limit of quantification was 8.77x6-10 M. This method showed high precision, with an RSD % that did not exceed %2.22. The accuracy of this method was obtained by comparing recovery percentages with values less than %5. The results describe that there was no significant difference between the references, label, and the recovery was less than %5.

Conclusion
The study successfully developed a disposable potentiometric micro-sensor (microchip) with screen-printing electrodes for the analysis of metformin in pharmaceutical dosage forms. The method demonstrated

favourable characteristics in terms of being easy to use, fast, and cost-effective. The benefit of this study is suggested to use this method in quality control laboratories for routine metformin analysis as an alternative to current methods.

202220
Treatment of epilepsy by genistein.

Afnan Almarwani, Shatha Alblowy, Manahel Alatawi, Sultan Alanazi and Maha Albalawi

Background
Epilepsy is a common chronic neurological disease caused by excessive electrical discharge from the brain's neurons. Symptoms can range from minor muscle jerks or lapses in attention to severe and prolonged convulsions. Globally, around 50 million people have epilepsy. Genistein, a natural isoflavone found in soybeans, has antioxidant properties that can prevent chronic diseases such as cardiovascular disease, osteoporosis, and hormone-related cancers. Therefore, we aim to investigate the potential protective effects of genistein against epilepsy by enhancing antioxidant activity (Nrf2 and HO-1), promoting mitochondrial biogenesis (TFAM), and reducing brain tissue apoptosis (BCL2, BAX, and caspases).

Method
Epilepsy was induced in rats by 35 mg/kg PTZ thrice weekly for three weeks. After this, some rats were given 25 mg/kg genistein through oral gavage daily for three weeks. The hippocampus sections were then stained with hematoxylin/eosin to study the tissue structure. Additionally, other sections were stained with anti-BAX antibodies. Furthermore, TFAM, Nrf2, HO-1, BCL2, BAX, and caspases-9/8/3 gene expression and protein levels were investigated.

Result
Rats displayed notable progress in their behavior during behavioral tests after being treated with genistein. Sections stained with hematoxylin/eosin revealed that genistein helped to lessen the neuronal damage and also prevented the shrunken spindle cells. Additionally, genistein was discovered to increase the expression of TFAM, Nrf2, HO-1, and BCL2, which helped to reduce the levels of BAX and caspase-9/8/3.

Conclusion
Genistein can protect against epilepsy in rats by improving their behavior and restoring normal neuron structure. The protective effects of genistein may be due to its ability to enhance antioxidant activity (by overexpressing Nrf2 and HO-1) and increase mitochondrial biogenesis (by upregulating TFAM), which leads to a reduction in cell apoptosis (by downregulating BAX and caspases).

202221

Greenness assessment of HPLC analytical methods with common detectors for assay of caffeine in pharmaceutical dosage forms and caffeine extraction

Nawaf AL Thagafi, Maher Aburas, Ahmed AL Zahrani, Khaled AL Shehri and Mohammed AL Suwat

Background

Caffeine, as the most extensively used psychostimulant consumed worldwide, is frequently extracted from different matrices by chromatographic methods and analyzed in pharmaceutical products on a daily basis in several pharmaceutical quality control labs. Accordingly, chromatographic analytical procedures of caffeine should be carefully reviewed in light of the current interest in "green analytical chemistry" because they could pose a threat to either the environment or the analyst's health.

Method

HPLC chromatographic methods are the most widely used methods of analysis especially with UV, DAD and MS detectors. The eco-scale assessment (ESA), the national environmental methods index (NEMI), and the analytical greenness metric (AGREE) tools were utilized to establish the greenness comparisons.

Result

The greenest chromatographic method for caffeine analysis in pharmaceutical dosage forms were proposed by Al-Khadhra et al., with values of ESA = 87 and AGREE = 0.72. However, the greenest chromatographic approach for caffeine extraction was proposed by Chen et al., that yielded scores of ESA = 84 and AGREE = 0.66. The AGREE tool covers the 12 principles of green analytical chemistry and demonstrates both qualitative and quantitative aspects. AGREE is found to be the most trustworthy among the applied greenness assessment approaches. In comparison to other tools, NEMI was shown to have poor outcomes and hence cannot be used alone. Accordingly, greenness assessments should be performed using several assessment tools together.

Conclusion

The presented study aims to establish greenness assessments of 27 HPLC analytical methods for caffeine analysis in pharmaceutical dosage forms and 6 HPLC methods for caffeine extraction in different matrices.

202231

The Mechanism of Hyperuricemia as A Risk Factor for Development of Osteoarthritis (OA): Implication of Tissue Macrophage Activation

Alshaimaa Fageehi, Noor AlBedaiwi, Thikra Humadi, Maha Altherwi and Marwa Qadri

Background

Osteoarthritis (OA) is a degenerative joint disease affecting the synovium, articular cartilage and underlying bone. Synovial macrophages play an important role in driving OA pathogenesis. Innate immunity contributes to OA progression, mediated by TLR2 and TLR4. Hyperuricemia is an established risk factor for the development of gout arthritis. The association between gout arthritis and OA has been observed in many clinical trials. Synovial-resident macrophages exist on a polarization spectrum with two distinct populations: M1, pro-inflammatory, and M2, anti-inflammatory macrophages at opposite poles.

Method

Murine bone marrow was isolated as previously described using 14-12-week-old C57BL/6 mice. The cells were stimulated with murine M-CSF to generate bone marrow-derived macrophages (BMDMs). BMDMs polarized into M2 macrophages using 20 ng/mL IL-4. M2 BMDMs were primed with 50 mg/dL soluble uric acid (sUA) for 24h, followed by TLR2 agonist (Pam3CSK10 ;4 ng/mL) for another 24 h. Isolation, quantification of RNA, synthesis of first strand cDNA, and RT-qPCR were conducted using specific kits. Genes of interest included iNOS; M1 marker, Arg-1, Yum-1, and Fizz-1 are M2 markers, L-1β, TNF-α, TLR2, TLR4, Nrf2 and β-actin. Secreted IL-1β levels were determined using ELISA kit.

Result

sUA + Pam3CSK4 treatment increased iNOS, TLR4/2, L-1β, TNF-α expression and production in M2 BMDMs ($p<0.0001$). sUA + Pam3CSK4 reduced Arg-1, Ym-1, and Fizz-1 in M2 BMDMs ($p<0.001$). sUA + Pam3CSK4 significantly reduced Nrf2 expression in M2 BMDMs ($p<0.001$).

Conclusion

The anti-inflammatory function of M2 macrophages is impaired following sUA and Pam3CSK4 stimulation. sUA and Pam3CSK4 combined to skew M2 macrophage polarization pattern into M1-like function exhibited by increased M1 genetic marker expression, pro-inflammatory cytokines expression, and enhanced oxidative stress in M2 macrophages as downregulate Nrf2 expression in M2 BMDMs. A novel treatment that targets macrophage polarization to re-establish homeostasis may initiate a drug discovery program of novel disease-modifying agents for OA.

202235

Computer-Aided Designing and Discovery of Isoniazid-Based Small Molecules As Potent Antitubercular Agents

Razan Alanazi, Abida Ash Mohd and Futoon Aldhafiri

Background

Background: Tuberculosis (TB) is one of the deadliest and unmet

bacterial infections around the globe. Many existing anti-TB drugs have demonstrated resistance to TB bacteria. Accordingly, health agencies worldwide have advocated developing new medicines for TB.

Method

Methods: Many INH-based pyridazinone derivatives (IBP) were designed. The pharmacokinetic, pharmacodynamic and toxicological characteristics of IBPs were anticipated by computational methods (Swiss-ADME, docking and ProTox II software). Four compounds (IBP19, IBP21, IBP22, and IBP29) were identified as potent inhibitors of DprE1 enzyme. These compounds were synthesized, and in vitro testing was also performed.

Result

Results: With encouraging pharmacokinetic properties, eleven non-toxic IBPs were found. Compared to macozinone (-8.76) and BTZ043 (8.56-), the docking scores of IBP19 (9.52-), IBP(8.78-) 21, IBP(9.07-) 22, and IBP(9.99-) 29 were higher, indicating that these compounds block the DprE1 enzyme. The MIC values, which measure the in vitro anti-TB activity, showed that IBP19, IBP21, IBP22, and IBP29 were nearly twice as effective as INH and PYZ at 1.562 µg/ml, 3.125 µg/ml, and 3.125 µg/ml, respectively. When tested against HCL and VCL cell lines, IBP19, IBP21, IBP22, and IBP29, all showed CC50 values greater than 300 µg/ml. This result outperformed INH (> 200 µg/ml), ETH (> 150 µg/ml), and PYZ (> 200 µg/ml).

Conclusion

IBP19, IBP21, IBP22, and IBP29 offer a fresh framework for creating innovative DprE1 inhibitors that are safe and effective.

202237

Quality control of rosuvastatin and teneligliptin formulation by mathematically modified UV spectroscopic methods to resolve overlapped spectra: Appreciation of environmental sustainability

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Background

A fixed-dose combination of rosuvastatin (ROS) and teneligliptin (TEN) used for the treatment of cardiovascular complications developed due to increased blood sugar levels and high cholesterol levels. There is an urgent need for a simple, environment-friendly analytical method for the quality control of this formulation.

Method

UV absorption spectra of ROS and TEN showed overlapping spectra, however, TEN has no

absorption above 300.0 nm allowing quantification of only ROS. Hence, overlapped spectra of ROS and TEN were separated by ratio difference, ratio first derivative; constant extraction coupled with multiplication with divisor spectrum, and induced dual-wavelength methods. Validation of the proposed methods was performed by following the ICH criteria.

Result

A good linear relationship was demonstrated by all four methods, in the range of 15-2 µg/mL and 30–2 µg/mL for ROS and TEN correspondingly. The high percentage recovery of %100.22-98.96 and %99.73- 98.72 for ROS and TEN respectively, with low relative error, assured the accuracy of the techniques. The validated methods were applied for concurrent quantification of ROS and TEN from binary formulation and laboratory-prepared mixture. The standard addition process verified the reliability of the projected procedures.

Conclusion

The presented mathematically modified UV spectroscopic methods are simple, accurate, and reproducible for concurrent determination of ROS and TEN from binary formulation devoid of any preliminary separation. Further, the manipulation was performed using the software provided with the instrument and involves fewer steps. The developed methods use an ecofriendly nature solvent system with less generation of waste compared to the HPLC methods, making the methods green and white. Hence, eco-friendly, simple, and accurate mathematically processed UV spectroscopic procedures can be employed for simultaneous quantification of ROS and TEN for routine quality control study.

202245

EGCG ameliorates the severity of ulcerative colitis in rats by inhibiting inflammation and apoptosis

Wasayf Almarwani, Khulud Aljohani, Ajwan Albalawi and Shekha al-atwi

Background

Ulcerative colitis (UC) is a chronic inflammatory bowel disease that affects the lining of the colon, leading to severe inflammation and the formation of ulcers. The condition can cause various symptoms like abdominal pain, diarrhea, rectal bleeding, and weight loss. Epigallocatechin gallate (EGCG) is a potent polyphenolic compound found in green tea, known for its antioxidant and anti-inflammatory properties. This study aims to investigate the impact of EGCG on inflammation and apoptotic pathways in UC rats.

Method

To induce UC in rats, a single intracolonic administration of 2

ml of %4 acetic acid was given. Subsequently, the UC rats were treated with 20 mg/kg of EGCG. Colon samples were collected to evaluate the gene and protein expression of nuclear factor (NF)κB, tumor necrosis factor (TNF)-α, sphingosine kinase (SphK), macrophage inflammatory protein-1α (MIP-1α), B-cell lymphoma 2 (BCL2) and BCL2 Associated X (BAX). Additionally, colon sections were stained with Masson trichrome to investigate the cell structure.

Result

Microscopic examination of rat colonic sections stained with Masson trichrome revealed severe damage to the intestinal glands, marked by widespread hemorrhage and extensive fibrosis. However, treatment with EGCG was found to significantly reduce the severity of the damage. Furthermore, treatment with EGCG resulted in a decrease in the expression of several pro-inflammatory markers, including NFκB and TNF-α, as well as SphK, MIP-1α, and BAX. Conversely, EGCG was found to increase the expression of BCL2.

Conclusion

EGCG can be used as a therapy for UC in rats. It works by reducing the expression of inflammatory markers such as NFκB, TNF-α and MIP-1α, while inhibiting apoptosis by decreasing the expression of BAX and increasing the expression of BCL2. This suggests that EGCG could be a potential therapeutic agent for treating UC in humans.

202246

Mesenchymal stem cells–Derived Exosomes protect against chemotherapy-induced ovarian insufficiency in rats: Effect on PI3K/Akt axis and cellular apoptosis

Omnia A. Refadah, Hanan M. Alshan, Nesrine Ebrahim, Mohamed S Abdel-Maksoud and Nehal Elsherbiny

Background

The use of chemotherapy in cancer management is frequently associated with early ovarian follicular depletion, infertility and estrogen deficiency-related complications. Oocytes or ovarian cortex cryopreservation are currently used to protect gametes from chemotherapy gonadotoxic impacts. However, these methods are challenged by many technical obstacles. Therefore, developing new strategies to preserve ovarian function represents a major challenge in the field of onco-fertility. Mesenchymal stem cells (MSCs)-derived exosomes are nano-sized vesicles with proved efficacy in regenerative medicine. The purpose of this study was to explore the capability of MSCs-derived exosomes to maintain ovarian function in chemo-ablated rats. The possible mechanisms underlying these effects were also elucidated.

Method

Female albino rats were randomly assigned into three groups: control, chemo- ablation (using Busulfan and cyclophosphamide), and chemo-ablation+ intraperitoneal MSCs-exosomes (100 µg protein/ ml, using protective protocol). Follicle development was tested by histopathology, and ovarian function was evaluated by hormonal assessment. Gene and protein expression of key elements of PI3K/Akt signaling pathway as a key modulator of ovarian follicular activation were assessed. Immunohistochemistry was used to assess proliferation, pluripotent and apoptotic markers. Statistical differences were evaluated using ANOVA and Kruskal Wallis tests for parametric and non- parametric data, respectively. Tukey's test was used as a post hoc test.

Result

Administration of exosomes to chemo-ablated animals maintained serum estradiol and follicle stimulating hormone, preserved primordial follicles and oocytes, activated ovarian pTEN, suppressed PI3K/Akt axis and downstream effectors (mTOR and FOXO3), decreased expression of apoptotic markers (caspase-3, BAX) and increased expression of proliferation (PCNA) and pluripotency (OCT4) markers.

Conclusion

The present study gave a rationale for the use of exosomes as adjuvant therapy to protect against chemotherapy-induced ovarian insufficiency. Concurrent exosomes treatment during chemotherapy could significantly preserve ovarian function and fertility by suppressing PI3K/Akt axis, preventing follicular overactivation, maintaining normal ovarian cellular proliferation and inhibiting cellular apoptosis.

202250

Corn Oil Amide Diol and Gallic Acid-based Coating Material for Hospital Environment: Synthesis, Characterization, and Molecular Docking Study

Dema Alhuthayli, Maraia, Mojally, Razzaz Sharkar, Jumanah Rayes, Najla Obaid, Afnan Batubara, Eram Sharmin and Manawwer Alam.

Background

Hospital environment is a reservoir to bacteria and viruses, Preventive antimicrobial measures are undertaken to inactivate micro-organisms already adhered to the surfaces or to resist the initial microbial adhesion to surfaces. The present project deals with the development of cost-effective, solvent-less, antimicrobial surface coatings through “greener” route that are suitable for hospital environment, using naturally available materials:

Corn oil (CO), a vegetable oil and gallic acid (GA), a carboxylic acid

Method

Several compounds were synthesized including N,N' bis-2-hydroxyethyl corn amide [HECA] and corn oil ester amide [CEA]. In addition, coatings were synthesized and coating material were characterized using FTIR and NMR. Physico-Mechanical and Chemical Resistance and thermal studies also obtained as well as differential scanning calorimetry. Molecular docking studies using pseudomonas aeruginosa quorum sensing regulator (PqsR) target protein attained.

Result

-Coating Properties/ Thermal Stability
CEA formed scratch resistant, impact resistant, flexibility retentive and glossy reflective coatings.
-Thermal analysis confirmed that CEA coatings were stable up to 200oC.
-Spectral analysis
FTIR and NMR results confirmed the amidation reaction of CO forming HECA and reaction of HECA with GA producing CEA-Docking Results
CEA showed binding affinity with docking scores -6.9 kcal/mol, higher than the binding affinity obtained by the co-crystalized inhibitor of PqSR and the control gentamycin.
The docking results of CEA in PqSR crystal structure protein showed some similar interactions between the co-crystalized ligand and similar amino acids in the active site of the protein.
HERA and GA showed lower binding affinity than both controls with docking scores -6.0 kcal/mol, -5.8 kcal/mol.

Docking results suggest that CEA could have a promising antimicrobial activity.

Conclusion

The CEA coatings are expected to serve as potential antimicrobial surfaces for hospital environments. Further studies are still going on to establish the role of CEA coatings for hospital environment.

202255

Diacerein potentiates anti-proliferative effect of 5-flurouracil in Ehrlich solid tumor model: Effect on AKT/ NF-κB/p53 axis

Renad Alatawi, Sarah Albalawi, Maram Alrashidi, Rahaf Alatawi, Mohamed Abdel-Maksoud and Nehal Elsherbiny

Background

5-Fluorouracil (5-FU) is a frontline chemotherapeutic agent. However, its clinical application is limited by development of chemoresistance and serious organ toxicity. These shortcomings decrease 5-FU tolerability, leading to compromised therapeutic outcomes, poor quality of life and increased mortality of cancer patients. Diacerein is an anti-inflammatory drug currently prescribed for the treatment of

osteoarthritis. However, recent reports have demonstrated its anti-proliferative and chemo-sensitizing activities. The present study evaluated the chemo-sensitizing efficacy of combined Diacerein and 5-FU administration in experimental model of breast cancer, the most diagnosed malignancy among Saudi women.

Method

Ehrlich solid tumor (EST), a spontaneous murine mammary adenocarcinoma was induced in female Swiss mice. Mice were randomly divided into 4 groups: EST + vehicle, EST + 5-FU, EST + Diacerein, and EST+ combination. Day 0 was considered when tumor size reached 100 mm3. The treatment continued for 21 days. The effect of Diacerein (50 mg/kg/day, oral) and/or 5-FU (25 mg/kg/ three times weekly) on animal survival and tumor growth was assessed. Moreover, gene and protein levels of key-effectors coherent with carcinogenesis including angiogenesis, inflammation and apoptosis were evaluated using real time polymerase chain reaction, western blot, enzyme-linked immunosorbent assay, histopathology and immunohistochemistry.

Result

Diacerein reduced tumor weight and volume and increased survival time of EST mice. Additionally, Diacerein potentiated the antiproliferative efficacy of 5-FU. The antiproliferative potency of Diacerein was accompanied by suppression of Akt phosphorylation, reduction of downstream inflammation (NF-κB, TNF-α, IL-6), decrease in angiogenesis (VEGF) and enhancement of apoptosis by restoring the levels of P53, Bax, and caspase-3.

Conclusion

Diacerein demonstrated potential antiproliferative efficacy in EST model through its inhibitory effect on AKT/NF-κB/p53 axis. Additionally, Diacerein could be used as adjuvant therapy in breast cancer treatment with 5-FU to enhance its anticancer efficacy through cooperative inhibition of inflammation, angiogenesis, and apoptosis.

202257

Protective Effect of Olive Oil Nanoemulsion Against Doxorubicin Induced Cardiotoxicity

Nada Alqalawi, Hanan Alharbi, Shayma Alsayegh and Basmah Almaghrabi

Background

Breast cancer is the most prevalent cancer among women, often requires anthracycline-based treatments such as doxorubicin (Dox). However, Dox administration poses a risk of cardiotoxicity therefore, this study aimed to develop a novel nanoemulsion formulation, combining doxorubicin with olive oil for its established cardioprotective

benefits. The research seeks to analyze the effects of this formulation on cardiac myocytes, focusing on its potential impact in providing cardioprotection.

Method

Nanoemulsion was prepared by high pressure homogenization. Rigorous analyses, including creaming, particle size, zeta potential, viscosity, pH measurement, and drug incorporation, were employed to assess the nanoemulsion formulations. Cellular cytotoxicity against a cardiac cell line was evaluated using the MTT assay.

Result

Formulations F2, F3, and F4 exhibited favorable characteristics, with minimal creaming, suitable particle sizes (224 to 868.31 nm), stable zeta potentials ranged from (-4.3 ± 30.6 mV) to (-45.2 1.8 ± mV), and low viscosities. pH values fell within acceptable limits varied between 4.70-4.32, and drug incorporation percentages ranged from %63.77 to %83.16, indicating substantial drug loading. The MTT assay demonstrated a significant reduction in cytotoxic effects for the doxorubicin-olive oil nanoemulsion, particularly with formulation F4. This formulation showed superior efficacy in minimizing cytotoxicity ($P<0.01$), emphasizing its potential for targeted breast cancer therapy.

Conclusion

Our study introduces a pioneering solution for anthracycline-induced cardiotoxicity in breast cancer. Particularly, formulation F4 of the doxorubicin-olive oil nanoemulsion demonstrates optimal characteristics, minimizing off-target effects. This innovative strategy enhances doxorubicin's therapeutic effectiveness, aligns with evolving cancer therapeutics, and holds promise for reducing cardiotoxicity, contributing substantially to discussions on treatment efficacy and cardiovascular safety in oncology.

202260

Treatment of experimental induction of ulcerative colitis in rats with cyanidin through reduction of inflammation and inflammasomes.

Ziyad Alanazi, Ziyad S Alshammari, Talal S Alharbi, Fahad Althobaiti and Mohammed M H Al-Gayyar

Background

Ulcerative colitis (UC) is a chronic inflammatory bowel disease that affects the mucosal lining of the colon, leading to severe inflammation and the formation of ulcers. Cyanidin, a natural organic compound found in various red berries such as grapes, berries, and cherries, exhibits antioxidative, anti-inflammatory, and cytoprotective effects. This study aimed to investigate the ability of cyanidin to influence inflammation and inflammasome pathways in UC rats.

Method
To induce ulcerative colitis (UC) in rats, a single administration of 2 ml of %4 acetic acid was given intracolonically. After that, the UC rats were treated with 50 mg/kg of cyanidin. Samples of the colon were collected to evaluate the gene and protein expression of nuclear factor (NF)κB, tumor necrosis factor (TNF)-α, IL-1β, NLR family pyrin domain containing 3 (NLRP3), and toll-like receptor 4 (TLR4). Additionally, colon sections were stained with Alcian Blue to investigate the cell structure.

Result
Upon examining micro-images of UC rats sections stained with Alcian Blue, it was found that the intestinal glands were severely damaged and almost absent. However, the damage was significantly reduced by treatment with cyanidin. Additionally, treatment with cyanidin reduced the expression of several inflammatory markers, including NFκB, TNF-α, IL-1β, NLRP3, and TLR4.

Conclusion
Cyanidin has therapeutic effects against UC induced in rats. Cyanidin was observed to downregulate the NFκB/TNF-α/IL-1β and TLR4/NLRP3 pathways, which are known to play a crucial role in the pathogenesis of UC. This suggests that Cyanidin could be a potential therapeutic agent for treating UC in humans.

202266
Sorafenib/Piperine Co-encapsulated PLGA Nanoparticles: Preparation, Characterization and In Vitro efficacy against Hepatocellular Carcinoma

Hessa bin Hithlayn, Atheer Almutiri, Mohd Abul Kalam and Sulaiman Alhudaithi

Background
Hepatocellular carcinoma (HCC) is an aggressive type of liver cancer and prognosis of those who develop metastases is poor. The 5-year survival rate in the localized stage is approximately %40; however, in advanced stage HCC, the survival rate drops dramatically to less than %10 because of metastases. Sorafenib (SORA) is a tyrosine kinase inhibitor used as standard of care therapy in EGFR+ late stage HCC. However, the response rate to such therapeutic is very low (< %5)., piperine (PIP), an alkaloid compound, with various pharmacological activities, including anti-tumorigenesis. PIP has been shown to exert anticancer effects, either directly, or indirectly by ameliorating the pharmacokinetic properties of other anticancer agents. The objective of this work was to improve the therapeutic outcomes in HCC by incorporating PIP as an add-on therapy to SORA via dual encapsulation of the drugs in a biodegradable and biocompatible delivery system.

Method
In this study, SORA and PIP were co-loaded into poly(D,L-lactide-co-glycolide, PLGA) nanoparticles(SP-PNPs), and PNPs were stabilized with various concentrations of polyvinyl alcohol (PVA). Dynamic light scattering (DLS), and scanning electron microscopy (SEM) were used to characterize the SP-PNPs. Drug release from SP-PNPs was assessed in-vitro at physiological and tumour pH conditions, and the efficacy of the therapeutic against a HCC cell line (HepG2) was also evaluated.

Result
Results showed that the optimal formulation, %0.5 PVA SP-PNPs, was spherical in shape, displayed an average size of ~ 224 nm and high encapsulation efficiency (SORA: ~%82, PIP: ~%79). In addition, in vitro release assessment revealed that drugs were released in a sustained fashion in both acidic and neutral pH environments. SP-PNPs were also highly effective in killing HCC cells in vitro and showed a superiority over SORA monotherapy.

Conclusion
In conclusion, these results demonstrate the potential of SP-PNPs in management of HCC, paving the way for future preclinical studies.

202270
Repurposing Sulfadiazine as a promising anticancer agent: Results from in vitro, and in silico studies.

Dhay AlFahad, Razan Alanzi, Nada Tawfeeq and Mohamed Gomaa\

Background
According to the World Health Organization, cancer incidence is predicted to increase over the next decades, with over 20 million new cancer cases anticipated annually by 2025. Drug repurposing offers exciting opportunities to unmask the novel therapeutic potential of approved medications. Sulphonamides, a widely used antibacterial, are approved for additional indications due to their safety, efficacy, and good pharmacological profile.

Method
In our study sulfadiazine, was repurposed as a promising anticancer agent using in vitro, and computational approaches.

Result
Our results show that the antiproliferative effect of sulfadiazine was a result of inhibition of the COX/LOX pathway Enzyme binding assay revealed that sulfadiazine expressed weaker inhibitory activity against COX-2 (IC1.32 = 50 µg/ml) in comparison with the COX-2 selective reference inhibitor celecoxib (COX-2 IC0.739 = 50 g/ml). However, a more balanced inhibitory effect was revealed for sulfadiazine against the COX/LOX pathway with greater affinity towards 5-LOX (IC4.77 = 50 µg/ml) versus COX-1 (IC4.60 = 50 µg/ml) as compared to celecoxib (5-

LOX IC6.36 = 50 µg/ml, and COX-1 IC2.24 = 50 µg/ml). Cell-based assays to determine anti-cancer activity revealed the IC50 values for the anti-proliferative activity of sulfadiazine on human hepatoma (HepG2) and breast cancer (MCF7) cell lines were found to be 1.02 ± 61.49 µg/ml and ± 53.98 0.95 µg/ml, respectively compared to the standard drug cisplatin (20.15 0.54 ± µg/ml and 0.39 ± 14.1 µg/ml, respectively). Of interest, sulfadiazine showed no cytotoxic effects on normal liver cells. Molecular docking studies support these findings where the computationally predicted binding affinities were in alignment with the experimental IC50 and interestingly, key binding interactions for sulfadiazine were identified with the three target enzymes through its 2-sulfamoylamino pyrimidine moiety.

Conclusion

The results suggest that sulfadiazine is a promising COX/LOX inhibitor with inhibition pattern worthy of further research to validate this target for its therapeutic potential.

202276

Role of alpha-mangostin in ameliorating L-arginine induced acute pancreatitis

Mohammed Al salmi, Hanin Yousif ,Tala Rashwan, mohannad Al mikhlafi, Heba Eltahir and Mekky Abouzied

Background

Acute pancreatitis (AP) is an inflammatory disorder that has a spontaneous onset, and can occasionally develop into systemic inflammation, organ failures and death. Oxidative stress and activation of inflammatory pathways are major players in AP pathogenesis, so that attenuating injuries to the pancreas and controlling the inflammatory process to prevent its generalization is considered the focus of current management protocols. In this study, the role of alpha-mangostin in modulating L-arginine-induced AP rat model was investigated.

Method

Rats were subdivided randomly into three groups: healthy control group, acute pancreatitis group (a single dose of L-arginine 2.50 g/kg, IP), and alpha-mangostin + L-arginine-treated group (10mg alpha- mangostin/kg body weight/day, PO). Treatment with alpha-mangostin started one hour after induction of AP and continued for 7 consecutive days. Biochemical and histopathological investigations were performed on serum and tissue samples collected from the test animals after 7 days of AP induction.

Result

L-arginine increased pancreatic MPO and serum amylase- and lipase activities as well as various cytokines (TNF-α, IL-6). MDA and NO levels were elevated in L-arginine-treated

animals whereas serum calcium and GSH levels were decreased. It resulted also in histopathological changes that were observed by H&E staining. Alpha-mangostin treatment significantly ameliorated these biochemical and histological changes diminishing the signs of AP.

Conclusion

Alpha-mangostin treatment was effective in ameliorating L-arginine-induced AP which can be regarded to its anti-inflammatory and antioxidant effect.

202278

Exploring Novel Efflux Pump Inhibitors for Combatting Antibiotic Resistance: A Computational Study on the AcrAB-TolC Efflux Pump in E. Coli

Raghad Khojah, Alruba Albadri, Abdelsattar Omar and Khadijah Mohammad

Background

Antibiotic resistance is a major cause of death worldwide, with Multidrug-resistant (MDR) bacteria presenting a serious threat to public health. Overexpression of MDR efflux pumps is among the leading mechanisms of resistance and inhibiting these efflux pumps is a promising approach to restore antibiotics' activity against resistant bacteria. Our objective was to discover a new efflux pump inhibitor (EPI) for the AcrAB-TolC pumps in Escherichia coli using computational modeling.

Method

We screened 3.4 million lead-like compounds over the AcrB subunit of the efflux pump co-crystallized with a known EPI (MBX3132), performed molecular docking to obtain the docking scores of each compound relative to the co-crystallized ligand, and analyzed the behavior of the high-scoring ligands with the protein in a simulated physiological environment using molecular dynamics.

Result

Our results showed six high-scoring compounds, of which, three of them (5 ,1, and 6) illustrated excellent protein stability and ligand-protein complex affinity compared to the co-crystallized structure.

Conclusion

Overall, this study presents a novel approach to identifying novel EPIs for the AcrAB-TolC pumps and provides a foundation for their development for potential clinical use. Further investigations are necessary to evaluate the inhibitory activity of the EPIs in combination with antibiotics.

202279

Gastroprotective effect of Quercus infectoria Olivier gall extract against alcohol-induced gastritis in rats.

Mohammed Albadrani, Abdulaziz Alamri, Mazen Almuzaini, Hossein Elbadawy, Heba Eltahir and Mekky Abouzied

Background

One of the common inflammatory disorders that substantially affect the stomach and its mucosa is gastritis. It can be induced by NSAIDs, antibiotics, alcohol, helicobacter pylori infection and stress. These factors affect cellular regeneration, mucus production, and bicarbonate secretion. Ethanol-induced gastritis is one of the commonly used models for studying the pathology of the disease and the effect of drugs in managing the disease. Quercus infectoria Olivier (QI) galls are rich in several bioactive molecules that have been shown effective in several inflammatory conditions. In this study we aimed at evaluating the therapeutic potential of QI gall extract in treating alcohol-induced gastritis.

Method

adult male swiss rats were divided into 4 groups: healthy control, alcohol (%80 in water, 5ml/kg) alcohol + omeprazole (20mg/kg), and alcohol+QI gall extract (300mg/kg). Gall extract was administered for 7 days then alcohol was administered 2 hrs before animals were euthanized. Biochemical and histopathological investigations were performed on serum and stomach samples collected from the test animals.

Result

Estimation of PgE2, lipid peroxidation and antioxidants in gall extract showed results that were comparable to omeprazole treated animals. Histological examination showed a protective effect of the extract against alcohol-induced gastric damage similar to standard drug treated animals.

Conclusion

QI gall extract possess a promising gastroprotective effect against alcohol-induced gastritis

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202288

A promising crude extract proved effective against HIV/AIDS: A comparison study of Thymus Vulgaris L. (Thyme) from Saudi Arabia and Palestine

Maryam Ahmed Al-Jaziri, Dina Hajjar, Abdul-Hamid Emwas, Arwa A. Makki, and Mariusz Jaremko

Background

Thymus vulgaris (thyme) is widely used as a flavoring in various types of food, such as fish, eggs, and pasta, and, in the Middle East, people add thyme to bread and olive oil in traditional breakfast meals. Because of the extensive use of this herb and its unique properties, this study aimed to find novel and successful treatments for viral diseases from natural sources.

Method
In this study, we investigated the possible capacities of thyme methanol/dichloromethane crude extracts from Palestine and Saudi Arabia to inhibit HIV-1 protease, evaluate their abilities to scavenge free radicals against synthetic ABTS radicals and determine the biodiversity of natural products by HPLC, GC-MS, and NMR, which might be responsible for biological impact properties.

Result
Thyme extract from the KSA significantly inhibited protease enzymes, with an IC50 of 12.5 µg/mL. In contrast, thyme from Palestine showed no significant inhibition of proteases, with an IC50 of 72.7 µg/mL. The antioxidant assay indicated that both extracts had similar activity against ABTS + radicals despite the presence of a high content of flavonoids in the extracts. Furthermore, our biochemical analysis revealed biodiverse primary and secondary metabolites.

Conclusion
This study found that thyme crude extract has the potential for use in the development of novel drugs against HIV/AIDS and is a promising candidate as a complementary medication.

202302
Neuroprotective effect of Ranolazine improves behavioral discrepancies in rat model of scopolamine-induced dementia Faten

Mohamad Alasiri, Shereen M. Samir, Hend M. Hassan, Rasha Elmowafy, Eman Mohamad El Nashar, Mansour Abdullah Alghamdi, Mona Hmoud AlSheikh, Norah Saeed Al-Zahrani, Mona G. Elhadidy

Background
Ranolazine (Rn) is an antianginal agent also acts in the central nervous system and it has been a potential treatment of pain and epileptic disorders. Alzheimer's disease (AD) is one of the most prevalent neurodegenerative diseases and the leading factor in dementia in the elderly. Aim of the work In this study, we examined the impact of Rn on scopolamine -induced dementia in rats.

Method
32 albino male rats were divided into four groups: control, Rn, scopolamine, and Rn+ scopolamine.

Result
A significant decrease in the escape latency in the Morris Water Maze test after pretreatment with Rn explained better learning and memory in rats. Additionally, Rn significantly upregulated the activities of the antioxidant enzymes in the treated

group compared to the untreated one, while substantially reducing acetylcholinesterase activity and thiobarbituric acid reactive substance levels in the hippocampus. As observed in the current study, Rn dramatically reduces interleukin-1 β (IL-1β), IL-6 and upregulates the expression of the gene for brain-derived neurotrophic factor (BDNF). Furthermore, in the scopolamine-induced dementia group that was left untreated, the hippocampal tissue's immunohistochemical reaction to antibodies against Tau and glial factor activating protein (GFAP) was significantly increased, in addition to the upregulation of the Caspase-3 gene expression, which were markedly improved by pretreatment with Rn. The majority of pyramidal neurons had large vesicular nuclei with prominent nucleoli and appeared to be more or less normal, reflecting the all-beneficial effects of Rn when hippocampus tissue was examined under a microscope.

Conclusion

our findings imply that Rn, through its antioxidative, anti-inflammatory, and anti-apoptotic activities as well as control of the expression of GFAP, BDNF, and Tau proteins, has a novel neuroprotective impact against scopolamine-induced dementia in rats.

202303

Oxytocin attenuates sleep deprivation-induced brain deficits in rats: behavioral and molecular evidence

Sadeem Alharbi, Ibtisam Alnasser, Hany Ahmed, Hanan Henidi and Nehal Elsherbiny

Background

Sleep deprivation (SD) is highly prevalent among Saudi populations. SD triggers stressful and energetically expensive periods to the body. Prolonged stress with continual rerouting of energy away from normal body self-maintenance lead to accelerated aging and brain deficits. Oxytocin hormone has been recently reported for neuroprotection and anti-inflammatory activities. The present study aimed to evaluate the role of oxytocin in the functional and structural impairment in the brains of SD rats and to outline the underlying molecular mechanisms.

Method

Adult Sprague Dawley rats were assigned into three groups: normal + vehicle, SD + vehicle, and SD + intranasal oxytocin (1.25 IU/kg, daily). Animals were sleep deprived using the Modified Multiple Platform Method for 4 weeks with or without oxytocin treatment. Behavioral tests were used to evaluate memory performance, anxiety, and depression. Expression of oxytocin and its receptor was assessed in brain tissue. Potential

neuroprotective effect of oxytocin against SD-induced brain deficit was also studied using histopathology, spectrophotometry, protein, and gene analyses. ANOVA test was used for multiple variable comparisons followed by Tukey's post-hoc test to compare the significance between groups.

Result

Oxytocin administration enhanced memory performance and attenuated anxiety and depression in SD rats as indicated by T-Maze test, open filed test, and swimming test, respectively. It also restored brain oxytocin levels and normalized oxytocin receptor expression. Additionally, oxytocin modulated hippocampal and cortical structure alterations, restored GABA receptor subunit 1 and myelin basic protein expression, prevented phosphorylation of ERK and p38, and decreased markers of inflammation (TNF-α, IL-6, IL-1β) and macrophage infiltration (CD45)

Conclusion

Our findings indicate that decreased oxytocin could play critical roles in the pathogenesis of SD-induced brain injury. Intranasal oxytocin demonstrated anti-inflammatory and neuroprotective effects in SD rats, highlighting it as a promising therapy to halt against brain deficits in sleep disorders.

202315

Injectable Nanocrystal Formulations from the stem latex of Euphorbia fractiflexa, a Native Desert Plant of Abu Arish, Saudi Arabia: Innovations in Combating Human Pathogenic Bacteria

Rawan Mashi, Lojain Adawi, Lama Alhazmi, Rafa Homadi and Sivakumar Moni

Background

Euphorbia fractiflexa, a desert plant widely distributed in Abu Arish, Saudi Arabia, is known for its ornamental properties but has not yet been investigated for its pharmaceutical significance. The aim of this study is to develop and evaluate nanocrystals as injectable antibacterial formulations derived from the stem latex of Euphorbia fractiflexa.

Method

The highly viscous latex was obtained by cutting the stem longitudinally using a sterile blade. The latex was diluted in Millipore water to obtain a solution with a concentration of 5 % v/v. The solution was kept on a hot plate with constant stirring. A concentration of %1 (w/v) tripolyphosphate was added as a stabilizer at predetermined time intervals and stirring was continued for up to one hour to develop the reaction mixture (RM). During stirring, sonication was performed at %100 amplification. Subsequently, the RM was mixed with methanol and

stirring was continued overnight to evaporate the solvent and form the nanocrystals (NC) at the bottom of the reaction flask. The NC was subjected to dynamic light scattering analysis to determine the zeta potential (ZP), nano-size and conductivity of the crystals. Finally, the NC was tested for its antibacterial activity against human pathogenic bacteria.

Result

The injectable formulation of NC exhibited a unique ZP with optimal and uniform particle size. The NC showed good mobility in a colloidal injectable formulation with ideal conductivity, poly dispersity index (PDI) and % PDI. Scanning electron microscopy analysis and transmission electron microscopy studies revealed the morphological features of the NC as discrete crystals with rough surfaces. Antibacterial studies showed broad activity against both Gram-positive and Gram-negative bacteria.

Conclusion

Injectable NC is an excellent pharmaceutical agent, a novel therapeutic dosage form that will represent a milestone in the treatment of human bacterial infections and combat antibiotic resistance.

202319

Modulation of Cytochrome P450 metabolizing enzymes by Boswellia Frereana; Implications for Drug-Herbal Interactions

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Background

Boswellia Frereana is a commonly used medicinal herb belonging to the well-known middle eastern Frankincense, believed to possess anti-inflammatory, anti-neoplastic, antimicrobial, and analgesic properties. Understanding the effect of herbal treatment on our physiologic detoxifying feature represented by the Cytochrome P 450 enzyme is crucial since it could interfere with pharmacological treatment. Furthermore, assessing the induction of variable enzyme families needs to be better understood and should be investigated to explore the potential drug-herbal interaction.

Method

Several resin extracts were prepared using boiling and sonicated water for Boswellia frereana. Then, the resin extracts were tested for in vitro cytotoxicity against the HepG2 cell line using MTT Cell Viability Assay. Quantitative Polymerase Chain Reaction (qPCR) was employed to assess the CYP protein expression of three Cytochrome P 450 (CYP) families, 1A3 ,2A4, and 2B6. Next, Liquid chromatography–mass spectrometry (LC-MS) was used to identify the metabolites of B. frereana resin extracts.

Result

Our results showed that CYP 1A2 mRNA expression was suppressed to more than 0.5 of the control level using 25mcg/ml and 50mcg/ml concentrations of B. frereana. Moreover, CYP2D6 expression showed an increase when cells were exposed to 25mcg/ml and 50mcg/ml of aquous extract. However, CYP 3A4 did not show induction or inhibition due to the results demonstrated the 25mcg/ml concentration of B. frereana showed a decrease, whereas an increase was observed with a 50mcg/ml. Furthermore, the LC-MS revealed eight metabolites for B. frereana in boiled aqueous extracts.

Conclusion

In conclusion, sonicated and boiled B. frereana aqueous extracts modulated CYP 1A2 ,2B6, and 3A4 gene expression at clinically relevant concentrations regardless of preparation methods. Moreover, LCMS revealed the secondary metabolites that could be responsible for CYP enzyme modulation. Further investigations could be done to identify the molecules that affect CYP enzymes and determine their safety and efficacy which benefit the drug development process.

202323

Preventive effect of yarrow oil against peptic ulcer induction via ethanol

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Background

Gastric ulcer is one of the most common gastrointestinal diseases, its pathophysiology involves an imbalance between mucosal protective and offensive dynamics. Yarrow (Achillea Millefolium, family Asteraceae) is one of the most commonly used herbs in the Arab World. Yarrow oil can treat many disorders such as wounds, skin- skin-inflammatory conditions, digestive system problems such as cramps, and constipation, and circulatory disorders such as varicose veins and Hemorrhoids.
The main aim of the study is to estimate the gastroprotective effect of yarrow oil on peptic ulcer disease including via alcohol.

Method

Rats were distributed into five groups (n = 6); the control group administered only saline, orally, for two weeks; the ethanol group administered absolute ethanol (5 mL/kg) on the last day of the experiment. Yarrow essential oil 100 or 200 mg/kg + ethanol groups pretreated with yarrow oil (100 or 200 mg/kg, respectively), orally, for two weeks prior to gastric ulcer induction by absolute ethanol. Lanso + ethanol group administered 20 mg/kg lansoprazole, orally, for two weeks prior to gastric ulcer induction by ethanol.

Result

The results of the Macroscopic Assessment of Gastric Necrotic Damage: ulcerated stomachs showed severe damage and hemorrhagic lesions. Pretreatment with YEO reduced damage and lesions. Lansoprazole had some benefits but did not fully prevent gastric congestion and swelling. Macroscopic scores assessed the severity of the damage.
Also the other test (Microscopic Evaluation): shows The study found that normal animals had healthy gastric mucosa, while ethanol administration caused significant damage, including hemorrhagic injuries and loss of epithelial cells. However, pretreatment with YEO and lansoprazole protected against ethanol-induced damage and preserved the integrity of the stomach wall.

Conclusion

Administration of yarrow oil may limit gastric ulcer in the rats as shown by the improvement of the antioxidant activities and histology.

202327

The Protective Effects of Vitamin B Complex on Diclofenac Sodium-Induced Nephrotoxicity: The Role of NOX4/RhoA/ROCK

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Background

Diclofenac sodium (DIC) is a non-steroidal anti-inflammatory drug widely used for its anti-inflammatory and analgesic effect. Unfortunately, its prolonged use is associated with nephrotoxicity due to oxidative stress, inflammation and fibrosis. The exact mechanism underlying these deleterious effects is not fully clear. NOX4/RhoA/ROCK pathway plays an important role in renal pathophysiology, therefore, this study aimed to investigate the possible role of this pathway in the DIC-induced renal injury. Our aim is extended to evaluate the renoprotective effects of vitamin-B1, B6, B12 (Vitamin-B complex).

Method

Thirty-two rats were divided into four groups, normal control, DIC (10mg/kg, intramuscular), vitamin-B complex (16mg/kg B16 ,1mg/kg B0.16 ,6mg/kg B12, intraperitoneal), and DIC plus vitamin-B complex. After 14 days, kidney weight to body weight ratio (KW/BW) was calculated and the following were assayed; serum renal biomarkers (creatinine, blood urea nitrogen, kidney injury molecule-1), oxidative stress (lipid peroxidation, reduced glutathione, superoxide dismutase), inflammatory (tumor necrosis factor-α, interleukin-6) and fibrotic (transforming growth factor-β) markers as well as the levels of NOX4, RhoA and ROCK. Histological examination was performed using hematoxylin & eosin and Masson

trichrome to detect structural changes and fibrosis.

Result

Compared to DIC, vitamin B complex significantly decreased the KW/BW ratio, renal function biomarkers and markers of oxidative stress, inflammation and fibrosis. Moreover, the glomerular and tubular damage, inflammatory infiltration and the excessive collagen accumulation induced by DIC were also reduced by vitamin B complex. Protein levels of NOX4, RhoA and ROCK were significantly elevated by DIC and this elevation was ameliorated by vitamin B complex.

Conclusion

This study indicated the possible involvement of NOX4/RhoA/ROCK pathway in the DIC-induced renal injury. Vitamin B complex administration could be a renoprotective approach during treatment with DIC via, at least in part, suppressing the NOX4/RhoA/ROCK pathway.

202334

Grape Seed Extract and Urolithiasis Protection Against Oxidative Stress and Inflammation

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Background

Grape seed extract (GSE) has demonstrated various pharmacological actions. Urolithiasis is the occurrence of calculus in the renal system. The present study evaluated the anti-urolithic effect of GSE on ethylene glycol (EG) and ammonium chloride (AC)-induced experimental urolithiasis in rats.

Method

Rats were assigned into six groups; Normal control and Normal + GSE, in which rats received standard drinking water and GSE orally daily, respectively; Urolithiatic animals received EG with AC in drinking water for 28 days; Urolithiatic animals + GSE, in which rats were administered EG with AC in drinking water and GSE 100 and 200 mg/kg orally; and Urolithiatic + cystone, where rats received EG with AC in drinking water and 750 g/kg of cystone as a standard drug orally.

Result

Urolithiatic animals showed a significant decrease in excreted magnesium and citrate and antioxidant enzymes, whereas they exhibited amplified oxalate crystal numbers, urinary excreted calcium, phosphate, oxalate ions, uric acid, intensified renal function parameters, lipid peroxidation, and inflammatory mediators. Management with GSE and cystone significantly augmented urolithiasis inhibitors (excreted magnesium and citrate) and amplified the antioxidant enzymes'

activities. GSE reduced oxalate crystal numbers and urolithiasis promoters, including excreted calcium, oxalate, phosphate, and uric acid excretion, lessened renal function parameters, and declined lipid peroxidation and the inflammatory mediators.

Conclusion

GSE could protect against EG-induced renal stones as evidenced by mitigated kidney dysfunction, histological alterations, and oxalate crystal formation. This action may be related to the antioxidant as well as anti-inflammatory activities of the extracts.

202341

Pioneering Pharmaceutical Innovations from Aloe officinalis Flowers: In-depth Bioactive Compound Profiling via GC-MS and LC-MS Techniques

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Background

Aloe officinalis, a desert plant commonly found in Al Kadmi, Jazan, Saudi Arabia, is known for its therapeutic benefits. While research has primarily focused on gel and leaf extracts, the plant flowers, which are frequently underexplored, may contain various bioactive compounds. Therefore, the pharmaceutical potential of Aloe officinalis flowers remains an unexplored area of research. This study aims to develop new drugs from the flowers of Aloe officinalis by identifying bioactive compounds using GC-MS and LC-MS techniques. It focuses on demonstrating the antibacterial activity of the methanolic extract from these flowers.

Method

The dried flowers of Aloe officinalis were processed by methanolic cold extraction over seven days. Subsequently, the extracted substance was analyzed by gas chromatography-mass spectrometry (GC-MS) and liquid chromatography-mass spectrometry (LC-MS) to investigate the constituents of the flowers thoroughly. These techniques were chosen due to their high sensitivity and ability to detect a wide range of bioactive compounds. In addition, the efficacy of the extract against various human pathogenic bacteria was investigated to evaluate its potential.

Result

The study suggested that the cold methanolic extract of the dried flowers of Aloe officinalis showed unique bioactive compounds in both GC-MS and LC-MS analysis. The study indicates that Phenylalanylmethane, α-Hydroxynaphthalene, p-Isobutyl Benzaldehyde, Benzoic acid, pyrrolidine-2,5-diones, Benzamide, Thiocyanic Acid, Phenol, 2,4-bis(1,1-

dimethylethyl), Dasycarpidan-1-methanol, acetate (ester) and Octadecane, 3-ethyl-5-(2-ethylbutyl). Antibacterial studies showed broad spectrum of activity against both Gram-positive and Gram-negative bacteria.

Conclusion

This research has revealed a diverse array of bioactive compounds in the flowers of Aloe officinalis and highlighted their previously unrecognized potential for pharmaceutical development. These discoveries encourage further investigation into the medicinal use of these compounds. Furthermore, this study underscores the importance of investigating non-traditional sources of bioactive components in drug discovery.

202343

Exploring the potential of green nanotechnology and response surface methodology for the development of optimized eco-friendly niacinamide niosomes

Hanadi Shaheen, Shahad Alqarni, Sarah Aljabri and Manar Alkhamis

Background

Hyperpigmentation represents a major skin complaint with various causes. The treatment of such disorder is challenging owing to resistant skin barrier. Nanotechnology provides a promising approach for surpassing this challenge. Moreover, the direction towards green nanotechnology has evolved for developing non-hazardous formulations. Accordingly, this work aimed at merging green solvent-free method and experimental design to develop eco-friendly niacinamide niosomes (NIA-NIs) for management of post-inflammatory hyperpigmentation.

Method

NIA-NIs were prepared using a solvent-free ultrasonication technique. Response surface methodology was applied to study the effect of total niosomal components (X1), surfactant: cholesterol ratio (X2), Span: Tween ratio (X3), and sonication time (X4) on the particle size (PS, Y1) and zeta potential (ZP, Y2). Numerical method and desirability approach were utilized for anticipating the optimized formulation with minimized size and maximized absolute ZP.

Result

NIA-NIs showed PS ranging from 255 7.8 ± to 17.4 ± 799 nm and ZP values ranging from -0.4 ± 12.5 to - ± 28.5 1.1mV. A synergistic significant effect for X1 and X2 was observed on the PS, while an antagonistic effect was observed for X3 and X4. Regarding the absolute ZP, an inverse relationship was observed with both X2 and X3, while a direct relationship was observed with X4. The optimized variables levels were predicted as 989.8 mg, 2:1 w/w, 3:1 w/w, and 10 min.

for X1, X2, X3, and X4, respectively. The measured responses for the optimized formulation were ± 272 9.5 nm and – 1.2 ± 26.9 mV for PS and ZP, respectively. The optimized formulation could achieve the set goals with desirability of 0.945.

Conclusion

Ultra-sonication was successfully employed as a green method for preparing NIA-NIs. The coincidence of the measured responses of the optimized formulation with the predicted ones highlights the optimization method credibility. Further in vivo studies are recommended for confirming the efficacy of the formulation.

202354

Neuroprotective effect of betanin in Parkinsonian mice is mediated through downregulating TLR4/MyD88/NF-κB signaling.

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Background

Parkinson's disease (PD) is a progressive neuroinflammatory and degenerative disease. In this study, we investigated the neuroprotective action of betanin in the rotenone-induced Parkinson-like mice model.

Method

Twenty-eight adult male Swiss albino mice were divided into four groups: Vehicle, Rotenone, Rotenone + Betanin 50 mg/kg, and Rotenone + Betanin 100 mg/kg. Parkinsonism was induced by subcutaneous injection of 9 doses of rotenone (1 mg/kg/48 h) plus betanin at 50 and 100 mg/kg/48 h in rotenone + betanin groups for twenty days. Motor dysfunction was assessed after the end of the therapeutic period using the pole, rotarod, open-field, grid, and cylinder tests. Malondialdehyde, reduced glutathione (GSH), Toll-like receptor 4 (TLR4), myeloid differentiation primary response-88 (MyD88), nuclear factor kappa- B (NF-κB), neuronal degeneration in the striatum were evaluated. In addition, we assessed the immunohistochemical densities of tyrosine hydroxylase (TH) in Str and in substantia nigra compacta (SNpc).

Result

The results showed that rotenone remarkably decreased (results of tests), increased decreased TH density with a significant increase in MDA, TLR4, MyD88, NF-κB, and a decrease in GSH ($p < 0.05$). Treatment with betanin significantly results of tests), increased TH density. Furthermore, betanin significantly downregulated malondialdehyde and improved GSH. Additionally, the expression of TLR4, MyD88, and NF-κB was significantly alleviated.

Conclusion

Betanin's powerful antioxidative and anti-inflammatory properties can be related to its neuroprotective potential in PD mouse model. Betanin can be a promising therapeutic option for human PD if appropriate clinical data are available.

202362

Biological Screening of Glycyrrhiza glabra L. from Different Origins for Antidiabetic and Anticancer Activity

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Background

Geographical variation may affect the phytochemistry as well as the biological activities of Glycyrrhiza glabra (licorice) root. Herein, a series of biological activities were performed to evaluate the impact of geographical origin on the biological potential of eight different licorice samples.

Method

Cell culture studies were performed for cytotoxicity (MCF7, HCT116, HepG2, and MRC5), glucose uptake assay (HepG2), and glutathione peroxidase activity (HepG2), whereas α-amylase inhibition activity was tested for antidiabetic potential.

Result

The Indian sample was observed to be more cytotoxic against MCF(%22) 7 and HCT(%43) 116 with an IC50 value of (2.38±) 56.10 µg/mL against the MCF7 cell line. The glucose uptake was seen with a mean value of 96 (2.82±) and a range of %101–92. For glutathione peroxidase activity (GPx), the Syrian (0.11 ± 0.31) and Pakistani samples (0.08 ± 0.21) revealed a significant activity, whereas the Palestinian (0.09 ± 70) and Indian samples (0.06±68) effectively inhibited the α-amylase activity, with the lowest IC50 value (0.97 ± 67.11) µg/mL for the Palestinian sample. The statistical models of PCA (principal component analysis) and K-mean cluster analysis were performed to correlate the geographical origin, extract yield, and biological activities for the eight licorice samples of different origins.

Conclusion

The licorice samples exhibited significant cytotoxic, GPx, and α-amylase inhibitory activity. The samples
with higher extract yield showed more potential in these biological activities.

202366

Preparation and characterization of nanostructured lipid carriers (NLCs) for topical delivery of itraconazole

Kawthar Khalaf and Mohammed Elmowafy

Background
Itraconazole is a broad spectrum antifungal agent used for the treatment of several fungal infections. Besides its reported systemic side effects, hydrophobic nature limits its oral bioavailability. NLCs have been used to protect incorporated drugs against chemical degradation and improve skin penetration. So, the aim of this study was to formulate and characterize itraconazole loaded NLCs the formulations to improve of for the topical delivery.

Method
Formulations containing %10 of total lipid content and %2 surfactant were prepared by high shear stirrer followed by sonication. Three ratios of solid lipid (stearic acid) to liquid lipid (oleic acid) were studied (1:1 ,1:3 and 3:1). Formulations were tested for particle size, zeta potential, in vitro release and thermodynamic stability. Selected formulation was tested for thermal analysis and morphology.

Result
Particle size of formulations was in the colloidal nanometer range (<184 nm) where the smallest size was recorded for the formulation containing the highest liquid lipid concentration. Zeta potential was negative (from -4.3 ± 18.4 to -5.1 ± 16.5 mV) with insignificant effect of solid lipid to liquid lipid ratio. As the oleic acid concentration increased, the release of Itraconazole and formulation stability were increased. Thermal analysis showed that itraconazole was found in amorphous state. TEM imaging showed nanoparticles as dark and spherical shapes with particle size coinciding with zeta sizer measurement.

Conclusion
Looking forward to ex vivo and in vivo studies in the future, NLCs containing stearic acid to oleic acid in ratio 1:3 looks a promising candidate for topical delivery of itraconazole.

202374
A molecular docking study of Dengue virus Nsp1 as a druggable binding site
Mawaddah Aljohani and Shymaa Damfo

Background
The clinical features of dengue fever range from mild symptoms to lethal illness. According to the epidemiological survey, the Dengue virus is a global burden as the number of cases has increased dramatically in the recent two decades, and the number of deaths is approximately 9,000 yearly. In Saudi Arabia, dengue cases are common, particularly in the Western region (Makkah and Jeddah) and Southwest region (Jazan). The number of Hajj and Umrah visitors to Saudi Arabia increases the threat of disease. A study conducted by Farooq,

Qurrat ul Ain, et al. (2023) showed that Dengue virus non-structural protein 1 (DENV-Nsp1) is notable for having the maximum number of interactions with the host cells compared to other non-structural proteins. Moreover, DENV-Nsp1 is important for viral replication; hence, it is defined as a promising target. Until the current time, the treatment of dengue fever has been particularly supportive. This work aims to determine drug-like molecules targeting DENV-Nsp1.

Method
The MOE (v2014.09) and ICM (v3-3.9a) programs were utilized for molecular docking of the DSI-poised library against DENV-Nsp1 protein (PDB: 7k93).

Result
The top ten docking scores, which imply high affinities to the binding sites of Nsp1, were selected. The initial results of docking scores for best hits (C1-C10) range from -6.098 to -5.776. The protein-ligand interaction involved hydrogen bond interactions with residues Glu12, Ile21, Lys189, and Arg192. Conserved interactions were observed between C1, C9, and C10 with both Lys189 and Arg192.

Conclusion
DENV-Nsp1 emerges as a promising druggable protein as it has the highest number of interactions with the human host cells and can trigger both humoral and cellular immune responses. In this study, we utilize molecular docking to demonstrate the affinity of small molecules (fragments) to Nsp1. Further work will be conducted to elaborate these molecules to Nsp1 inhibitors.

202376
Neuroprotective effects of echinacoside against experimentally induced Alzheimer's disease in rats

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Background
Alzheimer's disease (AD) is the most frequent neurodegenerative diseases occurring in %60 to 80 % of 50 million neurodegenerative cases present worldwide and it impairs the memory and cognitive functions by destroying the cholinergic neurons in the cortex and hippocampal regions. Echinacoside is a natural phenylethanoid glycoside with anti-inflammatory, anti-endoplasmic reticulum stress, anti-oxidative stress, and other beneficial properties. This study aimed to investigate the neuroprotective effect of echinacoside on experimentally induced Alzheimer in rats and to investigate the molecular mechanisms of the protective effects.

Method
Alzheimer was induced in rats via

70 mg/kg aluminum chloride for six weeks. After induction of Alzheimer part of the rats were treated with 25 mg/kg Echinacoside. Sections of the brain were stained with hematoxylin/ eosin. Another part of the brain was used to investigate the expression of phosphoinositide 3-kinases (PI3Ks), protein kinase B (PKB), glycogen Synthase Kinase-3β (GSK3β), mammalian target of rapamycin (mTOR), B-cell lymphoma 2 (Bcl-2) and Bcl-2-associated X protein (BAX).

Result

The evaluation of oxidative stress and antioxidant activities showed that treatment with echinacoside significantly reduced the levels of AChE and MDA in the hippocampus and increased GSH levels. Also, echinacoside significantly interrupt the pathway of AD by reducing the expression of PI3K, PKB, GSK3β, mTOR and Bax associated with increase in the expression of BCL2 compared to the HCC group.

Conclusion

Echinacoside has been found to improve the structure of the hippocampus in rats with AD. In addition, Echinacoside produced antioxidant, and antiapoptotic effects in rats with AD, leading to significant improvement.

202377

Identification of Druggable Targets in Citrobacter koseri NCTC 11075 through Subtractive Genomics: A Computational Approach to Echinoderm Metabolite Docking and In Silico Validation

Bayan Alhaidhal, Fatimah Alsulais , Ramzi Mothana and Abdullah Alanzi.

Background

Citrobacter koseri is a versatile gram-negative bacterium that can cause serious infections if not properly treated. It has mechanisms for survival and transmission within the host. Infections can lead to sepsis if left untreated, which can be fatal. Identifying effective antibiotics is important to reduce the morbidity and mortality associated with C. koseri infections, but antibiotic resistance is a concern. Therefore, our study aims to identify unique therapeutic targets in C. koseri using a subtractive genomics method.

Method

The genome of C. koseri NCTC 11075 was analyzed to predict open reading frames (ORFs) and translate them into amino acid sequences. To ensure specificity to C. koseri, human-specific homologous and pathogen-specific paralogous sequences were removed from the bacterial proteome using bioinformatics techniques. Further investigations were conducted to assess the role of significant bacterial proteins in metabolic pathways and

subcellular localization. Two promising druggable proteins, WP_012000829.1 and WP_275157394.1, were identified as potential therapeutic targets. The 3D structures of these target proteins were obtained using Alpha Fold.

Result

Docking studies were performed using a library of 1600 compounds derived from echinoderm metabolites. The compounds Ampicillin, Levofloxacin, and Doxycycline served as controls. Among the top 10 compounds docked against each protein receptor, two compounds, CMNPD13085 and CMNPD15632, exhibited the highest binding affinity for WP_012000829.1 and WP_275157394.1, respectively. To validate the docking results, MM-GBSA binding free energy calculations and molecular dynamics simulations were employed.

Conclusion

Our study utilized a computational subtractive genomics approach to identify two druggable proteins as potential therapeutic targets in C. koseri using a variety of computational software and techniques. As a result, this work represents a significant step forward in the development of novel, effective anti- C. koseri drugs. Computer validations were used in this study. Further in-vitro research is necessary to transform these potential inhibitors into therapeutic drugs.

202379

Luteolin loaded Polymeric micro-beads for improvement of oral delivery: Development and in-vitro evaluation.

Mazen Aldlaan and Ameeduzzafar Zafar

Background

Luteolin is a natural flavonoid obtained from onion leaves, carrots, and cabbage. There it has various Pharmacological activities i.e., anti-inflammatory, anti-oxidant, antihypertension, anticancer antiallergic, and neuroprotective. Luteolin has limitations i.e., poor water-soluble, leads to poor dissolution, and poor absorption. The oral bioavailability of LN is %4.1 due to high first-pass metabolism The objective of the present research work was to develop luteolin-loaded microbeads for the improvement of oral delivery.

Method

The luteolin-loaded polymeric beads were prepared by ionotropic gelation technique using sodium alginate and gum tragacanth polymers. The beads were evaluated for particle size, % yield, Drug entrapment efficiency, Swelling study, in-vitro drug release, FTIR, and X-ray diffraction analysis.

Result

The beads showed 5.76±1023µm (F1)-5.70±1387 µm (F2) of size, -%2.54±97.54 %5.21±97.34 yield, - %5.21±97.34

%3.92±85.34 entrapment efficacy. Beads showed spherical shape. All batches of Beads showed excellent swelling in intestinal pH than gastric pH. All formulation batches showed high sustained release over 12h of study in intestinal pH because of the high swelling of beads. FTIR and X-ray diffraction showed the luteolin encapsulated into beads, these are also proved by the sustained release profile.

Conclusion

The finding revealed that micro-beads are the alternative novel carrier for the improvement of oral delivery of luteolin and require further preclinical investigation (pharmacokinetic and bioavailability)

202386

Role of Store-Operated calcium entry in Inflammation-Induced Migration and Chemotherapy Resistance of Breast Cancer Cells

Hajar Alnefaie, Mohammed Alqinyah, Amira Badr and Abdullah Alhamed

Background

Breast cancer (BC) is a significant health concern impact some women all over the world. In Saudi Arabia, BC is considered one of the most common causes of cancer women's death due to its high mortality and resistance to available chemotherapies. Previous studies have established links between inflammation and BC tumor progression, invasion, and migration. A major example of such correlation is the role of cycolooxygenase-2 (COX-2) in enhancing migration and invasion of BC cells and chemoresistance. Store-operated calcium entry (SOCE) has been shown to enhance the effect of lipopolysaccharide (LPS), a known toll-like receptor 4 (TLR4) agonist, on the production of inflammatory cytokines and COX-2 expression in immune cells such as macrophages and microglia. Orai is a selective plasma membrane calcium ion (Ca^{2+}) channel that is considered as essential part of the SOCE. Thus, we hypothesized that the inhibition of SOCE may suppress the inflammatory signaling and inflammation-induced migration and enhance chemotherapy-induced death of BC cells.

Method

Different techniques were used, like enzyme-linked immunosorbent assay (ELISA), western blot analysis, in-vitro scratch assay, MTT assay, and FITC Annexin V apoptosis assay.

Result

Results from this project provide evidence that SOCE plays a major role in enhancing LPS-induced inflammatory signaling and migration in MDA-MB-231 BC cells, mechanisms include inhibition of LPS-induced upregulation of inflammatory and oncogenic markers; IL-6, IL-8, COX-2, PGE2, and VEGF. Furthermore, SOCE

inhibition potentiated cisplatin-induced death in MDA-MB-231 BC cells.

Conclusion

This project can aid in developing novel therapeutic approaches to treat breast cancer by targeting calcium signaling to influence inflammation and cancer progression.

202388

Exploring the Potential Effects of Boswellia Carterii on Drug Metabolism and Drug-Herb Interactions: A Study on CYP Isoenzymes Induction

Raghad Alajmi, Hussah Albahlal, Amani Alsharidah, Aljawharah Almogren , Zeyad Alehaideb and Sahar S. Alghamdi

Background

The Boswellia carterii plant, commonly known as Al-Liban in Arabic, has a long history of traditional use in Saudi Arabia. Of particular interest is its potential effects on the induction of CYP isoenzymes, which are involved in drug metabolism. This study aims to investigate whether Boswellia carterii can influence drug metabolism and potentially lead to drug-herb interactions.

Method

To assess the presence of bacterial endotoxins, a Bacterial Endotoxins Test (BET) was conducted. Boswellia carterii extracts were prepared using water solvent, as well as through sonicated and boiled extraction methods. The vitality of hepatic cells was evaluated using the MTT assay, focusing on CYP enzymes that are primarily found in the liver. The extracts were tested for their ability to modulate the gene expression of cytochrome P-450 enzymes 1A,2 2B6, and 3A4 in the Hep G2 cell line. Experimental receptor binding assays were performed using constitutive androstane receptor (CAR) and Pregnane X receptors (PXR). LCMS was employed to identify secondary metabolites, and computational predictions were used to assess molecular interactions, pharmacokinetic properties, and safety profile.

Result

The B. carterii resin extracts showed a low level of bacterial endotoxin contamination. Furthermore, these resin extracts were found to induce the gene expression of the three CYP enzymes in a dose-dependent manner, with expression levels exceeding two-fold compared to untreated Hep G2 cells. The induction of CYP enzymes was primarily mediated through the CAR nuclear receptor, while the extracts exhibited weak to no binding to PXR. Docking results revealed strong interactions between β-Sitosterol and Ursodeoxycholic acid with the active site of the CAR receptor. Most of metabolites exhibited favorable

pharmacokinetic properties and safety.

Conclusion

This study demonstrates that Boswellia carterii resin extracts have the potential to induce the gene expression of CYP enzymes, particularly through the CAR nuclear receptor. These findings suggest that the plant may indeed influence drug metabolism and have implications for potential drug-herb interactions.

202394

Identifying a Novel Treatment for Sepsis-induced Cardiac Inflammation

Sara Abul-Ola, Ghalya Al-Maraghi, Tamader Al-Jumaily, Rana Magdy and Zaid H. Almaayah

Background

Patients with sepsis are at a high risk of morbidity and mortality due to multiple organ injuries caused by pathological inflammation. Although sepsis is accompanied by multiple organ injuries, cardiac injury is a significant contributor to sepsis morbidity and mortality. Thus, dampening inflammation-induced cardiac injury may limit the severe consequences of sepsis. As several studies have suggested that octyl itaconate is beneficial for treating various inflammatory diseases, we aimed to examine the potential protective effect of octyl itaconate on the lipopolysaccharide (LPS) model of cardiac injury.

Method

Human left ventricular cardiomyocyte AC-16 cells were treated with LPS (5 ug/ml) + nigericin (2.5 uM) in the presence and absence of increasing concentrations of octyl itaconate (100 ,50 and 200 µM). Inflammation markers, Interleukin1b (IL1b), IL6 and IL8, cardiotoxic markers, β-myosin heavy chain (βMHC) and Atrial natriuretic peptide (ANP), as well as epoxygenase markers mRNA expressions were quantified by Real-time polymerase chain reaction (qRT-PCR). Additionally, cardiac cell surface area was assessed using an inverted microscope.

Result

Our results show that octyl itaconate dampened LPS-induced cardiac inflammation markers such as IL-1β, IL-6 and IL-8 in a concentration-dependent manner, and the maximum inhibitory effect (%80) was observed at the highest concentration for IL-1β, IL-6 and IL-8 mRNA levels. Furthermore, we found that octyl itaconate significantly reduced cardiac toxicity markers, βMHC and ANP, and cell volume in our LPS/nigericin model. Mechanistically, our data indicate that octyl itaconate may signal through the epoxygenase pathway to contribute to the improvements observed in our LPS/nigericin model of cardiac inflammation and toxicity.

Conclusion

The data of our study show that octyl

itaconate possesses a beneficial cardio-protective effect against LPS/ nigericin-induced cardiac toxicity.

202395

Phyto synthesis of Manganese Oxide Nanoparticles and Their Antimicrobial Activity

Fatimah Albani, Nouf Albulushi, Hanin Alhuraibi, Reham Aldhasi, Sahar S. Alghamdi and Afrah E. Mohammed

Background
In the current investigation the green synthesis approach was used to fabricate manganese oxide nanoparticles (MnO NPs) using the reducing and stabilizing agents from an aqueous extract of Russelia equisetiformis leaves.

Method
The biosynthesized MnONPs were monitored using various techniques such as UV-Visible spectroscopy (UV), dynamic light scattering (DLS), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX), transmission electron microscopy (TEM), and Fourier transform infrared spectroscopy (FTIR). The antibacterial and antifungal activities of MnONPs were tested against Klebsiella pneumoniae and Staphylococcus aureus as well as Sclerotinia sclerotium and Fusarium equiseti, respectively.

Result
Results indicated the successful formation of MnO NPs, as confirmed by peak absorbance of the UV–vis spectra at 325.09 nm. The SEM and TEM analysis showed the presence of spherical nanoparticles, while the EDX analysis revealed intense signals of the manganese element. FTIR analysis that was carried out to determine the organic ingredients in the leaf extract responsible for the bio reduction and stabilization of MnO NPs indicated the presence of phenol and protein. The stability of MnO NPs was confirmed by the negative zeta potential −0.014 mV for 211.9 nm size. The antibacterial effectiveness of MnONPs was approved against K. pneumoniae and S. aureus, with 0.1±25.3 and 0.3±20 mm zone of inhibition, respectively. Further, the growth of S. sclerotium and F.equiseti was reduced at the MnONPs treated plates compared to untreated control indicating their ability as antifungal agents.

Conclusion
Overall, this investigation highlights the successful synthesis of MnO NPs using a green approach and provides valuable insights into their characterization and biological activities. The findings contribute to the growing field of nanotechnology and hold promise for various applications in medicine.

202403

Antibacterial and Anticancer Properties of Silver Nanoparticles Synthesized with Saudi Plants Extract: A Promising Alternative to Chemotherapy

Haifa Alhaidal, Afrah Mohammed, Arwa Alsubait, Lamis Alsaqer, Layan AlTuhayni, Fai Alenazi, Shahad Alzahrani and Sahar Alghamdi

Background
In recent years, there has been growing interest in exploring alternative treatments for cancer that are safer and more effective than traditional chemotherapy. Dual therapy with plant extracts and silver nanoparticles (AgNPs) offers a safer and more effective cancer treatment. This study examines the antibacterial and anticancer properties of AgNPs synthesized from silver nitrate (AgNO3) and bio-components from Rhazya stricta (R.S.), Calotropis procera (C.P.) and Calligonum crinitum (C.C). The goal is a safer, more effective alternative to chemotherapy.

Method
AgNPs were synthesized using a plant extract and characterized using various techniques. The organic components were identified, and the size, morphology, and surface characteristics of the nanoparticles were analyzed. Cytotoxicity tests were performed on various cancer cell lines (KAIMRC2, MDA-MB231, MCF-7, and HCT-116) and non-cancer cell line (MCF-10A) and biometabolites were identified using LC-MS and in silico methods.

Result
FTIR analysis confirmed the successful synthesis of AgNPs. The average sizes of the synthesized AgNPs were determined to be 155 nm for C.P., 103 nm for R.S., and 54 nm for C.C. SEM and EDX analysis showed unique nanoparticle shapes and the presence of biomolecules such as carbon, oxygen, and silver. C.P.-AgNPs exhibited the strongest cytotoxic activity against MCF-7 and HCT-116 cancer cell lines, while C.C.- AgNPs had the strongest cytotoxicity against KAIMRC-2 cells, and R.S.-AgNPs showed the highest cytotoxicity against MDA-MB231 cells. The AgNPs had low cytotoxicity against normal epithelial cells, indicating their selectivity for cancer cells. C.P.-AgNPs also demonstrated antimicrobial activity against S. aureus and E. coli strains. The metabolites Calactin, Calotropin, and Uzarigenin in C.P. were identified as having high anticancer and antibacterial properties.

Conclusion
R.S., C.P., and C.C. extract were used to synthesize AgNPs successfully. The combination of these extracts and silver nanoparticles exhibited enhanced therapeutic effects, suggesting a synergistic interaction. The nanoparticles displayed selective targeting of cancer cells and reduced

toxicity to normal cells, indicating their potential as a viable alternative to conventional chemotherapy.

202409

Evaluation of Anti-Cancer and Anti-Bacterial Activity of Synthesis Silver Nanoparticles Containing Calligonum Comosum.

Lamis Alsaqer, Haifa Alhaidal, Shahad Alzahrani, Fai Alenazi, Layan Al Tuhayni, Afrah Mohammed, Arwa Alsubait and Sahar Alghamdi

Background

In recent decades, the rise of multi-drug resistant (MDR) bacteria among cancer patients has posed significant health challenges. There is a need for novel medication to tackle this issue. Therefore, our study explores the efficacy of medicinal plant Calligonum Comosum (C.C) derived silver nanoparticles (AgNPs), enclosed for potential use against these diseases. A previous studies show that nanoparticles enhance potency in the biological activity and offer a new delivering system.

Method

Diverse scientific techniques were used to assess C.C plant. C.C.-AgNPs extract was synthesized and characterized via TEM, Zetasizer, FTIR, and SEM. Antimicrobial activity against Escherichia coli and Staphylococcus aureus was evaluated by the inhibition zone. Cytotoxicity effect was tested on multiple cancer cell lines (MDA-MB231, MCF-7, KAIMRC2, HCT-116) and MCF-10A were evaluated using an MTT assay.

Result

TEM analysis confirmed uniform dispersion of C.C.-AgNPs ranging from 18.8 nm to 70.1 nm. SEM identified NP shapes, and EDS analysis detected carbon, oxygen, and silver. C.C.-AgNPs exhibited superior antibacterial effects, with a 20mm inhibition zone against S.aureus compared to 18mm for E.coli. Surprisingly, it outperformed the (Ampicillin against both bacteria with 13 mm, 12 mm, respectively). C.C.-AgNPs extract showed the highest IC429.1 50 µg/ml against MCF-10A. Among cancer cell lines, C.C.-AgNPs demonstrated the lowest IC50 at 135.1 µg/ml against KAIMRC2, followed by MCF-7 (163.6 µg/ml), HCT-116 (163.3 µg/ml), and MDA-MB231 (173.7 µg/ml). The findings indicate that C.C.-AgNPs hold promise dual therapeutic agent against both cancer and bacterial infections.

Conclusion

Our findings suggest that C.C.-AgNPs may serve as promising agent for drug development for combating pathogenic bacterial infections and cancer.

202410

Screening of polyphenolic compounds to identify dual inhibitors against Glycogen Synthase 3β and Acetylcholinesterase for the treatment of Alzheimer's Diseases

Somayah Alharbi, Minhajul Arfeen and Abeer Alharbi

Background

Alzheimer's diseases is a neurodegenerative progressive diseases accompanied by complex pathology. Because of its complex pathology, multi-target ligands are considered as an attractive strategy for new drug development against AD. Dual inhibition of AChE and GSK-3β can be considered as an important strategy.

Method

Various polyphenolic compounds from the literature were collected and evaluated against AChE and GSK-3β using molecular docking.

Result

The results indicated good binding potential of all the docked compounds for GSK-3β (9 kcal/mol), while weak to good binding potential for AChE (8 to 12 kcal/mol). The binding mode analysis of GSK-3 docked complexes showed interactions with key residues like Asp133 and Val135 which are important for molecular recognition. Additionally, the docked compounds showed interactions with Leu132, Arg141 and Cys199, the residues important for potency and selectivity. With respect to AChE, the compounds mostly occupied peripheral aromatic site in the active site of AChE, the site important for binding of ligands and inhibitor. The binding mode analysis showed interactions with key residues Tyr124, Ser293 and Arg296 important for substrate binding and recognition. Further the polar interactions were also noted for His447 and Ser203 (residues important for Ach hydrolysis) in some of the identified ligands.

Conclusion

Overall the work resulted in the identification of eight compounds 5'-geranyl-4,'5,7,2'tetrahydroxyflavone-2, Kuwanon E 4, Gossypetin, Kaempferide, Galangin, Kaempferol, baicalein and Ellagic acid with the potential dual inhibition of AChE and GSK-3β. It should be noted that kaempferide was not reported in the literature for AChE inhibition, while except baicalein none of the compounds were reported for GSK-3β. Further, the eight identified compounds were subjected for ADME profiling using SwissADME which showed their drug like character. Therefore, based on the results from this study, the above mentioned eight compounds can be looked upon with the potential of dual inhibition against AChE and GSK- 3β.

202411

Exploring the Therapeutic Potential of JWH-113: A Synthetic CB2 Agonist in Cancer Treatment

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Background

There is ongoing research to find effective anticancer agents and one of the novel approaches is to use Cannabinoid Receptor 2 (CB2) agonists. Thus, our study focuses on the effects of JWH-133 on various cancer cell lines, including those isolated from the Saudi population to gain insights into the potential therapeutic properties of JWH-133 in the context of cancer treatment.

Method

The MTT assay evaluated the cytotoxic activity of JWH-133 on various cancer cell lines, including breast, colorectal, and adenocarcinoma. The study also included Saudi isolated breast cancer cells. Results were compared to normal fibroblast cells. A scratch assay examined cancer cell migration, proliferation, and migration in response to JWH-133. These experiments aim to explore the therapeutic potential of JWH-133, a synthetic CB2 agonist, in cancer treatment.

Result

Our MTT results demonstrated the promising anticancer activity of JWH133 in various cancer types, with IC50 (μM) values of 22.08 ,10.88 ,22.11, and 19.81 at MDA-MB231, HCT-116, HCT-8, and KAIMRC2, respectively, after 24 hours of incubation. Similar effects were observed after 48 hours, with IC50 (μM) values of ,6.94 ,58.27 40.83, and 31.84 at MDA-MB231, HCT-116, HCT-8, and KAIMRC2, respectively. TiterGlo results for KAIMRC1 cancer cells showed promising potency, with IC50 (μM) values of 11.12 (at 24 hours) and 21.91 (at 48 hours). A time-dependent scratch experiment on KAIMRC-2 cells revealed that treatment with 25 or 30 μM of JWH-133 significantly reduced cell migration compared to the control group (***=P<0.005). However, lower concentrations of JWH-133 (10 μM and 20 μM) failed to inhibit cell migration. Mitoxantrone was used as a positive control in all experiments.

Conclusion

In conclusion, the study demonstrates that JWH-133 exhibits promising anticancer activity and highlight the potential of JWH- 133 as a therapeutic agent in cancer treatment and warrant further investigation.

202413

Enhancing Ulcer Treatment with Lafutidine Nanoparticles Loaded with Sodium Carboxy Methyl Cellulose: A Novel Spray-Drying Approach

Ahmed Almuhanna, Sreeharsha Nagaraja, Anroop Nair, Moayad Bujubarah, Hassan Alshamlan and Jafar Alkathem

Background

In this study, we formulated mucoadhesive nanoparticles using the new Büchi B-90 Nano Spray-Dryer technology. Our goal was to prepare the ulcer drug lafutidine work better as a drug. Improving the drug's solubility and dissolution rate was our main goal because it could change the way ulcers are treated.

Method

We formulated lafutidine nanoparticles filled with Sodium Carboxy Methyl Cellulose in order to SCMC accomplish this aim. Our comprehensive examination of these nanoparticles encompassed several vital aspects.

Result

First, we used UV spectrophotometry to precisely quantify the drug content, and the result was %0.6 ± 85.3. We evaluated the effectiveness of the spray-drying procedure by calculating the nanoparticle yield of %0.6 ± %79. The average particle size that we found using the Malvern Zetasizer was 501 nm. The morphology of these nanoparticles was revealed using scanning electron microscopy (SEM), which revealed surfaces that ranged from smooth to shriveled. Differential Scanning Calorimetry (DSC) measurements were used to determine the stability of our nanoparticles under different settings. Our findings gave confidence in the nanoparticles' potential for real-world applications by showing that they retained their physical characteristics in the face of temperature changes. The Attenuated total reflection-Fourier transform infrared spectrometry (ATR-FTIR) confirmed that the formulation of sodium carboxymethylcellulose loaded with lafutidine stayed the same and could be used without any risk. X-ray diffraction analysis (XRD) to examine the nanoparticles' crystalline structure. Our study showed that the lafutidine crystalline peaks decreased inside the microspheres. This means that the drug was evenly spread at the molecular level inside the SCMC polymeric microspheres.

Conclusion

By using the spray-drying method to make lafutidine nanoparticles that are loaded with SCMC, our work offers a good alternative to current ulcer treatments. This novel strategy has the potential to greatly improve ulcer treatment by providing more potent and palatable therapeutic choices.

202419

Probing the effectiveness of novel anti-inflammatory compounds in regulating calcium-mediated inflammation and breast cancer progression

Abdulelah Abahussain, Mohammed Alqinyah and Mohammed Alhamidi

Background

there is a necessity to find novel approaches that aid in combating breast cancer as it's a major healthcare burden that affects women worldwide due to its high incidence and mortality rates. Toll-like receptors (TLR4) play a crucial role in the innate immune system by activating various inflammatory signalling pathways which include NF-κB, and COX2 leading to the production of proinflammatory mediators for example, IL-6 and IL-8. The most recognized activator of TLR4 is lipopolysaccharide (LPS). TLR4 activation leads to an enhanced inflammation and proliferation of breast cancer cells. Results from our previous studies indicate that activating Store-operated Calcium Entry (SOCE) pathway potentiated TLR4-mediated inflammation and proliferation of breast cancer cells. However, the specific molecular pathways that mediates SOCE action on TLR4 signalling in breast cancer are still not clear. Our objective is to assess the role of COX-2, NLRP3 inflammasome, and NFKB pathways on SOCE and TLR4-induced inflammation and breast cancer proliferation.

Method

We used the cell line MDA-MB-231 as models of human breast cancer. Cell proliferation was assessed using MTT assay, and gene expression for inflammatory genes (COX2, IL6, and IL8) were measured using qRT-PCR. LPS and Thapsigargin were used to activate TLR4 and SOCE, respectively. Additionally, Triptolide was used to inhibit NFKB, MCC950 was used to inhibit NLRP3 inflammasome, and Meloxicam was used to inhibit COX-2.

Result

Our study shows that NFKB inhibition strongly suppressed both LPS and thapsigargin-mediated inflammation and proliferation of breast cancer cells. However, no significant effect was observed with COX-2 and NLRP3 inflammasome inhibitors.

Conclusion

Our data suggest that NFKB pathway, and not COX-2 or NLRP3 pathways, play a more significant role in mediating the effect of SOCE on TLR4 signalling in breast cancer cells. Therefore, combined inhibition of SOCE and NFKB pathways can be a potential valuable therapeutic approach in treating breast cancer.

202422

Application of Bioinformatics Approaches to Evaluate the RpoB Inhibitory Potential of Natural Products Derived from Marine Echinoderms for Tuberculosis Treatment.

Fatimah Alsulais, Dr.Abdullah Alonazi, Bayan Alhaidhal

Background

Tuberculosis (TB) remains a significant global health challenge, and drug-resistant TB is a growing concern. Effective drugs target a key enzyme for the replication of TB causing bacteria in both wild-type and mutant RNA polymerase (RpoB) are crucial for global TB control efforts, helping reduce TB incidence, mortality, and transmission. The purpose of this study is to utilize modern bioinformatics and AI tools to evaluate the potential of the untapped reservoir of echinoderm metabolites as Anti-TB agents against WT and the most prevalent mutatnts (RpoB D516V, RpoB H526Y, and RpoB S531L).

Method

Several tools and techniques such as molecular docking, molecular dynamics simulation, proteins alignment and ADMET were used. The docking results were evaluated using the glide gscore, and the top 10 compounds docked against each protein receptor were chosen.

Result

Among the selected compounds, CMNPD2176 showed the highest binding affinity against wildtype RpoB, CMNPD13873 showed the highest binding affinity against RpoB D516V mutant, CMNPD2177 showed the highest binding affinity against RpoB H526Y mutant, and CMNPD11620 showed the highest binding affinity against RpoB S531L mutant. Furthermore, the selected compounds underwent ADMET screening, demonstrating that they have the potential for therapeutic development. Additionally, MM-GBSA binding free energy and molecular dynamics simulations were used to support the docking investigations.

Conclusion

The study's findings suggest that these compounds could eventually be utilized in the treatment of tuberculosis, assisting in global TB control efforts by reducing TB incidence, mortality, and transmission. However, further research and development are necessary to validate their efficacy and safety in clinical settings.

202427

Exploring Phytoconstituents the Therapeutic Potential of CK1δ Inhibitors in Ovarian Cancer: Implications for Precision Oncology and Early Diagnostics

Albatool Alshaikh and Dr. Shadma Wahab

Background

Casein kinase 1 delta (CK1δ), which is also referred to as CSNK1D, is a protein kinase involved in the regulation of multiple physiological processes such as the cell cycle, circadian rhythms, and response to DNA damage. Cancer has been linked to abnormalities in CK1δ activity, and this protein can play a complex function in the

disease. CSNK1D has been linked to the development, progression, and metastasis of ovarian cancer.CK1δ participates in the DNA damage response mechanism. It is essential for this system to work properly to repair damaged DNA and stop the build-up of mutations that can cause cancer. Disruptions in DNA repair processes are frequently observed in ovarian cancer, and CK1δ may be involved in this process. Potential diagnostic or prognostic markers for ovarian cancer could be CK1δ and its downstream targets. Variations in CK1δ expression or activity in ovarian cancer cells may be linked to the tumor's aggressiveness or response to treatment. The purpose of this abstract is to provide an outline of CSNK1D role. In ovarian cancer and the therapeutic strategies targeting CSNK1D using IMPPAT inhibitors.

Method

To discover viable therapeutic candidates after competitive inhibition of with CSNK1D small molecular drug complex, high throughput screening and docking studies were used. Further we carried the compounds based on binding energy and interaction analysis. Finally, two different compounds were being selected to carry out MD simulations.

Result

CSNK1D-IMPHY002594 and CSNK1D-IMPHY011318 are the two compounds that were identified. Overall, our results suggest that the CSNK1D-IMPHY002594 and CSNK1D-IMPHY011318 complex was relatively stable during the simulation.

Conclusion

The compounds that have been found can also be further examined as potential therapeutic possibilities. The combined findings suggest that CSNK1D, together with their genetic

changes, can be investigated in therapeutic interventions for precision oncology, leveraging early diagnostics and target-driven therapy.

Keywords: CSNK1D, Molecular Docking, ADMET properties, MD simulations, Free Energy Landscape.

202428

Recent advances on nano herbal formulations of thymoquinone against cancer

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Background

Thymoquinone, a potent compound from Nigella sativa seeds, has shown promise in inhibiting cancer growth. Recent interest lies in optimizing its impact through nanoparticle formulations, which offer enhanced delivery precision and reduced toxicity. This systematic literature review delves into the current understanding of thymoquinone's

direct effects on cancer. It explores the advantages of nanoparticle utilization, aiming to distil critical insights for future research and therapeutic applications.

Method

The current review article collected information from a literature search using various computerise databases such as PubMed, Google Scholar, Scopus, ScienceDirect, and Saudi Digital Library. Keywords such as Nigella sativa, Thymoquinone, α-phellandrene, thymol, proteins, oleic acid, and carbohydrates were used to search literature concerning Thymoquinone. Phrases like "Anti-inflammatory effect of thymoquinone", " Immunomodulatory effects of thymoquinone", " Antioxidant effect thymoquinone", "Anticancer properties of thymoquinone" "nanomaterials with combinations of thymoquinone" “mechanism of actions thymoquinone” and "nanomaterials combination with thymoquinone used to treat cancer" were used to search the literature related to chronic diseases. Further information was retrieved from various books.

Result

Thymoquinone is a biologically active molecule; it could be the best alternative to treat cancer. However, the significant physicochemical barriers that hinder the utilisation of these natural actives as cancer treatments are bioavailability, pharmacokinetic characteristics, low solubility, poor gastrointestinal absorption, low hydrophilicity, and delayed intrinsic dissolution. These problems can be overcome through the application of novel drug-delivery technologies.

Conclusion

This review thoroughly examines drug delivery systems utilizing thymoquinone, focusing on harnessing nanotechnology's capabilities to effectively tackle the challenges associated with drug delivery. The ultimate goal is to develop a successful strategy for anticancer therapy.

Keywords: Thymoquinone; Nigella sativa; anticancer; bioavailability; Anti-inflammatory

202430

Ferulic acid inhibits tumor proliferation and attenuates inflammation of hepatic tissues in experimentally induced HCC in rats.

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Background

Hepatocellular carcinoma (HCC) is a common type of primary liver cancer with a five-year survival rate of only %18. Finding new drugs that do not result in resistance is crucial. Ferulic acid, a natural compound found in fruits and vegetables like

tomatoes, sweet corn, rice bran, and dong quai, is a potential drug that has various beneficial effects on the body, including anti-inflammatory, anti-apoptotic, hepatoprotective, cardioprotective, and neuroprotective properties. Our study aimed to investigate ferulic acid's potential antitumor activity against HCC in rats by inhibiting tumor proliferation and attenuating inflammation.

Method

To induce HCC, rats were administered thioacetamide. Additionally, some rats were given ferulic acid thrice a week for 16 weeks through oral gavage at 50 mg/kg. The liver impairment was evaluated by measuring serum α-fetoprotein (AFP) and examining liver sections stained with hematoxylin/eosin or anti-HIF-1α antibodies. The hepatic expression of mRNA and protein levels of HIF-1α, NFκB, TNF-α, mTOR, STAT3, cMyc, and cyclin D1 were analyzed.

Result

Ferulic acid can increase the survival rate of rats by reducing the levels of serum AFP and hepatic nodules. We also found that ferulic acid can improve the appearance of HCC-induced vacuolated cytoplasm by reducing apoptotic nuclei and necrotic nodules. Lastly, ferulic acid can decrease the expression of HIF-1α, NFκB, TNF-α, mTOR, STAT3, cMyc, and cyclin D1.
Conclusion: Ferulic acid may possess anti-tumor properties and could be useful in preventing HCC. Evidence shows that it can increase survival rates and decrease the number of tumors and AFP. Ferulic acid works by blocking the expression of HIF-1α, thereby inhibiting HCC-induced hypoxia. Additionally, it helps to reduce the expression of mTOR, STAT3, cMyc, and cyclin D1, which in turn, slows down tumor cell proliferation. Furthermore, Ferulic acid reduced hepatic tissue inflammation by downregulating NFκB and TNF-α.

Conclusion

Ferulic acid may possess anti-tumor properties and could be useful in preventing HCC. Evidence shows that it can increase survival rates and decrease the number of tumors and AFP. Ferulic acid works by blocking the expression of HIF-1α, thereby inhibiting HCC-induced hypoxia. Additionally, it helps to reduce the expression of mTOR, STAT3, cMyc, and cyclin D1, which in turn, slows down tumor cell proliferation. Furthermore, Ferulic acid reduced hepatic tissue inflammation by downregulating NFκB and TNF-α.

202436

Leveraging Information Technology for Industrial Upgrading: A Systematic Review of the Transformation of Saudi Arabia's Pharmaceutical Industry

Reema Ibraheem Alalmaie, Razan Alshahrani, Rahaf Hakami, Taherah Abdulhaq and Shamama Javed

Background

Escalating financial challenges on global pharmaceutical industry calls for innovative solutions to deal with it. And presently, the pharmaceutical industry is experiencing a profound transformation through the adoption of advanced technologies such as blockchain, machine learning, and artificial intelligence (AI) giving rise to the concept of a smart pharmaceutical industry. This systematic review aims to explore the implications of these technologies on industrial upgrading within the industry.

Method

The review encompasses various applications, including the use of blockchain for preventing counterfeit drugs, optimizing drug distribution, tracking and tracing pharmaceutical products, ensuring safety and security. Additionally, machine learning and AI are extensively utilized for drug discovery, predictive analytics, personalized medicine, and operational process optimization as AI is a valuable tool in understanding market dynamics, demand forecasting and inventory management. AI has the power to utilize the advanced algorithms with unparalleled accuracy. The transformation through technology is remarkable when traditional approaches are compared with AI-driven methods in terms of cost saving, high efficiency and anticipation of demand fluctuations.

Result

The findings underscore the potential of these technologies in enhancing transparency, improving supply chain efficiency, reducing costs, and enhancing decision-making processes. However, the studies also highlight challenges and limitations related to data governance, data quality, regulatory compliance, and the need for skilled professionals. The integration of these technologies has the potential to revolutionize the sector, improve patient outcomes, and drive economic growth. Future research should focus on addressing the identified challenges and exploring further opportunities for the application of advanced technologies in the pharmaceutical industry.

Conclusion

This systematic review provides valuable insights into the transformative impact of advanced technologies, such as blockchain, machine learning, and AI on industrial upgrading within the Saudi Arabia's pharmaceutical industry. It is a very transformative idea of present times.

202445

Impact of vitamin D receptor in the anticancer activities of the alkaloids Coclaurine and Reticuline using CRISPR/Cas9-mediated VDR knockout colorectal cancer cell line HCT116: in vitro and in silico studies

Hind Alghamdi, Sahar Alghamdi, Rana Alghamdi, Sabine Matou-Nasri and Maryam Al-Zahrani

Background

The Vitamin D receptor (VDR) plays a crucial role in mediating the anti-colorectal cancer (CRC) effects of 1α,25-dihydroxy vitamin D3 (1,25(OH)2D3), the active metabolite of vitamin D. Annona species-derived Reticuline and Coclaurine have been reported as anti-CRC alkaloids. However, there is no experimental evidence revealing any potential role of VDR in the anti-CRC activities of both alkaloids. Thus, we aim to investigate the anti-cancer properties of Reticuline and Coclaurine in CRISPR/Cas9-mediated VDR knockout (KO) and wild-type (WT) CRC cell line HCT116.

Method

Cell viability and growth rate were assessed by treating CRISPR while HCT116/VDR-KO and HCT116/WT with various concentrations (-0.01 10000 nM) of Coclaurine, Reticuline and vitamin D3 (positive control) for 72 hours, using the Cell Meter™ Colorimetric MTT assay. Western blot analysis was performed to detect apoptosis related proteins. Molecular docking studies were conducted to examine the molecular interactions between these chemical structures and VDR active site.

Result

Like vitamin D3, Coclaurine, and Reticuline exhibited an anti-proliferative effect in HCT116/WT cells, while HCT116/VDR-KO cell viability was not affected. The induced cell death was confirmed by the strong detection of cleaved caspase-3, particularly induced by Coclaurine, and cleaved poly-ADP ribose polymerase (PARP), particularly induced by Reticuline, in WT cells. In all conditions tested, no apoptosis induction was detected in VDR-KO cells. Docking studies revealed that Vitamin D3, Coclaurine, and Reticuline occupy the active site and form several hydrogen bond interactions with crucial residues.

Conclusion

Our findings demonstrate the role of VDR in Coclaurine and Reticuline antiproliferative and pro-apoptotic effects in CRC. Deeper investigation is needed to shed light on the molecular mechanisms of their distinct anticancer activities.

202446

Actions of Valsartan against ethanol-induced gastric ulcer in rats

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Background
Peptic ulcer (PU) is a painful ulcer that develops in the lining of the stomach or the duodenum, when there is an imbalance between gastric mucosal protective and destructive factors. Common causes of peptic ulcer include H. pylori infection and non-steroidal anti-inflammatory drugs. Proton pump inhibitors are the gold standard to treat PU. Valsartan is an angiotensin receptor blocker drug that acts by blocking angiotensin that causes blood vessels constriction. Therefore, this study is aimed to evaluate the effect of valsartan on ethanol-induced peptic ulcers.

Method
Wistar male rats (8–6 weeks and -110 280 g) were distributed randomly into 4 groups (n=6). Group 1 received the vehicle to be a negative control group. Group 2 administered valsartan (100mg/kg) orally for 14 days. Group 3 received alcohol (5mg/kg) once by gastric gavage on the last day. Group 4 was given alcohol and valsartan as mentioned before. Before ethanol administration, animals were fasted for 24 hours, with free access to drinking water till 2 hours before ethanol administration. Four hours after absolute ethanol administration, animals were anesthetized using pentobarbital sodium. Rats were sacrificed, and the stomachs were separated, washed with ice-cold saline for subsequent analysis.

Result
Ulcer surface area is significantly increased in ethanol-administered animals. Additionally, animals pretreated with valsartan showed elevated gastric ulcer surface area when related to ulcerated animals. Rats with gastric injuries induced by ethanol presented a substantial reduction in the Alcian blue binding ability of the mucosa when correlated to the control. While, animals pretreated with valsartan further reduced in Alcian blue binding ability of the mucosa.

Conclusion
Valsartan augmented peptic ulcer which may be related to the ANG II-role in gastric ulcer healing.

202447
Computational Analysis of the Binding Mode of DprE1 Complexed with Inhibitors

Abdulrhman Al-Saqaby, Njood Aloufi, Haneen Alharbi and Suliman Al-Mahmoud

Background
Mycobacterium tuberculosis (MtB) is a one of the world's top ten infectious killers. According to World Health organization (WHO), 10.6 million patients suffered from TB in 2022 worldwide. The current anti-Mtb treatment consists of a four-drug isoniazid (INH), pyrazinamide (PYR), rifampicin (RFP) and ethambutol

(EMB). However, the spread of multi drug-resistant (MDR) and extensively drug-resistant (XDR) tuberculosis contribute to the lack of the efficacy of anti-Mtb treatment. Therefore. There is an urgent need to find out a new effective treatment to control the disease. The decaprenylphosphoryl-β-D-ribose 2'-epimerase (DprE1) is a critical flavoenzyme in cell wall biosynthesis. There a significant number of DprE1inhibitors showed a promiscuous anti-Mtb activity. In our study, we run molecular modeling of DprE1 to gain new insights into the activity DprE1inhibitors and important amino acid for ligand binding that should facilitate the design, develop and optimization of future DprE1inhibitors.

Method

AutoDuck Vina was used for the molecular docking of DprE1. The 3D crystal structures of DprE1 were downloaded from the Structural Bioinformatics protein data bank (RCSB). Ligand-protein Interactions of DprE1 were analyzed by BIOVIA discovery studio client.

Result

The comparisons of predicted docking scores to the experimental affinity of DprE1 inhibitors shows that the docking scores of the model 4P8C are in good agreement with the experimental affinity, with mean errors of -0.79 kcal/mol, the root-mean-square errors of 1.32 kcal/mol, and the mean absolute errors of 0.90 kcal/mol. Our data revealed that the residues Trp323, Tyr324, and Lys297 play critical roles in ligand binding to DprE1 protein.

Conclusion

Our studies on the protein/ligand dockings on the docked complexes have suggested that AutoDuck Vina is very dependable in terms of their predictability of the activity for DprE1 inhibitors.

202457

Optimized quercetin loaded glycerohyalurosomes: A promising approach for wound healing management

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Background

Skin wounds are considered one of the most prevalent lesions that humans could suffer from. Nano-based drug delivery approaches have been explored for promotion of wound healing. Modifying such systems to improve their performance and augment the efficacy of wound-healing agents has recently attracted attention. Thus, our study aimed at development of quercetin loaded hyaluronic acid-modified glycerosomes (glycerohyalurosomes) for wound healing management. Both glycerol and hyaluronic acid

imparts flexibility to the developed vesicles, thus improving actives delivery to the skin. Further, both substances could contribute to wound healing acceleration via improving skin barrier and reducing scars.

Method

Quercetin glycerohyalurosomes were prepared using thin film hydration method. The effects of cholesterol amount (X1), hyaluronic acid concentration (X2), and glycerol percentage (X3) on particle size (PS) were studied using D-optimal response surface design. The results were statistically analyzed using Analysis of variance. Numerical optimization was utilized for prediction of the optimal formulation with minimized size.

Result

The prepared glycerohyalurosomes showed PS ranging from ± 162.33 3.29 to 9.31 ± 478.49 nm. A synergistic significant effect for X1 and X3 was observed on the PS, while an antagonistic effect was observed for X2 at $P \leq 0.05$. In addition, a significant interaction between X3 and either X1 or X2 was shown at the same significance level. The optimized formulation that could achieve the desired goal of minimized size with the highest desirability was predicted as follows: 30.13 mg, 3.69 mg/mL, and %10.64 glycerol for X1, X2, and X3, respectively. The percentage error between the measured size and the predicted one was less than %5.

Conclusion

Thin film hydration method was successfully utilized for preparing quercetin glycerohyalurosomes. The good agreement between the measured size and the predicted one confirms the optimization reliability. Further in vivo studies are currently under investigation to prove wound healing capability.

202458

Study and biochemical evaluation of β-lactam analogues of Combretastatin A-4 as a potent anti-cancer agents

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Background

Nowadays, Cancer is considered a leading cause of death worldwide, nearly 10 million deaths were estimated in 2020, most common types of cancer are Breast, lung, and colon cancer. Many anti-cancer treatments are developed to tackle this disease, one of which is Combretastatin A-4 (CA-4¬) a natural Anti-tubulin agent that binds to the colchicine binding domine. However, photoisomerization instability can limit the use of (CA-4) due to the rotatable Ethylene bridge in its chemical structure, resulting in an inactive Trans isomer. Over the past few years, Rigid analogues were developed to solve CA-4 instability.

Nevertheless, none has reached the market until date. Our aim was to introduce novel stable analogues of CA-4, by replacing the flexible Ethylene bridge with a rigid β-lactam ring, offering analogues with better pharmacokinetic (PK) profile, activity, and potency against breast and colon Cancer.

Method

We used the 3-phenyl-β-lactams (2-azetidinones) scaffold to synthesize 2 novel compounds: (4-Quinolin-3-yl β-lactam) 3 and (4-Naphthalen-3-yl β-lactam) 4, we performed in silico studies to assess PK profile and binding affinity in Colchicine domain, and finally performed In-vitro studies to assess the activity and potency of these novel compounds against MCF-7 and HCT-116 cell lines in comparison with reference compounds: CA-4 and a prototype of rigid β-lactam analogue of CA-4 (4-(4-methoxy)-3-yl β-lactam) 2.

Result

In silico studies showed favorable PK profile and binding affinity for compound 3. In-vitro studies demonstrated comparable activity for compound 3 (IC0.110 = 50 μM in MCF-7, and 0.061 μM in HCT-116) in comparison to compound 2 (IC= 50 0.112 μM in MCF-7 and 0.145 μM in HCT-116) and CA-4(IC0.080 = 50 μM in MCF-7 and 0.041 μM in HCT-116).

Conclusion

We believe that compound 3 is a potential anti-tubulin compound that could possess superior stability along with comparable potency to CA-4 for the treatment of breast and colon cancer.

202463

In silico screening of sesquiterpene coumarin phytoproducts of Ferula asafoetida as potential therapeutic candidates

Abdulaziz Alghazawi, Osama Alshareef , Faisal Albalawi , Faisal Aljohani and Kamel Metwally

Background

Asafoetida is the oleogum resin obtained from the rhizomes and roots of the perennial plant Ferula asafoetida from the Umbelliferae family. The oleogum resin asafoetida is sold in Saudi Arabia under the name “Haltit” and is traditionally used for the treatment of different diseases, such as asthma, flatulence, stomachache, epilepsy, intestinal parasites, weak digestion and influenza. It has also been reported recently to have anti-diabetic, antihypertensive, antioxidant, antiviral, antifungal, cancer chemopreventive, and antispasmodic activities. In terms of chemical constituents, the resin fraction contains ferulic acid, sesquiterpene coumarins and other terpenoids. Recent studies have revealed that assafoetida sesquiterpene coumarins display antiviral, antiangiogenic, and

antitumor activities. These findings motivated us to perform a molecular modelling study to screen the potential therapeutic utilities of the coumarin constituents of assafoetida.

Method

Molecular modeling studies were carried out using Molecular Operating Environment (MOE 2019.0102, Chemical Computing Group, Canada) software. The X-ray crystallographic structure of the studied proteins complexed with appropriate ligands were retrieved from the RCSB Protein data Bank (RCSB-PDB). The ligands were built using the builder tool of the MOE program and subjected to energy minimization. The active site was determined by using the "Site Finder" tool. The 'Site Finder' tool of the program was used to search for its active site. The best docking configurations were selected on energetic basis.

Result

Molecular modeling results indicated that Ferula asafoetida coumarins exhibit appreciable binding affinities to a number of target proteins including vitamin K peroxide reductase (VKOR), monoamine oxidase B (MAO-B), epidermal growth factor receptor (EGFR), and acetylcholinesterase (AChE) and butyrylcholinesterase (BChE).

Conclusion

Sesquiterpene coumarin phytoproducts of Ferula asafoetida are potential therapeutic candidates as anticoagulants, anti-Parkinson's disease, anti-Alzheimer's disease, and cancer chemotherapeutic agents.

202469

Neurobehavioral and Peripheral Inflammatory Responses of Obesity in Young Subjects

Shaden Alzahrani, Bdour Saad Alshalawi, Aliyah Almomen and Amsha Alsegiani

Background

Recent statistics reveal obesity as a becoming serious global health concern, particularly in the young population. Repeated activation of systemic inflammatory pathways caused by obesity triggers neuroinflammation, leading to damages in sensitive brain areas like the hippocampus, responsible for learning and memory. The study examined the cognitive effects of obesity-associated systemic inflammation on human-like species of young obese mice, focusing on memory and retrieval abilities, highlighting the potential link between these effects.

Method

Wild-type male C57BL/6 mice aged 6-4 weeks were fed continuously until becoming obese through a high-fat diet (HFD). Afterward, by using

two of the behavioral neuroscience techniques; Morris water maze and Y-maze spontaneous alterations test, we assessed their learning and spatial memory functions to provide an insight into the cognitive processes involved in navigation and memory formation. Furthermore, there is still ongoing work of using other advanced techniques to measure a variety of cognition biomarkers.

Result

Mice showed a sign of obesity after 2 weeks of HFD. In the MWM test, we demonstrated that obese mice have cognition and motor dysfunction 2 weeks post-HFD and get worse until the end of the study. Notably, Cognitive functions measured by Y-maze presented more significant deficits in obese mice compared to the control group. Moreover, obese mice showed higher peripheral inflammatory responses, as represented by elevated serum levels of peripheral inflammatory cytokine markers.

Conclusion

In this study, we investigate the correlation between obesity, high-fat feeding, and cognitive impairments in young obese mice. Therefore, targeting relevant protein pathways and understanding their possible roles in neuroinflammation will provide promising approaches to treat and prevent obesity and obesity-related mental complications in the young population.

202470

Fabrication and Characterization of axitinib loaded spanlastics; I-Optimal optimization and In-vitro cell proliferation assay.

Bodoor Alanazi, Ruba Alwtaidy, Randa Zaki and Layla Alkharashi

Background

Axitinib is anticancer agent which is used to treat renal cell carcinoma .Axitinib is a new drug which have problems in it's solubility and bioavailability.So in order to solve these problems we have formulated Axitinib laoded spanlastics to improve the cellular uptake of Axitinib consequently improvement in its anticancer activity.

Method

Formulation were prepared by using ethanol injection method with minor modification and design-expert software was used to establish the optimum criteria.The independent variables were the concentration of Sorbitan monostearate, concentration of edge activator and the type of edge activator (sorbitan monooleate or sodium deoxycholate).
The dependent variables were encapsulation efficiency (EE%), Zeta potential, and particle size.

Result

The results of the evaluation were the EE% values ranged from 65.5 to 90.3 and the particle size ranged from 223.2 to 784.4 nm, the zeta

potential values ranged from −23.1 to -45 mv.Then the optimum formula was selected by using Design Expert software,and has a desirability of 0.767 and consisted of 400 mg of span60 and 172.08 mg of SDC. The optimum formula was further characterised by in vitro drug release and cytotoxicity study. The in vitro drug release is higher in the optimum formula compared to the suspension. The cytotoxicity study was done on two human cancer cell lines (MCF-7, OV-2774). The un-coated axitinib spanlastic showed enhanced anticancer activity on both cancer cell lines in comparison to free drug solution. However, the coated axitinib spanlastic formula was more effective in reducing %50 cell viability than the free drug solution.

Conclusion

Axitinib was successfully formulated as Axitinib laoded Spanlastics with higher encapsulation efficiency, higher zeta potential for greater stability and nano-sized vesicles which are important for enhancing the cell delivery for the drug. Furthermore, the optimum formula showed enhanced release indicating higher bioavailability.And it will be more effective in suppressing tumor growth.

202471

The Molecular Modeling on the Binding Site of Mycobacterium Tuberculosis L,DTranspeptidase2 (LdtMt2)

Lujain AlMazyad, Suliman AlMahmoud, Ghadeer AlFuhaydi and Shahad AlSoweed

Background

Tuberculosis (TB) is the most common infectious cause of death. Current TB treatments are insufficient. There is a demanded need for new agents which effective in the treatment of TB. L,D-transpeptidase2 (LdtMt2), involved in cell-wall biosynthesis, is a promising target for the treatment of TB. The β-lactam antibiotics showed a positive effect against TB by inhibiting LdtMt2 . The β-lactam antibiotics have several drawbacks including by cost, stability, and delivery issues. Therefore, there is a giant interest in discovering, and developing new LdtMt2 inhibitors. Here we run molecular modeling studies for several 3D crystal structures of LdtMt2 to define and determine a model that is able to predict the binding affinity of LdtMt2 inhibitors. In addition, we studied the crystal of LdtMt2 inhibitors complexed to identify the main amino residues that is responsible for LdtMt2 inhibitors interaction. Our data a satisfactory structural basis of LdtMt2 to assist the designing and development new LdtMt2 inhibitors.

Method
The Molecular docking of LdtMt2 inhibitors run by AutoDuck Vina against X-ray crystal structures of LdtMt2 which are downloaded from The Structural Bioinformatics protein data bank (RCSB). The ligand-protein Interactions were analysed by BIOVIA discovery studio client.

Result
The docking scores of the model 3VYP are in good agreement comparing to experimental affinities, with low errors: average mean errors were -0.87 kcal/mol, root-mean-square errors were 1.86 kcal/mol, and mean absolute errors were 1.51 kcal/mol. The residues M303, Y408, Y318, F334, H336, W340, H452, C354, and N456 are important for ligand binding to 3VYP protein, according to our results.

Conclusion
AutoDuck Vina is reliable in terms of their predictability of the activity for LdtMt2 inhibitors based on the study of the protein/ligand dockings on the docked complexes.

202480
Garcinol attenuates HCC experimentally induced in rats via inhibition of tumor cells invasion

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Background
Hepatocellular carcinoma (HCC) is a prevalent form of primary liver cancer, and its five-year survival rate is as low as %18. It is crucial to discover new drugs that do not result in resistance. Garcinol, a polyisoprenylated benzophenone found in Garcinia fruit, exhibits antioxidant, anti-inflammatory, and antitumor activities. Our study aimed to determine whether garcinol could inhibit tumor invasion and demonstrate potential antitumor activity against HCC in rats.

Method
Rats were given thioacetamide to induce HCC. Some rats were also administered garcinol orally for 16 weeks at a dosage of 50 mg/kg. The extent of liver impairment was assessed by measuring serum α-fetoprotein (AFP) and examining liver sections stained with hematoxylin/eosin or anti-VEGF antibodies. The expression levels of mRNA and protein of various factors such as matrix metalloproteinase (MMP)-2 and -9, tissue inhibitor of metalloproteinase (TIMP)-1 and -2, vascular endothelial growth factor (VEGF), SMAD4 and fascin were analyzed in the liver tissue of rats.

Result
Our research has shown that Garcinol can be effective in improving the survival rate of rats by reducing the levels of serum AFP and hepatic nodules. Additionally, we have

discovered that garcinol can greatly improve the appearance of HCC-induced vacuolated cytoplasm by reducing the number of apoptotic nuclei and necrotic nodules. Lastly, we have found that garcinol can be used to downregulate VEGF, MMP2, MMP9, SMAD4, and fascin, which are associated with overexpression of TIMP-1 and TIMP-2.

Conclusion

Garcinol possesses promising anti-tumor properties that could potentially prevent the development and progression of HCC. This bioactive compound has been shown to increase the overall survival rates and reduce both serum AFP and the tumor burden in animal models of HCC. Finally, garcinol inhibits tumor invasion.

202483

Potential protective effect of apremilast in liver injury induced by cisplatin in the rat.

Fatimah Hemdi, Btool Albeladi and Rana Albarqi

Background

Cisplatin (CIS) is one of the most widely used drugs in cancer chemotherapy. The hepatotoxicity of CIS is one of the major side effects. Apremilast (APR) has been recognized to have antioxidant and anti-inflammatory activity in in-vivo and in vitro models. The present study aimed to examine the promising prophylactic properties of APR concerning hepatic tissue damage caused by CIS.

Method

Low dose 5mg/ kg for 21 days S.C injection of CIS for induction of chronic liver injury. A total of 24 wistar rats, animals are going to be used in four different groups. In control groups rats administered SC injections of DMSO once daily for 21 days. CIS group administered SC injections of CIS (5mg/kg) once daily for 21 days. APR group administered APR (5 mg/kg) once daily for 21 days. CIS + Apr group administered Apr (5 mg/kg) orally before CIS (5mg/kg) SC injection once daily for 21 days.

Result

Administration of a lower dose of CIS 5 mg/kg for 21 days produced a significant increase in ALT and AST liver enzymes, hepatic malondialdehyde (MDA), tumor suppressor protein (p53), tumor necrosis factor-alpha (TNF-a), Caspase-3, histone deacetylases (HDAC), interleukin 6, interleukin 1 beta, adenosine levels and hydroxyproline levels and a significant decrease in hepatic glutathione (GSH) levels as compared to control group. Treatment with Apremilast for 21 days significantly attenuated unfavorable changes in these parameters. According to histopathological findings, APR significantly reduced CIS-induced inflammation and degeneration in the liver.

Conclusion

These results suggested that APR alleviates CIS-induced hepatic toxicity in rats which might show a novel therapeutic potential for managing these toxicities.

202511

Evaluating anticancer activity of emodin on PKC/ADAMTS4 pathway in thioacetamide-induced hepatocellular carcinoma in rat

Rahaf Alatawi, Waleed Khubrani , Salman Alqaisi and Mohammed Al-Gayyar

Background

Emodin is a naturally occurring anthraquinone derivative. It has been proven to possess a wide range of pharmacological activities, including neuroprotective, antitumor, and anti-inflammatory activities. This research aims to assess the anticancer activity of emodin against hepatocellular carcinoma in rat models using the proliferation, invasion, and angiogenesis biomarkers.

Method

Rats were categorized into four groups: control group, treated-control group, hepatocellular carcinoma (HCC) group, and treated-HCC group. Assessment of the liver impairment and the histopathology of liver sections were investigated. Hepatic expression of both mRNA and protein of the oxidative stress biomarkers; HO-1, Nrf2, the mitogenic activation biomarkers; ERK5, PKCδ, the tissue destruction biomarker; ADAMTS4, the tissue homeostasis biomarker; aggregan, the cellular fibrinolytic biomarker; MMP3 and of the cellular angiogenesis biomarker; VEGF were measured.

Result

Emodin increased the survival percent by about 1.7 times of the HCC group. Moreover, it reduces the number of hepatic nodules by %77 compared to the HCC group. Besides, emodin reduced the elevated expression of both mRNA and proteins of all PKC, ERK5, ADAMTS4, MMP3, and VEGF compared with the HCC group. On the other hand, emodin increased both the reduced expression of mRNA and proteins of Nrf2, HO-1, and aggrecan compared with the HCC group.

Conclusion

Emodin is a promising anticancer agent against HCC, preventing the cancer prognosis and infiltration. It works through many mechanisms of action, such as blocking oxidative stress, proliferation, invasion, and angiogenesis.

202518

Garcinol Attenuated Gastric Ulcer Experimentally Induced in Rats via Affecting Inflammation, Cell Proliferation and DNA Polymerization

Waleed Khubrani, Rahaf Alatawi ,Yousef Alatawi , Marwan Alhablani , Fahad Al-Rashidi , , Salman Alqaisi , Mohammed M H Al-Gayyar and Hanan M Hassan

Background

Gastric ulcer (GU) is one of the most critical gastrointestinal tract disorders that widely distributed all over the world with about %10 prevalence. Garcinolis a polyisoprenylated benzophenone that is present in Garcinia fruit peel and leaves with antioxidant and anti-inflammatory properties. Therefore, we conducted this study to assess the protective effects of garcinolagainst GU experimentally induced in rats. We investigated garcinol effects on DNA polymerization markers (mTOR and cyclin D1), cell proliferation markers (PCNA) and inflammatory markers (COX2, TNF-α and IL-1β).

Method

We used a single oral dose of 80 mg/kg of indomethacin to induce GU in rats. Part of the rats were treated with 50 mg/kg garcinol. Gastric tissues were used for investigation of gene and protein expression of mTOR, cyclin D1, PCNA, COX2, TNF-α and IL-1β. In addition, sections from gastric tissues were used for investigation of cell structure.

Result

The sections of gastric tissues showed degeneration of epithelial cells with infiltration of inflammatory cell. Treating GU rats with garcinol inhibited infiltration of inflammatory cells and improves the structure of gastric cells. Moreover, treatment with garcinol significantly decreased the expression of mTOR, cyclin D1, PCNA, COX2, TNF-α and IL-1β.

Conclusion

Garcinol produced therapeutic effects against experimentally induced GU in rats. The protective effects of garcinol could be referred to its ability to reduce the gene and protein expression of DNA polymerization markers, cell proliferation markers and inflammatory markers.

202539

Targeting the Shikimate Kinase in Acinetobacter baumannii: Identifying Antibacterial Compounds through a Structure-Based Computational Approach.

Marwah Alhamadah, Futun Alshehri and Mansour Alturki

Background

Misuse and overuse of antibiotics and microorganisms' ability to evade treatment cause multidrug resistance (MDR), which lessens the efficacy of antibiotics over time. Acinetobacter baumannii is a particularly dangerous pathogen due to its ability to acquire or enhance resistance determinants. The metabolic process known as the shikimate pathway (SP) is present in A. baumannii, and it connects

carbohydrate metabolism to the production of chorismate. Chorismate is a precursor for essential molecules such as aromatic amino acids and folate. Because the shikimate pathway is absent in mammals, it has been identified as a promising target for antimicrobial drugs. Continuous research is being conducted on developing inhibitors that target enzymes in this particular pathway.

Method

7650 drugs were retrieved from the Zinc 15 database and then prepared and filtered using Maestro software. Then, molecular docking was performed on the crystal structure of the shikimate kinase A. baumannii protein retrieved from the Protein data bank (PDB code: 4Y0A).

Result

High Throughput Virtual Screening (HTVS) and Shape-Based Screening provided us with 9 hits (Mepiroxol, Gallic acid, Oxipurinol, Mesalazine, Paraben, Piracetam, Oteracil, 4-aminosalicylic acid, and Oxiracetam). Results indicated that the molecule fits well within the shikimate binding site.

Conclusion

Our study suggests that the 9 final hits have the potential to be a candidate for repurposing as an antibacterial drug against shikimate kinase A. baumannii. Future research will investigate 9 potential agents against A. baumannii with molecular dynamics and in vitro studies.

202577

Repurposing drugs for enhanced efficacy and bioavailability in the treatment of colorectal cancer

Batool Alhamdan

Background

Colorectal cancer is the second leading cause of cancer-related deaths globally and the first cause of death among all types of malignancies in Saudi Arabia. The annual rise in the number of new cases, simultaneously the lack of effective therapies highlights the need for novel therapeutic approaches. Acetazolamide, a carbonic anhydrase inhibitor reduces cancer cell proliferation. Anti-fungal agent, Griseofulvin has shown cytotoxic effect by induction of cell apoptosis and cell cycle arrest. Combination of Acetazolamide and Griseofulvin offers a new promising treatment for colorectal cancer and microsphere formulation aid to achieve prolonged levels of drugs in the systemic circulation.

Method

Different ratios of Microspheres formulations was prepared by ionotropic gelation technique using a combination of sodium alginate and HPMC as polymers and underwent several characterization studies including different scanning calorimeters, In-vitro drug release, molecular docking, and micromeritic studies. Furthermore to assess the

anticancer activity of the formulations an Anti-cancer in vitro analysis, Apoptotic DAPI (6,'4-diamidino-2 phenylindolenuclear staining), Superoxide Dismutase (SOD) Assay, Glutathione Reductase (GR) Assay and Glutathione Peroxidase (GP) Assay were conducted.

Result

The microsphere formulation of Acetazolamide and Griseofulvin in combination demonstrated cytotoxic action against HCT-116 cells. Molecular docking confirms that Acetazolamide-Griseofulvin combination showed cooperative binding in the ERK active site and are well aligned with the overlay of the crystallized inhibitor. In vitro drug dissolution test preformed for different formulations showed a satisfactory drug release of both Acetazolamide and Griseofulvin.

Conclusion

The novel combination of acetazolamide and griseofulvin supported by the in vitro testing and studies performed throughout this research demonstrates a promising result that may prompt the advancement of colorectal cancers treatment pathways.

202580

Formulation Characterization And In Vitro Evaluation Of Losartan Potassium Microspheres By Ionic Gelation Method Using Natural Polymers.

Mujtaba Aljasim, Hussain Alsadah and Ashfaq Ahmed Mohsin

Background

Losartan Potassium is an antihypertensive drug called angiotensin II receptor blockers is a highly water-soluble drug. Losartan Potassium has shorter half-life of 2-1.5 hrs. and after oral administration mostly it is degraded in the liver and does not show prolonged effect. The objective of the present work was to formulate and evaluate Losartan potassium sustained release microspheres using hydrophilic polymers hydroxypropyl methylcellulose, sodium alginate and calcium chloride as encapsulating material and cross-linking agent with an aim to prolonged and sustained the drug release with an improve the bioavailability.

Method

Losartan potassium sustained release microspheres were prepared by ionotropic gelation method. The prepared microspheres were evaluated by flow properties such as angle of repose, Hausner's ratio, compressibility index, particle size, % yield, encapsulation efficiency and drug release profiles.

Result

All the prepared microspheres were spherical and exhibited satisfactory flow properties.

It was found that on increasing polymer concentration of formulations, % yield, the encapsulation efficiency and particle size were increased. The percentage yield of all the formulations were found between %77.72 to %92.82. The average particle size of the microspheres was found in the range of 502µm to 1003µm. Among all the formulations, F3 showed high drug encapsulation efficiency (%64.20). The in-vitro drug release studies revealed that formulation F3 shown sustained effect and it was found to be %94.06 at the end of dissolution studies. The Fourier transform infrared spectroscopy (FT-IR) and differential scanning calorimetry (DSC) studies were carried out for pure drug, polymers and optimized formulation, the studies showed that they were no incompatibilities between drug and polymers used in the study.

Conclusion

Thus it can be concluded that losartan potassium loaded microspheres could be successfully formulated using hydroxypropyl methylcellulose and sodium alginate by ionotropic gelation method to improve patient compliance and increase in bioavailability which give better approach to treat hypertensive condition and the angiotensin receptor blocking action of Losartan potassium.

202584

Chemical Composition, Antibacterial Activity and In Vitro Anticancer Evaluation of Ochradenus baccatus Methanolic Extract

Enas Alrkad, Weam Khojali , Weiam Hussein , Mohammed Break , Ahmed Alafnan , Bader Huwaimel , Nasrin Khalifa , Wafa Badulla , Raghad Alshammari , Lama Alshammari , Rehab Alshammari , Sara Albarak , Tooba Mahboob and Hisham Alshammari

Background

Ochradenus baccatus belongs to the family Resedaceae. It is widely spread in Saudi Arabia and other countries in Southwest Asia. O. baccatus is extensively used in traditional medicine as an anti-inflammatory and antibacterial agent, in addition to being a vital source of food for certain desert animal species. The aim of the present study was to investigate the chemical composition and antibacterial/anticancer activities of O. baccatus methanolic extracts collected.

Method

The O. baccatus extracts were obtained by macerating the crude powder in methanol, followed by filtration and evaporation. Liquid chromatography–mass spectrometry (LC-MS) was used to analyze the methanolic extracts' chemical constituents. Broth microdilution

assay for minimum inhibitory concentration (MIC) determination was used to assess antimicrobial activity, while the extracts' anticancer potential was assessed by sulforhodamine B Assay (SRB) assay.

Result

The results of the antibacterial assay showed that the methanolic extracts from the roots and branches possessed varying degrees of activity against particular bacterial strains, with the highest activity being exerted by the branches' extract against Escherichia coli and Salmonella typhimurium (St), demonstrating MIC values of 15.6 µg/mL and 20 µg/mL, respectively. Furthermore, the SRB cell viability assay revealed that only the branches' extract inhibited the growth of A549 cancer cells, with an IC50 value of 86.19 µg/mL. The LC-MS analysis of the methanolic extracts from the plant's roots and branches was then conducted, resulting in the identification of 8 and 13 major chemical constituents, respectively. Azelaic acid, β-amyrin, and phytanic acid are some of the bioactive compounds that were detected in the extracts via LC-MS, and they are thought to be responsible for the observed antibacterial/anticancer activity of O. baccatus methanolic extracts.

Conclusion

This study confirmed the antibacterial/anticancer potential of O. baccatus methanolic extracts and analyzed their phytochemical constituents. Further isolation and biological screening are warranted to understand the therapeutic potential of O. baccatus.

202585

Generation and Characterization of CYP2E1-Overexpressing HepG2 Cells to Study the Role of CYP2E1 in Hepatic Hypoxia-Reoxygenation Injury

Nouf Alwadei, Mamunur Rashid, Devaraj Venkatapura Chandrashekar, Simin Rahighi, Jennifer Totonchy, Ajay Sharma, and Reza Mehvar

Background

The mechanisms of hepatic ischemia/reperfusion (I/R) injury, which occurs during liver transplantation or surgery, are poorly understood. The central pathophysiological phenomenon of this injury is the formation of reactive oxygen species (ROS). Recent studies suggest that P450 enzymes may contribute to ROS generation, which may occur through their uncoupling and/or release of heme and iron after their degradation. Among P450 enzymes, CYP2E1 is unique because it is considered a leaky enzyme, producing significant ROS through uncoupling in the absence of substrates, accelerating its own degradation and reducing its half-life. In this study, we generated and characterized a HepG2 cell line with

stable overexpression of CYP2E1 to investigate the role of the enzyme in I/R injury in an ex vivo setting.

Method

As a result, GFPtagged CYP2E1 and Control clones were developed, and their gene expression and protein levels of GFP and CYP2E1 were determined using RT-PCR and ELISA/ Western blot analysis, respectively. Additionally, the CYP2E1 catalytic activity was determined by UPLC-MS/MS analysis of 6-hydroxychlorzoxazone formed from the chlorzoxazone substrate. The CYP2E1 and Control clones were subjected to hypoxia (10 h) and reoxygenation (0.5 h), and cell death and ROS generation were quantitated using LDH and flow cytometry, respectively.

Result

Compared with Control clone, the selected CYP2E1 clone showed a 720-fold increase in CYP2E1 expression and a prominent band in the Western blot analysis, which was associated with a 150-fold increase in the CYP2E1 catalytic activity. CYP2E1 clone produced 2.3-fold more ROS and 1.9-fold more cell death in the H/R model.

Conclusion

In conclusion, our HepG2 cellular studies suggest that the constitutive CYP2E1 in the liver may play a detrimental role in hepatic I/R injury.

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Residency Showcase

The primary aim of this endeavor is to facilitate a connection between pharmacy graduates, students, residency program leaders, and current residents. It offers a platform to provide insights into these programs and address any inquiries they may have. This event presents an excellent opportunity for residency programs to not only attract potential candidates but also contribute to the advancement of Pharmacy Residency Programs.

RESIDENCY SHOWCASE PARTICIPANTS

Riyadh 1st Health Cluster

Saudi Arabia, Riyadh

تجمع الرياض الصحي الأول
Riyadh First Health Cluster
وزارة الصحة

Residency program director:
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Director of Pharmacy:
Dr. Amani Albraiki
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The purpose of this PGY1 pharmacy residency program is to build on Doctor of Pharmacy (PharmD) education. PGY1 residencies provide residents with opportunities to practice in a variety of settings to build the experience and knowledge necessary for the provision of patient care. Residents who successfully complete PGY1 residency programs will be skilled in diverse patient care, practice management, leadership, and education, and be prepared to provide patient care, seek board certification in pharmacotherapy (i.e., BCPS) and pursue advanced education and training opportunities including postgraduate year two (PGY2) residencies. The Pharmacy Residency Program (PGY1) is a 24-month program located at King Saud Medical City, Riyadh as well as King Khaled Hospital, Alkharj. We recruit for six residency positions. This program prepares the residents to become a professional clinical pharmacist through a broad range of learning experiences. At King Saud Medical City where most of the clinical learning experiences will take place, we strive to provide the best level of care using a patient-centered care approach. We provide care for a wide range of specialties including, internal medicine, critical care, solid organ transplant, nephrology, pediatrics, oncology, infectious disease, ambulatory care, and cardiology.

Children's Cancer Hospital-Egypt

Egypt, Cairo

مؤسسة مستشفى سرطان الأطفال-مصر
57357
Children's Cancer Hospital Foundation - Egypt

Residency program director:
Dr. Sally Fikry
Sally.fikry@57357.org

Director of Pharmacy:
Dr. Mohamed Nagy
mohamed.nagy@57357.org

Our residents participate in a well-rounded core curriculum with an excellent balance of ambulatory and inpatient experiences. They assume complete responsibility for the inpatient and outpatient care of their patients under the supervision of expert clinical pharmacists. Residents receive training in dispensing pharmacy, IV admixture, clinical round, ICU, Ambulatory care, Multi-specialty clinics, Personalized Medication Management Unit, medication safety, leadership, education, infectious disease and nuclear pharmacy. We are committed to ensuring our residents have strong mentoring. Through both clinical pharmacists and group mentoring, our residents receive guidance to reach their career goals and to put their knowledge into action. Requirements for acceptance: graduation certificate, updated CV, personal statement, and pharmacy practice license.

RESIDENCY SHOWCASE PARTICIPANTS

Cleveland Clinic Abu Dhabi

United Arab Emirates, Abu Dhabi

كليفلاند كلينك أبوظبي
Cleveland Clinic Abu Dhabi
Brought to you by Mubadala

Residency program director:
Dr. Rania El Lababidi
ellabar@clevelandclinicabudhabi.ae

Director of Pharmacy:
Dr. Saad Sultan
SultanS4@ClevelandClinicAbuDhabi.ae

The Cleveland Clinic Pharmacy Residency Program is a two-year program designed to prepare pharmacists for careers in specialized areas of pharmacy practice. The program offers a variety of rotations in both inpatient and outpatient settings, as well as opportunities for research and teaching.

As one of only two accredited programs in the UAE, the Pharmacy Practice Residency (PGY1) program at Cleveland Clinic Abu Dhabi is designed to expose residents to a variety of practice areas in an acute care setting so that they may develop and expand the knowledge and skills required for direct patient care.

In the first year of the residency program, students learn more about how to manage medication-use systems and how to help patients with a wide range of diseases get the most out of their medication therapy.

The goal of the second year is to improve the resident›s clinical knowledge so that they are ready to work in the healthcare system.

Applicants to the pharmacy residency program at Cleveland Clinic Abu Dhabi must satisfy the following eligibility requirements.

Criteria for obtaining a license in the UAE:

Minimum GPA of 3.0 and a 5-year BS in Pharmacy or Pharm.D. Achieve a passing score on the residency entrance exam administered by the Department of Health.

King Fahad Armed Forces Hospital

Saudi Arabia, Jeddah

Residency program director:
Dr. Shaimaa Alsulami
shaima.alsulami@hotmail.com

Director of Pharmacy:
Dr.Hala Al-Buti
halaalbuti@yahoo.com

The pharmacy department at King Fahad Armed Forces Hospital is comprised of a diverse staff clinical pharmacist with a wide range of training and experiences. The general clinical pharmacy diploma program is a two-year program. The pharmacy resident will have the opportunity to learn from clinical pharmacists and pharmacists from every area within the pharmaceutical care team, thereby providing the resident with ample opportunity to learn and grow professionally. During the residency program the resident will have the opportunity to educate colleagues within the profession of pharmacy, as well as other medical professionals, including but not limited to physicians, residents, nurses, dieticians, and medical students. The residents will have opportunities to take on leadership roles, start initiatives, complete a manuscript from a research project, and precept students. The program's goal is to provide the opportunities needed for the residents to progress in the clinical practice of pharmacy to pursue careers in clinical pharmacy, research, and leadership. The available seats at KFAFH are 2 to 4 seats/year.

RESIDENCY SHOWCASE PARTICIPANTS

Prince Sultan Cardiac Center

Saudi Arabia, Riyadh

Residency program director:
Dr. Turki Asiri
Tassiri@pscc.med.sa

Director of Pharmacy:
Dr. Fadwa Alkhuraisi
FAlkhuraisi@pscc.med.sa

General Clinical pharmacy Diploma program (D1/D2) at Prince Sultan Cardiac Center is a 24-month postgraduate program starts usually from October 1st each year. Our residents will have the opportunity to provide pharmaceutical care to the patients in multiple settings, develop independent learning skills, maintain a professional ethic, provide effective patient counseling to patients and their caregiver, understand research principles and contribute in scientific research activities. The rotations in first year will allow the residents to develop skills, competencies and expertise in all aspects of pharmacy practice. In the second year the resident will cover clinical rotations that are designed to develop clinical experience and skills in different areas of pharmacotherapy. The Cardiovascular Pharmacotherapy Specialty Program (R3) is a 12-month postgraduate program starts usually from January 1st each year. The program offers the residents the opportunity to develop into cardiology clinicians in a dynamic learning environment. Many areas in cardiology are available to the resident to gain knowledge and exposure to all aspects in cardiovascular diseases management. The resident will be involved in teaching pharmacy students and D2 residents throughout the residency year. Kindly refer to PSCC and SCFHS manuals for more details.

King Fahad Hospital

Saudi Arabia, Madinah

Residency program director:
Dr. Buthainah Alammash
Balammash@moh.gov.sa

Director of Pharmacy:
Dr. Abdulaziz Almusallam
ajalmusallam@moh.gov.sa

KFH is the first reference hospital for Madinah region, tertiary and teaching center with 500-bed capacity. The hospital offers health services in various specializations.
The Pharmacy Department serves adults and children patients with a mission of providing safe, high-quality pharmaceutical care services that meet patients› needs and satisfaction. Related Departments, Units & Sections: In-Patient Pharmacy, Out-Patient Pharmacy, ER pharmacy, Diabetic Center Pharmacy, Kidney center pharmacy, Narcotic & Control pharmacy Clinical service, Drug information center Consulting clinic. The pharmacy supports clinical pharmacy services and clinical pharmacy unit needs.

The pharmacy supports continuing education and training programs for all pharmacy members Residents are encouraged and sponsored to participate in scientific events and attending conferences to represent the pharmacy department in KFH-Madinah.
Eligibility Requirements:
Applicant must obtain a final acceptance letter from Saudi council for health specialty.
Applicant must submit to Residency Program Director (RPD) by specified deadline:
Graduation certificate Pharmacy school transcript Curriculum vitae Three letters of recommendation.
Passing the interview successfully in which it will be conducted onsite or online at KFH-Madinah.

RESIDENCY SHOWCASE PARTICIPANTS

King Faisal Specialist Hospital & Research Centre

Saudi Arabia, Riyadh

Residency program director:
Dr. Razan Alghunaim
ralghunaim@kfshrc.edu.sa

Director of Pharmacy:
Dr. Mohammad Al Nahedh
MNahedh@kfshrc.edu.sa

PGY1- Residency Program:
Our PGY1- residency program is composed of 2-year training under the auspices of the Saudi Commission for Health Specialties (SCFHS) and the American Society of Health-System Pharmacists (ASHP). The Pharmaceutical Care Division is the place of the first ASHP accredited PGY1 and PGY2 residencies outside the United States. The program starts in October and ends in September of each year. The first year covers staffing in different areas of pharmacy practice (inpatient, outpatient, satellite, and sterile preparation pharmacies), in addition to drug information rotation and administration rotation. The second year is composed of clinical rotations that are designed to develop clinical experience and skills in different pharmacotherapy areas. A broad range of clinical rotations are offered including cardiology, critical care, infectious diseases, internal medicine, parenteral nutrition, pediatrics, transplantation, and hematology/oncology. The specific program for each resident varies based on the resident's interests and previous experience.

PGY2- Residency Program:
PGY2- residency program is composed of nine clinical rotations (five weeks each) in one year of comprehensive clinical training with an emphasis on a specialty area. There are several specialty areas for PGY2- residency program training in KFSH&RC including, cardiology, hematology/oncology, medication-use safety and policy, parenteral nutrition, critical care, infectious diseases and solid organ transplantation.

Prince Sultan Military Medical City

Saudi Arabia, Riyadh

Residency program director:
Dr. Wafa Alfahad
wafa.a.f@hotmail.com

Director of Pharmacy:
Dr. Bandar Alharbi
bm-alharbi@psmmc.med.sa

Prince Sultan Military Medical City (PSMMC): Is a tertiary care medical center, established in 1979. It has had a leading record in many medical achievements, and it is one of the most advanced centers in the Middle East. Pharmacy department is one of leading departments at the medical city and it has been always one of the biggest training sites. The clinical services continue to grow with more than twenty-two clinical pharmacists in different clinical areas. Prince Sultan Pharmacy Residency Program started in 2002, one of the first hospitals established program in our region. Thirty-six clinical pharmacists were graduated from the residency program in different specialty. Currently, twenty-two clinical pharmacists covering different specialty in the hospital. Most of PGY1 core rotations offered by our hospital.

RESIDENCY SHOWCASE PARTICIPANTS

Security Forces Hospital

Saudi Arabia, Riyadh

Residency program director:
Dr. Faisal A. Alqarni
Faisal91alqarni@hotmail.com

Director of Pharmacy:
Dr. Abdullah M. Alzahrani
azahrani@sfh.med.sa

Security Forces Hospital›s Pharmacy Residency Program began in 2001 as one of the oldest pharmacy residency programs in the Kingdom. Our residency program provides a chance to gain more handsome skills through training, experience, and mentorship. A major strength of the program is the presence of a number of preceptors and instructors with many years of experience in various clinical specialties (e.g., nephrology, oncology, infectious disease, pediatric, internal medicine, cardiology, and critical care) and in the areas of management, health outcomes, medication use policy.

Second Health Cluster Central Region

Saudi Arabia, Riyadh

Residency program director:
Amira Aldarwish
aaldarwish@kfmc.med.sa

Director of Pharmacy:
Nayef Alyamani
nalyamani@kfmc.med.sa

The Second Health Cluster (Cluster 2) pharmacy residency program, is a program that consists of two centers in Riyadh. King Fahad Medical City (KFMC) and Prince Mohammed bin Abdulaziz Hospital (PMAH). KFMC is one of the largest tertiary referral hospitals in the Middle East with a total capacity of 1095 beds. Leading the transformation of the Ministry of Health in Riyadh. The complex consists of four hospitals: maternity, specialist, rehabilitation, and pediatrics. Furthermore, King Salman Heart Centre, Comprehensive Cancer Center, The Obesity, Endocrine, and Metabolism Center and National Neuroscience Institution. PMAH is a 500-bed hospital, that provides secondary healthcare services for the region. It is a hospital that is specialized in in adults, infectious diseases, and trauma. Our mission is to provide high-quality pharmacy practice training, encourage the concept that the pharmacist is responsible and accountable for optimal pharmaceutical care of patients, and develop skills in clinical services providing optimal patient care, teaching, research, and leadership skills. Our program consists of PGY-1 residency program, a 2-year SCFHS accredited residency program that is designed to provide educational training experiences for pharmacists in the fundamentals of pharmacy practice in an organized health care system. PGY-2 residency program, a 1-year focused clinical training in a specialized area. Our PGY-2 programs include: cardiology, pediatrics, total parenteral nutrition, oncology/hematology, and infectious diseases. Our residents will be able to benefit from our program, with the exposure on different specialties and areas in these two large hospitals combined under one program.

RESIDENCY SHOWCASE PARTICIPANTS

King Saud University Medical City

Saudi Arabia, Riyadh

KSUMC Pharmacy Residency Program

Residency program director:
Dr. Afnan Alsuanidi
aalsunaidi@ksu.edu.sa

Director of Pharmacy:
Dr. Abdulaziz Alhossan
alhossan@KSU.EDU.SA

King Saud University Medical City (KSUMC) is a tertiary care academic medical center with decades of experience in multi-facility and multi-disciplinary administration. Our KSUMC Pharmacy Residency Programs are SCFHS full accredited programs. In addition, the Pharmacy Practice Residency Program (PGY–1) is ASHP accredited. Our PGY-2 programs included subspecialties for Ambulatory Care, Cardiology, Critical Care, Hematology/Oncology, Infectious Disease, Internal Medicine, and Total Parenteral Nutrition. With our dedicated outstanding staff, we offer comprehensive training and experience in various pharmacy practice aspects including but not limited to clinical thinking, leadership, education, research, and operations that will equip you with essential skills to allow you to lead and create value

Eastern Health Cluster

Saudi Arabia, Dammam

تجمع الشرقية الصحي
Eastern Health Cluster

Residency program director:
Dr. Nada Alqadheeb
nalqadheeb@moh.gov.sa

Director of Pharmacy:
Dr. Nabil Kamas
NKamas@moh.gov.sa

Eastern Health Cluster consist (EHC) of 22 hospitals and 155 primary care centers, all located in the Eastern Province. The cluster developed a wide array of core competencies such as oncology, neuroscience, cardiac services, medical genetics and organ transplantation. The mission of the E1-Cluster is “to be a leading partner in the Saudi healthcare transformation, focusing on personal health accountability, reducing preventable disease burden in our community, while investing in our people and ensuring the sustainability of our healthcare networks”. Our vision is “Wellbeing and happier lives for a vibrant society” In October 2020, the Saudi Commission for Health Specialties (SCFHS) granted full accreditation to the E1-Cluster pharmacy residency program as the first program to be accredited across several healthcare institutions. The program offers two years of training in pharmacy practice and clinical pharmacy. Residents will be rotating across six different institutions under EHC. Core and elective rotations include Critical Care, Internal Medicine, Infectious disease and Cardiology; Organ Transplant, Total Parenteral Nutrition, Oncology and Nephrology. All accepted residents are fully sponsored by EHC and will have the same access and resource allocation as employees of the EHC. This includes an electronic library that has a substantial list of open-access clinical journals and a research center that provides scientific and administrative support. Furthermore, the model of EHC pharmacy residency program includes a dedicated educational coordinator who helps plan educational activities every week, review the progress of the training and education of all residents, and facilitate the selection of a clinically relevant research idea.

RESIDENCY SHOWCASE PARTICIPANTS

John Hopkins Aramco health care

Saudi Arabia, Dhahran

مركز جونز هوبكنز أرامكو الطبي
Johns Hopkins Aramco Healthcare

Residency program director:
Dr. Mohammed Alhabib
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Director of Pharmacy:
Dr. Fuad Al Ghamdi
Fuad.Ghamdi@jhah.com

The Johns Hopkins Aramco Healthcare PGY1 - Pharmacy Residency Program contribute to the development of highly trained clinical pharmacists, eligible for board certification and for specialized pharmacy residency training (PGY2). Provide two years of full-time experiential training and learning program based on Saudi Commission for Health Specialties' (SCFHS) requirements, best practice, evidence-based guidelines, residents' interests and past experience Prepare residents to act as independent clinical pharmacists by developing their clinical skills, enhancing knowledge to reach the highest level of clinical experience including patient care, research, education, and administration, and improve the residents' leadership skills to develop future clinical pharmacy leaders

King Abdulaziz Medical City - Riyadh

Saudi Arabia, Riyadh

Residency program director:
Dr. Abeer Al Smari
alsmariab@ngha.med.sa

Director of Pharmacy:
Dr. Numan Al Abdan
abdann@ngha.med.sa

The residency program at King Abdulaziz Medical City-Central Region is a two-year program that prepares its graduates to assume positions as advanced level patient care providers and to pursue post-graduate specialty residency training in a focused area of practice. The resident is expected to consider the goals and objectives for each rotation as a foundation for their experience.

Program Structure:
The program provides clinical learning experiences which are generally five weeks in duration. These learning experiences aim at producing a well-rounded pharmacist. The residency program also includes the development and completion of a major project related to pharmacy practice, development of oral and writing communication skills, patient education, participation in various departmental administrative committees, and practice in various pharmacy areas throughout the institution. Upon completion of the program, trainees are awarded a residency certificate. The first year is established to ensure that Saudi pharmacists possess the appropriate skills and knowledge to function effectively in various areas of pharmacy practice. The second year is designed to develop independent practitioners with knowledge and expertise in pharmacy practice. The residency program is a hospital-based experience with emphasis on pharmaceutical care.

Program Information:
Duration: 24 months
Number of positions: 8 for R1 and 8 for R2
Starting Date: first Sunday of October each year
Features and Benefits:
Four-week vacation Educational leave Paid holidays A salary for non-National Guard Health Affairs candidates
Various clinical pharmacy specialties

RESIDENCY SHOWCASE PARTICIPANTS

Hail health cluster
King Salman Specialist Hospital

Saudi Arabia, Hail

تجمع حائل الصحي
Hail Health Cluster

Residency program director:
Dr. Maram Alenazi
Malenazi31@moh.gov.sa

Director of Pharmacy:
Dr. Ali Altebainawi
aaltebainawi@moh.gov.sa

Our residency program carried out at King Salman Specialist Hospital (KSSH) and Cardiac Center in Hail, Saudi Arabia, is recognized as a governmental specialist hospital under the Ministry of Health (MOH). KSSH is a center of excellence in cardiology, oncology, and endocrinology. As well as it›s recognized throughout Hail Region. It is equipped with modern facilities for outpatient and inpatients seeking professional health care. The pharmaceutical care division provides comprehensive, 24-hour computerized services patient-centered care, and an integrated model of pharmaceutical care to both inpatients and outpatients settings. Hail Health Cluster has different clinical practice areas such as anticoagulation, cardiology, drug information, internal medicine, infectious diseases, pediatrics, adult & pediatric critical care, and parenteral nutrition. Pharmacy Residency Program (PGY-1) It is a joint program. Our program has collaboration agreements with different hospitals in Riyadh and Al-Madinah. The two years residency program is designed to provide high-quality training to residents both in general pharmacy practice areas and clinical services.

King Abdulaziz Medical City
Ministry of National Guard-Health Affairs

Saudi Arabia, Jeddah

الشؤون الصحية - وزارة الحرس الوطني
Ministry of National Guard Health Affairs
MNGHA

Residency program director:
Dr. Atikah Alharbi
Alharbiat@mngha.med.sa

Director of Pharmacy:
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Aseerima@mngha.med.sa

King Abdulaziz Medical City – Western Region (KAMC-WR) is a 780-bed tertiary care facility, operated by the National Guard Health Affairs (MNG-HA), that is located in Jeddah, KSA. It provides state of the art practice of medical care services for the eligible patients. The facility includes ambulatory care center with over 500,000 visits per year, cardiac & oncology centers, 50 beds Intensive Care Unit, emergency care, adult & pediatric surgical/medical services, obstetrics/gynecology, pediatric oncology, pediatric ICU, neonatal ICU, and home health care service. In addition, KAMC is affiliated with King Saud bin AbdulAziz University for Health Sciences and other universities. KAMC-WR is accredited by the Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) and Joint Commission International (JCI), which translates to a visible commitment in improving the quality of patient care and ensuring a safe environment. Moreover, KAMC-WR has had a Saudi Commission for Health Specialties (SCFHS) accredited general pharmacy residency (PGY-1) program for more than 15 years and an ASHP accredited PGY1 for more than 10 years. The oncology Pharmacy residency was accredited by the SCFHS on 2013 and candidate for ASHP accreditation. Recently in 2021, KAMC-WR was accredited by the SCFHS for Pediatric and Infectious Diseases PGY2.

RESIDENCY SHOWCASE PARTICIPANTS

King Fahad Central Hospital

Saudi Arabia, Jazan

Residency program director:
Dr. Abdulrahman Fagihi
ahfaqehi@moh.gov.sa

Director of Pharmacy:
Dr. Mujeeb Madkoor
giz-kfh-ph@moh.gov.sa

The pharmacy program in KFCH- Jazan is a fully accredited program with a total capacity of 10 residents; 5 seats entery each year. We run all the core rotations and many of the elective rotations by specialised consultant pharmacists. Jazan is well known of its nice weather and climate all the year with many attractive areas for weekend enjoyment. I trust you will enjoy your learning journay in Jazan.

AlNoor Specialist Hospital

Saudi Arabia, Makkah

Residency program director:
Dr. Ohoud Alsini
Oalsini@moh.gov.sa

Director of Pharmacy:
Dr. Nawaf AlQurashi
Nasalqurashi@moh.gov.sa

The residency program offered at Al-Noor Specialist Hospital is designed to provide comprehensive training and education to Pharmacist graduates in their chosen specialty. Our program offers a range of features and advantages that make it an excellent choice for aspiring Clinical Pharmacist. Firstly, our residency program is known for its strong emphasis on clinical experience. Residents have the opportunity to work closely with experienced mentors and gain hands-on experience in a variety of medical settings such as ICU, Infectious Disease and Cardiac department. This practical training allows residents to develop the necessary skills and confidence to excel in their future careers. Additionally, our program offers a supportive and collaborative learning environment. Residents have access to a wide range of resources, including research facilities and cutting-edge technology. Our faculty members are dedicated to provide mentorship and guidance to help residents succeed in their training. One of the unique advantages of our residency program is the exposure to a diverse patient population. Al-Noor Specialist Hospital serves a large and diverse community, providing residents with the opportunity to encounter a wide range of medical conditions and develop a well-rounded skill set especially during Hajj and Umrah settings.

To be considered for acceptance into our residency program, applicants must meet certain requirements. These include published research in a respected journal, participation in volunteering, clinical experience for more than 6 month under consultant supervision is considered a bonus, working in a full time job will add to the score and passing the necessary licensing examinations. Additionally, applicants must demonstrate strong academic performance, clinical skills, and a genuine passion for their chosen specialty. In conclusion, the residency program at Al-Noor Specialist Hospital offers a comprehensive and rewarding training experience for medical graduates. With its emphasis on clinical experience, supportive learning environment, and exposure to a diverse patient population, our program provides residents with the necessary tools to excel in their clinical careers.

RESIDENCY SHOWCASE PARTICIPANTS

King Khaled eye specialist hospital

Saudi Arabia, Riyadh

مستشفى الملك خالد التخصصي للعيون
King Khaled Eye Specialist Hospital

Residency program director:
Dr. Wejdan Almutairi
wmutairi@kkesh.med.sa

Director of Pharmacy:
Dr. Abdullah AlHumaidan
ahumaidan@kkesh.med.sa

King Khaled Eye Specialist Hospital is the main tertiary ophthalmic referral hospital. in the region. KKESH is a ministry of health facility that operates 250 beds, and occupies a prestigious reputable specialized ophthalmic care center in the world. Since 1983, KKESH has been recognized for excellence in the delivery of ophthalmic. patient care, for its strong educational programs (Including continuing medical education seminar and symposia, and training of ophthalmology residents and subspecialty fellows and other allied health personal), and its highly successful research programs. In 2016, KKESH get the SCFHS accreditation for the Clinical Pharmacy Practice Residency Program which is a hospital- based clinical experience with emphasis on pharmaceutical care. The general clinical pharmacy diploma program is a 2- years. training program. The first year of program is designed to insure that pharmacy. residents possess the appropriate skills and functions effectively in various areas. pf pharmacy practice independently. The second year of the program is designed. to develop independent practitioners with knowledge and expertise in general pharmacy practice. Selection for the residency program is based on criteria such as English proficiency, professionalism, leadership qualities, interest in ophthalmology, research skills, availability of educational resources, critical thinking ability, and reactions to program challenges. Through its Clinical Pharmacy Practice Residency Program, KKESH aims to advance clinical pharmacy practice, enhance patient care, and become a global leader in specialized ophthalmic care.

Hamad Medical Corporation

Qatar, Doha

مؤسسة حمد الطبية
Hamad Medical Corporation

Residency program director:
Dr. Rasha Al Anany
relenany@hamad.qa

Director of Pharmacy:
Dr. Moza Al Hail
malhail2@hamad.qa

The philosophy of the HMC PGY1 Pharmacy Residency Program is to provide structured, advanced educational and training experiences to develop or enhance resident's skills to provide pharmaceutical care to a diverse patient population in a health system environment. The resident will develop knowledge and skills in direct patient care with experiences in both acute and ambulatory care settings, teaching, and research. Additionally, the resident will be mentored in the development of pharmacy leadership skills that will serve the graduate well in a variety of integrated health care systems. Our Program is an American Society of Health-system Pharmacists (ASHP) fully accredited program that offers structured learning experiences spread throughout a 12-month period. Within each planned rotation, learning activities have been tailored according to each site tallow residents to gain the necessary in-depth clinical experience and knowledge. The program will also develop critical thinking, leadership and management skills needed to move forward in the everchanging world of pharmacy practice. More the 30 qualified preceptors are assigned to different learning experience across 6 sites for the residents and their individualized learning plans. Candidates must apply with BSc in Pharmacy Degree transcript and graduation statement and their copy of Qatar Pharmacy License, updated Curriculum vitae, and a letter of Intent. Only top applicant will be interviewed and then only 2 will be accepted for the residency program.

RESIDENCY SHOWCASE PARTICIPANTS

Prince Sultan Armed Forces Hospital-Medina

Saudi Arabia, Medina

Residency program director:
Dr. Fatimah Aljohani
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Director of Pharmacy:
Dr. Tariq Almuzaini
TAlmuzaini79@gmail.com

The PSAFHM clinical pharmacy residency program was established in 2021, With a capacity of 1 seat annually. The purpose of the program is to train inspired pharmacists to develop clinical interprofessional and leadership skills. Duration of the program: 2 years

King Abdulaziz University Hospital

Saudi Arabia, Jeddah

Residency program director:
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Director of Pharmacy:
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King Abdulaziz University Hospital (KAUH) is an academic center with more than 850 beds providing all inpatient and clinical pharmacy services for R1 and R2 residents. Our program offers applicants with varieties of opportunities to foster the development of a well-rounded health care professional. Our goal is to graduate highly skilled and knowledgeable advanced pharmacy practitioners to assume direct patient care positions in certain pharmacotherapy specialties according to the best practice and international standards. Seating Capacity: For the PGY4 :1 seats are available. For the PGY2 :2 seats are available for each program (ICU, ID, IM).

King Abdullah bin Abdulaziz University Hospital

Saudi Arabia, Riyadh

Residency program director:
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Director of Pharmacy:
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King Abdullah bin Abdulaziz University Hospital (KAAUH) is a 406-bedded teaching hospital, accredited by JCIA and CBHAI. KAAUH is located on Princess Nourah bint Abdulrahman University (PNU) campus; the campus hosts an impressive Health Sciences Research Center and the largest Simulation Center in the Middle East.
KAAUH is a hospital with secondary level of care for both adults and children (including neonates) and provide services through ambulatory care (Outpatient, Daycare, and Emergency Department) and in-patient services that includes critical care for adults, pediatrics and neonatal age group.
The Pharmaceutical Care Services at (KAAUH) is providing comprehensive services to all patients with quality of care. It is composed of 5 main sections: Ambulatory Care Pharmacy, Inpatient Pharmacy, Medication Safety/Clinical Pharmacy, Pharmacy Informatics Services, Oncology Pharmacy Services.
Besides theses sections, pharmaceutical care services have supporting units, include: Drug Information & Formulary Management Services, Training & Development unit, Narcotic and Controlled Substance.
The clinical pharmacy residency program at (KAAUH) is a two-year training program. Recently accredited by SCFHS for 4 years as shared training program with an annual acceptance of two trainees.
Future Plans include establishment of clinical pharmacy specialty programs (PGY-2) in the following specialties:
Critical Care, Pediatrics, Drug Information, Oncology/ Hematology, and Cardiology

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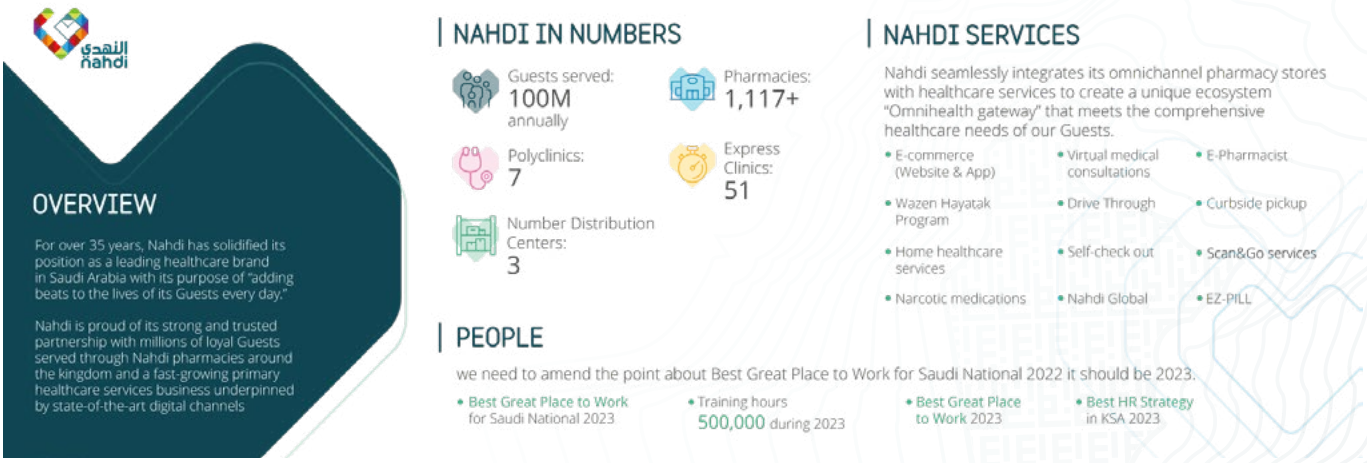

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Exhibitors

Exhibitors

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الإدارة العامة للرعاية الصيدلية
General Administration of Pharmaceutical Care

SFDA
الهيئة العامة للغذاء والدواء
Saudi Food & Drug Authority

Kuwait Pharmaceutical Association

الجمعية الصيدلانية العمانية
Oman Pharmaceutical Society

جمعية الصيادلة البحرينية
BAHRAIN PHARMACISTS SOCIETY

SSCP
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