8 يوم البحث العلمي بكلية الصيدلة
College of Pharmacy Research Day

جامعة الملك سعود
King Saud University
كلية الصيدلة

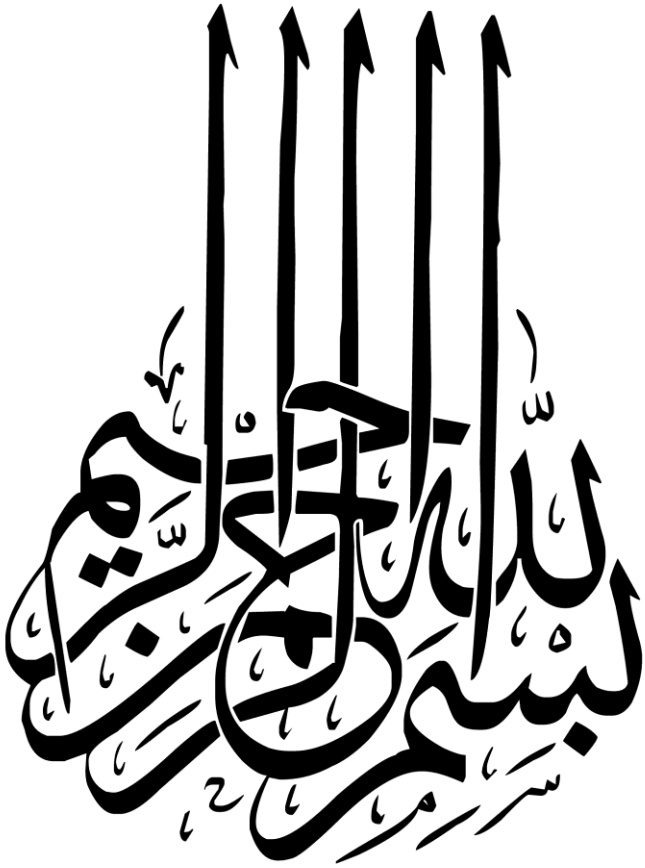


8th College of Pharmacy Research Day

April 25, 26 2018


Abstract Booklet




بسم الله الرحمن الرحيم

Content

About Research Day

The College of Pharmacy Research Day is an annual forum to highlight research projects of final-year undergraduate and post graduate students.

The primary goals of the Research Day are to showcase the various types of research in the College of Pharmacy, share our mutual interests, and develop intra- and interdepartmental collaborations.

The conception of this Research Day was created in year 2007 with the aim of preparing Pharmacy students for presenting their studies at scientific conferences. Thereafter, this effort has continued in which it became mandatory for all final-year students in the College of Pharmacy to participate in this Research Day by presenting their work.

Research Day provides a great opportunity to learn about diverse research ideas being conducted within the College of Pharmacy.

Message from the Dean

Dr. Aws Alshamsan
Associate Professor of
Nanobiotechnology
King Saud University

لا شك بأن البحث العلمي الرصين هو رافد مهم من روافد مهنة الصيدلة، ولن آتي بجديد إن قلت بأهميته للمؤسسة الأكاديمية. فهو وجودة التعليم جناحان تحلق بهما العملية التعليمية. ولقد دأبت كلية الصيدلة بجامعة الملك سعود على الريادة في الإنتاج البحثي كمًا ونوعًا، وذلك لخصوبة مجال الصيدلة ووفرة معطياته المعرفية، ولتميز منسوبي الكلية القائمين على أبحاثها.

وإيمانًا من الكلية بدورها الريادي، فقد رسخت مبادئ البحث في طلابها، وغرست فيهم استشعار أهميته، وأعدتهم بالوسائل والمهارات المناسبة لجعلهم قادرين على إجراء البحوث وفق المنهج العلمي، الذي لم يكن ليتحقق لولا التواصل الجيد بين طلاب الكلية وأساتذتها وإدارتها، فأصبح يوم البحث العلمي بكلية الصيدلة تتويجا لجهد الطلبة وأساتذتهم خلال عملهم في مشاريع التخرج. وتلك لعمري من أسعد اللحظات حيث نرى بوادر ما غرسه اساتذةٌ كرام و طلابٌ مجدون في سعيٍ علميٍ حثيث، يجمعهم هدفٌ سامٍ ألا وهو بناء وطنٍ قوي، عماده العلم و العمل بعد توفيق الله.

أتقدم بخالص شكري لزملائي أعضاء هيئة التدريس على تولي زمام المبادرة في إرشاد الطلاب نحو طرائق البحث العلمي، وتزويدهم بالمهارات اللازمة ليخطوا خطواتهم الأولى فيه. كما لا يفوتني أن أتقدم بجزيل الشكر لإدارة الجامعة على دعمها المتواصل لكلية الصيدلة، إيمانًا منها بمنزلة الكلية كإحدى أهم أذرعة البحث في الجامعة، وأهمية الصيدلة كمهنة تمس صحة المواطن وأمنه.

وفي الختام، اسأل الله عز وجل أن يبارك لنا فيما علمنا، ويعلمنا ما ينفعنا، وأن يديم علينا أمننا وازدهارنا، ويوفقنا لما يحب ويرضى.

د. أوس الشمسان

عميد كلية الصيدلة

Message from the Vice Dean

Prof Norah Alzoman.
Professor of Medicinal Chemistry
King Saud University

بسم الله الرحمن الرحيم
السلام عليكم ورحمة الله وبركاته
بمناسبة يوم البحث العلمي لكلية الصيدلة لبرامج البكالوريوس للدفعة 54 يسعدني تهنئة طلابنا على انجازاتهم الرائعة في هذا اليوم الذي يعتبر لقاء للمساهمة في تقديم الابحاث والمساهمة في منظومة البحث والابتكار وصناعة المعرفة في جامعتنا الرائدة. ولا يفوتني بهذه المناسبة أن اهنئ واشكر جميع اعضاء هيئة التدريس الموجهين للطلاب والمشرفين عليهم لتحقيق خطواتهم الأولى في البحث.

وختاماً أسأل الله للجميع التوفيق وتحقيق المراد وبلوغ الأمل.

د. نورة الزومان

وكيلة كلية الصيدلة

Committees

8th College of Pharmacy Research Day Committee

Maha Meshal Alrasheed, PhD
Chair

Ramzi Ahmed Mothana, PhD
Rapporteur

Nawaf Abdulaziz Alsaif, PhD
Member

Yousef Abdullah Bin Jardan, PhD
Member

Tahani Alshamari, PhD
Member

Nouf Ibrahim Almeshal, MSc
Coordinator

Advisory Committee

Mohammed Nasir Al-Arifi, PhD
Rapporteur

Norah Othman Abanmy, PhD
Member

Nouf Mohamed AlRasheed, PhD
Member

Ebtihal Sulaiman AlAbdullah, PhD
Member

Saleh Abdullah AlSweah, PhD
Member

Tariq Mohammed Alhawassi, PhD
Member

Ebtesam Saad AlSheddi, PhD
Member

Maha Meshal AlRasheed, PhD
Member

Scientific Committee

Lamya Saleh Alnaim, PharmD, PgCert, PgDipl
Rapporteur

Nawaf Abdulaziz Alsaif, PhD
Member

Tahani Alshamari, PhD
Member

Ramzi Ahmed Mothana, PhD
Member

Yousef Abdullah Bin Jardan, PhD
Member

Fadilah Sfouq Aleanizy, PhD
Member

Hadeel Abdulrahman Alkofide, PhD
Member

Ali Saed Alqahtani, PhD
Member

Nouf Mohamed Aloudah, PhD
Member

Monerah Mansour Alwhaibi, PhD
Member

Mohamed Saed AlQahtani,PhD
Member

Musaad Ali Alshammari, PhD
Member

Abdulaziz Mohamed AlHussan, PharmD, MPH, BCPS
Member

Ahmed Aldemerdash, BScPhm, PharmD,BCPS
Member

Organizing Committee

Maha Meshal Alrasheed, PhD
Rapporteur

Ramzi Ahmed Mothana, PhD, PhD
Member

Tariq Mohammed Alhawassi, PhD
Member

Nawaf Abdulaziz Alsaif, PhD
Member

Fulwah yahya Alqahtani, PhD
Member

Yousef Abdullah Bin Jardan, PhD
Member

Raha Saud Orfali, PhD
Member

Nouf Ibrahim Almeshal, MSc
Member

Media Committee

Nouf Ibrahim Almeshal, MSc
Rapporteur

Lama Fahad Alkhader, Msc
Member

Fawaz Mohammed Almutairi
Member

Hanouf Omar Aldeeb, PharmD
Member

Rana Abdullah Almuhaimed, PharmD
Member

Booklet Editorial Board

The Abstract booklet of the 8th College of Pharmacy Research Day, published every year, has been distributed since 2011. The electronic Pdfs can be downloaded from the research day website www.pharmacy.ksu.edu.sa/en/coprd

Principal Editors

Maha Meshal Alrasheed, PhD
Nouf Ibrahim Almeshal, MSc

Associate Editors

Lama Fahad Alkhader, MSc
Rana Abdullah Almuhaimed, PharmD

Review Panel

Ramzi Ahmed Mothana, PhD
Tariq Mohammed Alhawassi, PhD
Nawaf Abdulaziz Alsaif, PhD
Fulwah yahya Alqahtani, PhD
Raha Saud Orfali, PhD
Yousef Abdullah Bin Jardan, PhD

Day 1

Wednesday 25th April, 2018

9:00-10:00 AM **Registration / Poster Setup**

10:00-10:05 AM **Holy Quran**

Welcome address and Opening Remarks

10:05-10:10 AM **Associate Professor Aws Alshamsan**
College of Pharmacy Dean

10:10-10:15 AM **Professor Einas Aleisa**
Vice Rector for Female Student Affairs

10:15-10:20 AM **Professor Badran Alomar**
Rector

Session I

Professor Einas Aleisa, Dr. Sina Alaqeel

Keynote lecture I

10:25- 10:45 AM **Undergraduate Research: The Way Forward**
Dr. Sinaa Alaqeel

Student Oral Presentation

10:50- 12:00 PM

Identification of a novel ETFB missense mutation in a Saudi adult with glutaric aciduria type II
Taghreed Alzahrani - Nora Alkhayyat

Genetic analysis of long QT syndrome in Saudi Arabia: Identification of causative mutations and the role of KCNQ1 and AKAP9
Hanan Abouzaid, Hissah Almohaini

Naringenin enhances the protective effect of losartan against doxorubicin-induced toxicities in rats
Raghad Mustafa, Lulwah Al-Ahmed, Wejdan Al-Yousuf, Raghad Al-Qunebet

Supporting Medication Care in Patients with Systemic Lupus Erythematosus Through Developing a Targeted M-Health Application: A Pilot Study
Maha Alateeki, Alanoud Almeshal

Smart Colored Polymeric Nanofiber loaded with Minoxidil as beauty coverage and restore hair loss
Alya aldahash ,ghada altom ,raghad aljameel , sarah alomair

The Protective Effect of Cardamom Aqueous Extract on Tamoxifen-Induced Acute Pancreatitis in Female Rats
Afra'a Alza'ubi and Nour ALAnazi

Study of natural product impact on prevention of ovarian failure and kidney damage associated with cancer treatment modalities: Effect on oxidative stress and inflammatory response.
Alhanouf aldosari, Raghad bin zaid

12:00-1:00 PM ***Lunch and Prayer***

Day 1

Wednesday 25th April, 2018

Session II

Dr. Nouf Aloudah, Dr.Hazar Yacoub

Student Oral Presentation

1:00-2:10 PM

Prevalence of Complementary and Alternative Medicine Use in Adult Rheumatoid Arthritis Patients in Saudi Arabia: A Cross-sectional Study
Malak AlOwayid, Rawan AlHemiddi, Shahad AlKarni

Liposomal Curcumin Attenuates the Incidence of Oxidative Stress, Inflammation and DNA Damage-Induced by Copper Sulfate in Rat's Liver
Bshayer Al-harbi, Nouf Aldowsari, Azizah Aldosari, Njood Alsaadan

Biological effects of Nephrotoxic-Drugs in Nano-formulation on Human Kidney Cells
Alanood Al-Qahtani, Hessa Alduhailan, Raghed Qadadeh, Aia Soltan

Percutaneous Closure of Patent Foramen Ovale in Patients with Cryptogenic stroke: A Systematic Review and Network Meta-Analysis
Alhanouf Alnafisa, Alhanouf Alessa

The Effect of Camel Placenta Extract on Degraded Osteoarthritic Joints: In Vivo Evaluation
Lamya Alsaggaf, Noor Alhaidar, Fatmah Alsulihem, Nouf Bin awad

Quantitative screening of parabens in Ready-to-eat foodstuffs available in the Saudi market using HPLC-DAD
Munira Almeshal, Hawazin AlOtaibi, Njoud AlOtaibi

Prevalence, Treatments, and Outcomes of Multi-Drug Resistant, and Extensively Drug-Resistant Enterobacteriaceae: A Retrospective Cohort Study
Aseel Alsuwayegh, Daad Almoqbel, Aljawharah Albati, Aljoharah Alsaud

Poster viewing Session and Poster evaluation

2:10-2:30 PM ***Coffee Break***

Session III

Dr. Hana Alzamil, Dr. Aliyah Almomen

2:30- 3:10 PM

Optimizing Vancomycin dosing in pediatrics (O-VIP)
Ashwaq Alharthi, Sharouq Almutairi , Jamilah Alnahdi

Polypharmacy among Patients with Diabetes: A Cross-Sectional Retrospective Study in a Tertiary Hospital in Saudi Arabia
Nouf Alduhaim, Rawan Alabdulali, Hadeel Drweesh

The safety of the most commonly used biological therapies in the treatment of the three leading autoimmune diseases in Riyadh, Saudi Arabia
Haya AlObaid, Nada AlFudhaili, Noura AlShalaan, Rana Albader

Synthesis, Antioxidant Effect and Microbiological Evaluation of New Oxindole Derivatives.
Shahad Alsharqi, Lama Aljuhani, Hessa Alshaya

Day 2

Thursday 26th April, 2018

8:00-8:30 AM **Registration / Poster Setup**

Welcome address and Opening Remarks

8:30-8:40 AM **Associate Professor Aws Alshamsan**
College of Pharmacy Dean

Keynote lecture II

8:40- 9:00 AM **Creating a Successful Research: Idea is the First and the Most**
Fars Kaed Alanazi

Session I

Dr. Fars Kaed Alanazi, Dr. Abdulaziz Alhossan

Student Oral Presentation

9:00- 10:00 AM

The Impact of Resilience, Perceived Organizational Support and Employee Engagement in a Competitive and Stressful Work Environment
Waleed Alkhaldi

Adverse Drug Events in Hospital Settings: Reporting & Fate at a Tertiary Academic Hospital: Cross-Sectional Study
Mohammed Alqasem, Tariq Alhadlaq

Quantification of β-sitosterol and lupeol by HPTLC method in three different species of Astragalus (قتاد) Grown in Saudi Arabia
Abdul Majeed S. Husain and Tariq T. Alnajjar

Factors influencing medication counseling, immunization, and medical services in community pharmacies A cross-sectional study
Mohammed Aljabri, Mohammed Alqahtani

Assessment of Chemotherapy Induced Nausea and Vomiting Control in Oncology Patients Treated With Moderate-Highly Emetogenic Cancer Chemotherapy
Faisal Alreshedi, Ali Aljumayd

10:00-10:30 PM ***Coffee Break***

Session II

Dr. Ali S. Alqahtani

10:30-11:00 AM **Designing Novel Silica Based Drug Delivery Systems**
Hadi Kamal

Day 2

Thursday 26th April, 2018

10:30-11:00 AM **The use of piperine in combination therapy as combined dosage form to increase the efficacy and oral bioavailability of curcumin using self-nanoemulsifying lipid based formulation**

Sofiane Bouchenak

Development and Validation of Liquid Chromatography Method for Simultaneous Determination of a Novel Anticancer Combination of Palbociclib and Letrozole in Mice Plasma and Application in a Pharmacokinetic Study

Mohammed Alsahli

11:00-12:00 PM **Poster viewing Session and Poster evaluation**

12:00-1:30 PM ***Lunch and Prayer***

Keynote lecture III

1:30- 2:00 PM **Natural Products as a privileged source of new chemistry and biological activity**

Prof. Orazio Taglialatela-Scafati

Awards and Closing Remarks

2:00-3:00 **Dr. Aws Alshamsan, PhD**

Dean, College of Pharmacy

Dr. Maha M. AlRasheed, PhD

RD Committee Chairperson

Keynote Speakers

Prof. Taglialatela-Scafati Orazio got the Ph.D. in Pharmaceutical Sciences at University of Naples Federico II in 1997 (tutor prof. Fattorusso) and completed his formation at the University of British Columbia (Vancouver, Canada) under the guidance of Prof. Raymond J. Andersen.
Since 2016 he is Full Professor of Pharmaceutical Biology at the Department of Pharmacy, University of Naples Federico II, where he is also Coordinator of the Master in "Plants of Pharmaceutical Interest" and Scientific Responsible of the Agreement with Shanghai Institute of Materia Medica (China). Research activity in his laboratories takes inspiration from natural products to address problems in various realms of biomedical investigation, from pharmacology and nutrition (new drug leads and health-promoting dietary ingredients) to medicinal chemistry (optimization of natural product drug leads) and cell biology (mechanisms of activity). Prof. Taglialatela-Scafati is Author of over 170 papers on scientific Journals or books (including high-impact journals as *Angewandte Chemie*, *PNAS, Brain*, *Nat Prod Rep*.) and two international patents. In addition, he has co-authored the books "Modern Alkaloids, structure, isolation, synthesis and biology" (Ed. Wiley, 2007) and "Handbook of Marine Natural Products" (Springer, 2012).Prof. Taglialatela-Scafati is Associate Editor in Chief of the journal *Marine Drugs* and member of the Advisory Board of the journals *Steroids, Fitoterapia,* and *Acta Pharmaceutica Sinica.*

Prof. Orazio Taglialatela-Scafati
Professor of Pharmaceutical Biology
University of Naples Federico II

Keynote Speakers

Prof. Fars Kaed Alanazi is Director of Al-Kayyali Chair for Pharmaceutical Industry and the chairman of master program in quality control in pharmaceutical products. He is Professor of drug delivery and industrial pharmacy. He authored nine books and published more than 190 papers. He has been granted with 11 patents. He supervised more 30 master and PhD students locally and internationally. He has been awarded with many international awards and rewarded with number of international medals for his excellence in research. His expertise includes drug targeting, pharmaceutical industry, technology transfer and research management.

Prof. Fars Alanazi
Professor of Drug delivery and industrial Pharmacy
King Saud University

Dr.Sinaa Alaqeel
Associate Professor of Pharmacoeconomics and outcomes research
King Saud University

Dr. Sinaa Alaqeel received her B.S. in Pharmacy from the King Saud University, Saudi Arabia. She earned her M.S. and her Ph.D. from the University of Manchester, the United Kingdom. Currently she is associate professor at the department of clinical pharmacy, college of pharmacy, King Saud University. She held different leadership positions and her academic service activities include numerous committees at the school and university.

Dr Al Aqeel research focus is on medicines optimisation through the safe use of medicines, improved adherence, and effective pharmacy practice. She has a special interest in advocating the need for the application of economic evaluation to the Saudi health policy and medicine prescribing. Alaqeel also co-authored several papers on higher education policy.

Oral Presentations

Abstracts

Abstract Code: PP011

Polypharmacy among Patients with Diabetes: A Cross-Sectional Retrospective Study in a Tertiary Hospital in Saudi Arabia

Student(s) Name: *Nouf Alduhaim, Rawan Alabdulali, Hadeel Drweesh*
Supervisor(s) Name: *Monira Alwhaibi, Bander Balkhi, Tariq Alhawassi*

Abstract:
Background. Patients with diabetes are at high risk for polypharmacy (i.e. use of multiple medications) for treatment of diabetes, associated comorbidities, and other co-existing conditions. This study aims to estimate the prevalence of polypharmacy and factors associated with polypharmacy among adult patients with diabetes.
Methods. A cross-sectional retrospective observational study of adults with diabetes, who visited the outpatient clinic of a tertiary teaching hospital in Saudi Arabia, was conducted. Data were extracted from the Electronic Health Record (EHR) database for a period of twelve-month (January to December 2016). Polypharmacy was defined as the cumulative use of five or more medications. Polypharmacy among adults with diabetes was measured by calculating the average number of medications prescribed per patient. A multivariable logistic regression model was used to examine the factors associated with polypharmacy.
Results. A total of 8,932 adults with diabetes were included in this study. Of these, nearly 78 % had polypharmacy, which was more likely among women as compared to men and more likely among the elderly (age > 60 years) as compared to the adults. Also, polypharmacy was two times as likely among patients with coexisting cardiovascular conditions (AOR=2.89; 95% CI: 2.54-3.29), respiratory disease (AOR=2.42; 95% CI: 1.92-3.03), and mental health conditions (AOR=2.19; 95% CI: 1.74-2.76), and three times as likely among patients with co-existing musculoskeletal disease (AOR=3.16; 95% CI: 2.31-4.30) as compared to those without these co-existing chronic conditions categories.
Conclusions. Polypharmacy is common among patients with diabetes, with an even higher rate in the elderly patients. Health care providers can help in detecting polypharmacy and in providing recommendations for simplifying medication regimens and minimizing medications to enhance the outcome of diabetes care

Abstract Code: PP012

Identification of a novel ETFB missense mutation in a Saudi adult with glutaric aciduria type II

Student(s) Name: *Taghreed Alzahrani, Nora Alkhayyat*
Supervisor(s) Name: *Maha Meshal AlRasheed , Zuhair Al-Hasna, Norah Abanmy*

Abstract:
Background: Glutaric aciduria type II (GAII) is a rare autosomal recessive disorder which interferes with fat and protein metabolism resulting in acidic metabolite accumulation. Its clinical picture is highly variable, ranging from a severe neonatal-onset to mild late-onset form. We aimed to identify causative mutation(s) in an affected young Saudi adult by genetically screening the alpha electron transfer flavoprotein (ETFA), beta electron transfer flavoprotein (ETFB) and electron transfer flavoprotein dehydrogenase (ETFDH), known to cause the disease.
Methods The proband was transferred from King Faisal Specialist Hospital and Research Centre (KFSHRC) in Jeddah to the Medical Genetic Clinic at KFSHRC, Riyadh and studied under the approved Saudi Mendelian disease project. Genetic analysis of the three genes for the patient family and 2 controls was accomplished using PCR and Sanger sequencing. Data were analyzed by Lasergene software and mutation effect was assessed (In Silico) by the bioizformatic prediction.
Results A novel causative ETFB missense mutation (c.263 A>C, p.His88Pro) resulting in changing histidine to proline and another previously reported one (c.571 C>T, p.Arg191cys) were discovered in the proband. The sequence of the novel variant was assessed as probably a pathogenic damaging mutation with a score of 1.00.
Conclusions Two causative missense mutations were discovered in a Saudi young patient with GAII. Our results establish the importance of genetic testing as a clinical tool for counseling in affected families allowing for personalized risk assessment

Abstract Code: PP013

Genetic analysis of long QT syndrome in Saudi Arabia: Identification of causative mutations and the role of KCNQ1 and AKAP9

Student(s) Name: *Hanan Hosny Abouzaid, Hissah Abdulrahman Almohaini*
Supervisor(s) Name: *Maha Meshal Alrasheed, Zuhair Alhassnan*

Abstract:
Background Long QT syndrome type 1 (LQTS1) is an inheritable cardiac disorder which is characterized by phenotypic variability in its clinical manifestation, ranging from no symptoms to sudden death. We aimed to identify the responsible mutations for the disease in five consanguineous Saudi families by screening the KCNQ1 gene. We further wanted to investigate the role of ten variants in AKAP9 and KCNQ1 as potential modifier genes of the LQTS1 syndrome.
Methods Twenty-nine LQTS1 patients from five consanguineous Saudi families were studied as part of an ongoing approved project at KFSHRC. Identification of the causative mutations and the association of four AKAP9 variants (rs11772585, rs7808587, rs2282972 and rs2961024) and six KCNQ1 variants (rs8 234, rs10798, rs2519184, rs2074238, rs151344631 and rs199473403) with QT interval duration and disease severity were accomplished by PCR and Sanger sequencing. Data were analyzed using Lasergene and SPSS software.
Results Five KCNQ1 missense mutations, rs120074177G>A, rs199472763C>T, rs199472805T>C, rs199473662C>T and rs199472794 G>A were discovered to be causative in the studied families. Besides, three

KCNQ1 variants, rs8234_G, rs10798_G and rs2074238_C as well as two AKAP9 variants, rs11772585_T and rs7808587_A were potentially associated with reduced cardiac events and shorter QT interval (465.8±37.9, 465.8±37.9, 368.5±47.3, 467.0±64.7 and 475.4±57.7 ms), respectively. On the other hand, two AKAP9 variants, rs2282972_T and rs2961024_T, were potentially associated with a longer QT interval (480.0±54.7 and 477.4±59.1 ms, respectively).
Conclusion Our study provides an insight into the potential role of modifier genes in LQTS1, allowing therefore for personalized risk assessment. It also demonstrates the importance of genetic testing and counselling.

Abstract Code: PP014

The safety of the most commonly used biological therapies in the treatment of the three leading autoimmune diseases in Riyadh, Saudi Arabia.

Student(s) Name: *Haya AlObaid, Nada AlFudhaili, Noura AlShalaan, Rana Albader*
Supervisor(s) Name: *Lamya Saleh Alnaim*

Abstract:
Background Biological therapy have provided effective therapeutic response for patients with autoimmune diseases. These agents are immune modulators that raised safety concerns. The wide spread of autoimmunity diseases among Saudi population with no significant data for the safety of biological therapy is the major problem. The safety of these medications is needed for reducing harm from medicines through safe and quality use of medicines. In this study our objectives are to assess the safety, classify the main side effect, highlight new safety concern and make recommendations to improve the medication outcomes with minimum adverse effect among Saudi population.
Methods 1. Collect information by reviewing available evidence in pharmacovigilance SFDA and pharmaceutical companies. (Physician's perspective) 2. Collect information from patients by descriptive study (cross-sectional) that includes 115 patients from the Saudi population, aged 18-75 from both genders; excluding pregnant female. (Patient's perspective) 3. Compare data recorded from the survey with patient file to specify some information.4. Collect lab. results from both computerized and handwritten files, and check the biological therapy start date of each patient, in order to compare baseline data and lab result done after treatment. 5. Import collected data into Excel to be analyzed (The statistical analysis was conducted using SPSS), and compare data obtained from SFDA, pharmaceutical companies and real-life patient reported outcomes with the drug profile of each medication.
Conclusions The findings of our study will redound to the benefit of society and coordinating national safety and quality for better health care. Considering that biologic agents play an important role in treating many autoimmune diseases. As a pharmacist, preventing medication-related adverse events is an important role. The research demonstrates new safety concerns, classifies the main side effect, and modifies insufficiencies in the healthcare system and health education in public.

Abstract Code: PP015

The Impact of Resilience, Perceived Organizational Support and Employee Engagement in a Competitive and Stressful Work Environment.

Student(s) Name: *Waleed Alkhaldi*
Supervisor(s) Name: *Mohammed Al-Sultan, and Hussain Al-Omar*

Abstract:
Background: In today's stressful and competitive work environment, pharmacists are viewed as one of the most important assets for most organizations, in particular, service-based organizations. The purpose of this study was to explore and quantify the relationship between resilience, perceived organizational support and employee engagement in a stressful and competitive work environment.
Methods: A cross-sectional study was conducted using an online survey which consists of three well established and validated instruments to measure pharmacists' perceptions regarding employee engagement, resilience, and organizational support was used to collect data from pharmacists with different jobs, sectors, business model and organization.
Results: Of 75 respondents, only 31% of pharmacists admitted that they often feel strong and vigorous in their jobs, 41% find their jobs often inspiring, 30.7% admitted that they are often proud of their work. From resilience point of view, 42.7% of the respondents reported that they are able to bounce back quickly after exposing to a hard time at their work. Only 9.3% of pharmacists they agree that organization considers employees goals and values and 29.3% agree that their organizations support them when they have problems.
Conclusions: The results indicated that perceived organizational support had a significant positive effect on pharmacists' engagement, resilience, normative and continuous commitment. Moreover, resilience has the potential to reframe the challenging nature of pharmacists positions into a more progressive and desirable occupational domain, while perceived organizational support can be used by organizations as a social currency to increase employee engagement and ultimately job performance.

Abstract Code: PP016

Supporting Medication Care in Patients with Systemic Lupus Erythematosus Through Developing a Targeted M-Health Application: A Pilot Study

Student(s) Name: *Maha Alateeki, Alanoud Almeshal*
Supervisor(s) Name: *Haya Almalag*

Abstract:
Background: Systemic Lupus Erythematosus (SLE) patients are young, chronically ill and need constant care. Currently there are no Mobile Health (M-health)

applications for SLE patients in Arabic language. Therefore, our aim was to develop an M-health application for patients with SLE and test the application usability by a pilot of participants.

Methods: User Centered Design, which describes the processes where end-users participate in design, development and, testing of a product, was used. The SLENIC mobile application was developed after interviewing targeted end-users (patients with SLE). It contains medication reminders, Arabic medical content, and online access to healthcare provider. In a pilot study we invited subjects with SLE through the Charitable Association of Rheumatic Diseases to assess the application usability. After providing their consent, and downloading the application, they performed basic tasks without providing help. System usability scale (SUS), a validated tool to assess products usability, was administered, a score of 63 points or higher was used to define high usability.
Results: 15 subjects were involved in interviews to set-up the application and based on their feedback SELENIC was created. Ten participants were recruited to test the usability of the tool, their SUS score was 89.9±10.1.
Conclusion: Patients with SLE showed a need for an M-health application to help them in their medication use. The application we developed seems to be highly usable. After successful implementation, the next step is to expand the testing on a larger population, and study whether the application can impact medical knowledge and medication adherence.

Abstract Code: PP017

Prevalence, Treatments, and Outcomes of Multi-Drug Resistant, and Extensively Drug-Resistant Enterobacteriaceae: A Retrospective Cohort Study

Student(s) Name: *Aseel Alsuwayegh, Daad Almoqbel, Aljawharah Albati, Aljoharah Alsaud*
Supervisor(s) Name: *Hadeel Alkofide, Abdullah Alhammad, Ahmed Aldemerdash*

Abstract:
Background While antimicrobial resistance is emerging and affecting public health, limited data are available in the region regarding resistance rates, treatment approaches, and clinical outcomes for patients infected with resistant gram-negative bacteria. Our objectives were to describe the prevalence of multidrug-resistance (MDR) and extensive drug-resistance (XDR) bacteria within *Enterobacteriaceae* family in the intensive care units (ICUs), commonly prescribed antibiotics, and mortality rate associated with these infections.
Methods A retrospective cohort study conducted from 2015-2018 at the ICUs in King Saud University Medical City. Positive cultures for MDR or XDR *Enterobacteriaceae*: *Klebsiella pneumonia*, *Escherichia coli*, and *Enterobacter* were included. Demographics, microbiological, medications, and mortality data were collected. Descriptive analysis using mean±standard deviation and frequencies were used when appropriate. Ethical approval was obtained.
Results 227 *Enterobacteriaceae* cultures were identified, 46% were MDR (n=95) or XDR (n=8) infections. Average subjects' age was 60±18 years and 54% were females. Almost half of MDR/XDR cultures (46%) were *E. coli*, followed by 37% *Klebsiella pneumonia*, and 18% *Enterobacter* infections. Most MDR/XDR infections were treated with antibiotics (42% with 1 agent, 26% with 2 agents and 23% with >2 agents). Most common agents were piperacillin/tazobactam (53%), carbapenems (47%) and cephalosporins (21.3%). In-hospital death was 86% in MDR/XDR infected patients and cure rate was 40% based on clearance of positive cultures.
Conclusions We noticed high prevalence of resistant *Enterobacteriaceae* infections, that were mostly treated with piperacillin/tazobactam or carbapenems. The high mortality rates associated with these infections warrants the need to assess the effectiveness of regimens commonly prescribed.

Abstract Code: PP018

Optimizing Vancomycin dosing in pediatrics (O-VIP)

Student(s) Name: *Ashwaq Alharthi, Sharouq Almutairi, Jamilah Alnahdi*
Supervisor(s) Name: *Nouf Aloudah, Muneera Albabtain, Zaid Alanizi, Manal Abualker*

Abstract:
Background Vancomycin antimicrobial activity data shows time dependent activity, where the Area-Under-the-level-time-Curve (AUC) for 24 hours divided by the minimum inhibitory level (MIC) of ≥400 best predicts treatment outcomes. Calculating the AUC by the linear-trapezoidal formula is relatively difficult. An innovative approach for calculating AUC using two points was developed. It includes several steps of calculation that involves numerous equations. This study creates a smartphone app that examines the usefulness of this method.
Methods The smartphone app (O-VIP®) was created to calculate the optimal dosage regimen to achieve a vancomycin AUC/MIC >400. The app collects further data and using these information and with the application of several steps of calculations the app calculates the dose for an initial dose population or a dosing adjustment required for a current regimen that did not reach the AUC/MIC >400. An ethical approval to apply this method in Prince Sultan Medical City (PSCC) was obtained.
Results The O-VIP® was examined by two clinical pharmacists. It was well-accepted and using their comments resulted in several changes (O-VIP-1® and O-VIP-2®). The O-VIP-3® is the final version that will be

uploaded in both Android® and Apple® app stores. The O-VIP-3® is linked to an online database that will be active for one year (Nov 2018-Nov 2019), results are still being collected.
Conclusions O-VIP shows that there is a demand for apps in everyday practice of TDM; it appears to save time and efforts. Further research is needed to examine it effect on increased job satisfaction and improved patients' management.

Abstract Code: PP019

Assessment of Chemotherapy Induced Nausea and Vomiting Control in Oncology Patients Treated With Moderate-Highly Emetogenic Cancer Chemotherapy

Student(s) Name: *Faisal Abdullah Alreshedi, Ali Saud Aljumayd*
Supervisor(s) Name: *Wael Hamdy Mansy, Hussain Alomar, Haya Al Salloum*

Abstract:
Background Chemotherapy is one of the main treatment options for cancer. Chemotherapy-induced nausea and vomiting (CINV) has been commonly addressed by cancer patients as ''most unpleasant and distressing'' side effects associated with Chemotherapy. Therefore this study was designed to assess effectiveness of antiemetic regimens used with cancer chemotherapy induced nausea and vomiting (CINV) in adult cancer patients receiving moderate-highly emetogenic chemotherapy.
Methods A prospective observational study was conducted in the oncology center at KSUMC. We utilized the Multinational Association of Supportive Care in Cancer's (MASCC) Anti-emesis Tool (MAT) as to record the incidence of CINV episodes experienced by cancer patients receiving chemotherapy.
Results A total of 34 patients met our inclusion criteria and completed the MAT questionnaire. Most of recruited sample were females (79%) between 19 and 82 years of age with median age of 53. Ovarian cancer composed 44% of cases followed by 17% for either breast cancer or Hodgkin's lymphoma. Regarding the chemotherapy regimens that have been used, we found that carboplatin and doxorubicin-containing regimens represented most of the cases (44% and 41% respectively). Nearly 65% of patients receive a combination of antiemetic regimen composed of (Granisetron 1mg IV 30 min\ Dexamethasone 20mg iv 45min\ Diphenhydramine 50mg iv 30\ Ranitidine 50 mg iv 30min) before chemotherapeutic agents. The anti-emetic regimen produced a significant reduction of both acute as well as delayed N/V.
Conclusions Emesis control regimen in KSUMC is highly effective in reducing both acute and delayed N/V.

Abstract Code: APP059

Adverse Drug Events in Hospital Settings: Reporting & Fate at a Tertiary Academic Hospital: Cross-Sectional Study

Student(s) Name: *Mohammed Alqasem, Tariq Alhadlaq*
Supervisor(s) Name: *Mansour Almetwazi, Wael Mansy, Tariq Alhawassi, Nasser Alqahtani, Ghadah Alhuwyai*

Abstract:
Background Adverse drug events (ADEs) are deemed global dilemma as they are linked to increased morbidity and mortality. ADEs reporting has shown to be a key player to mitigate their consequences, especially when followed by appropriate actions to prevent further occurrences. The aim of this study was to investigate the actions that have been taken by various healthcare providers (HCPs) after each incident of an ADE.
Methods A cross-sectional study was launched based on 5,452 ADEs reports retrospectively retrieved for nine-month time frame between January and September 2017 at a tertiary academic hospital. Descriptive analyses were used to determine the prevalence of ADRs and medication errors.
Results Of 5,452 ADEs reports, 99% represented medication errors cases and 38 cases (1%) represented ADRs. It has been found that 68% of the medication errors were classified as prescribing errors, and nearly one-third (35%) of prescribing error cases were reported as dose and frequency related. Antibiotics and anticoagulants were the most classes of drugs involved in ADEs (33% and 13.6%, respectively). Regarding the actions that have been taken after the ADEs, we found that dose adjustment (30%), medication restriction (15.6%) and medication discontinuation (11.7%) were the most frequent types of actions to either quit or alleviate ADE cases.
Conclusions The study findings indicate that all ADE reports were analyzed and verified by medication safety officers and effective risk-mitigation actions were carried out in the vast majority of ADEs cases. To overcome under-reporting of ADRs, a necessity for more training and educational sessions will be the key elements to enhance reporting culture among HCPs.

Abstract Code: APP071

Factors influencing medication counseling, immunization, and medical services in community pharmacies: A cross-sectional study

Student(s) Name: *Mohammed Aljabri, Mohammed Alqahtani*
Supervisor(s) Name: *Abdulaziz Alhossan*

Abstract:
Background Changes in the profession of pharmacy necessitated reconsidering the pharmacist's role in patient care. Community pharmacists are often the most accessible health care professionals. The services provided in community pharmacies reflect on the profession's position in over-all health care. We explored the barriers and incentives according to community pharmacists in providing their clients with medication counseling, immunization, and medical services.
Methods Descriptive cross-sectional of data we received in response to a validated survey open between November and December 2017 to community pharmacists in Saudi

Arabia. Our respondents included community pharmacists, practicing currently in Saudi Arabia from all nationalities.
Results Our survey was answered by 2239 respondents. The majority (91.6%) believed that pharmacists are capable of running extra services besides dispensing prescriptions. Almost three-quarters of respondents (72.5%) cited "lack of time", and 40.9% cited "lack of space and equipment" as the main barriers for providing services besides dispensing. Customer questions encouraged 91% of participants to counsel. Sixty-seven percent of respondents would like to be certified as immunization providers. Blood pressure measurement (84.1%) and glucose measurement (75%) are the two medical services that can be provided in the community pharmacy setting according to most participants.
Conclusions Community pharmacies can go beyond dispensing to provide more value if some barriers are overcome.

Abstract Code: APP075

Percutaneous Closure of Patent Foramen Ovale in Patients with Cryptogenic stroke: A Systematic Review and Network Meta-Analysis

Student(s) Name: *Alhanouf Y. Alnafisa, Alhanouf S. Alessa*
Supervisor(s) Name: *Hadeel Alkofide, Ahmed Mayet*

Abstract:
Background Recent trails on percutaneous closure of patent foramen ovale (PFO) to prevent recurrent stroke show opposing results from those previously published. Our objective was to compare the efficacy and safety of different PFO closure devices and medical therapy in the prevention of recurrent cryptogenic stroke.
Methods ***Data sources:*** MEDLINE, EMBASE, and Google Scholar from inception through October 2017.
Study selection: Randomized controlled trials comparing PFO closure devices, either head-to-head or versus medical therapy alone, and reported on efficacy outcomes including composite of recurrent stroke, transient ischemic attacks, or deaths, and on safety outcomes including new-onset atrial fibrillation (AF).
Data extraction: 2 investigators independently extracted study data and assessed quality.
Data synthesis: Network meta-analysis was performed using Bayesian random-effects models.
Results Of the 1,279 abstracts screened, 5 trials (n=3,801) comparing PFO closure devices with medical therapy, and 1 (n=660) comparing devices to each other, met our inclusion criteria. In most studies the investigated devices were Amplatzer (AMP), STARFlex (STF), and HELEX (HLX). For the composite outcome, only AMP significantly outperformed medical therapy alone with an odds ratio (OR) of 0.40 (95% credible interval [CrI], 0.19-0.79), while there was no significant effect with STF (OR 0.90; CrI, 0.36-2.60) or HLX (OR 0.52; CrI, 0.19-1.60). Risk of AF was higher with STF and AMP but not with HLX, compared to medical therapy.
Conclusions In PFO carriers with cryptogenic stroke, the effectiveness of PFO closure is device dependent, with AMP showing the highest efficacy against medical therapy, but it increases risk of AF.

Pharmacology and Toxicology

Abstract Code: PT101

Liposomal Curcumin Attenuates the Incidence of Oxidative Stress, Inflammation and DNA Damage-Induced by Copper Sulfate in Rat's Liver

Student(s) Name: *Bshayer Al-harbi, Nouf Aldowsari, Azizah Aldosari, Njood Alsaadan*
Supervisor(s) Name: *Laila Faddah, Ahlam Alhusaini, Iman Hussein*

Abstract:
Background World Health Organization (WHO) estimated that approximately 8.3% of total mortality worldwide could be due to environmental exposure and improper management of metals. Copper sulfate (CuSO4) is widely used in agriculture as fungicide and insecticide. It induces multi-organ dysfunctions due to its ability to stimulate reactive oxygen species (ROS) and oxidative stress. Despite the numerous pharmacological properties of curcumin (CUR); its pharmacokinetic properties are less promising. Hence there is an urgent need for novel effective strategies to attenuate heavy metals toxicities; thus making the health care system more efficient. Liposomal curcumin (L-CUR) improves agent's dissolution, stability, and bioavailability. The objective of this study was to compare the efficacy CUR or L-CUR with that of desferrioxamine (DES) against CuSO4-induced hepatotoxicity.
Methods Forty male albino rats divided into 5 groups, 8 rats/each. Group I was considered as control, Group II received CuSO4, Group III, Group IV and Group V were given DES, CUR and L-CUR respectively. All treatments with fore mentioned antioxidants were administered seven days along with CuSO4.
Results The antioxidants in question markedly ameliorated serum ALT, AST, LD, CRP and hepatic NO, lipid peroxide, GSH and SOD levels as well as protein expression of COX-2 and DNA fragmentation that induced by a toxic dose of CuSO4. Interestingly L-CUR achieved the most hepato-protective effect compared to the native CUR.
Conclusions The current study establishes that L-CUR is considered as a useful tool to prevent liver injury induced by CuSO4. COX-2 protein expression and DNA fragmentation are involved in both CuSO4 toxicity and treatment.

Abstract Code: PT103

The Protective Effect of Cardamom Aqueous Extract on Tamoxifen-Induced Acute Pancreatitis in Female Rats

Student(s) Name: *Afra'a Alza'ubi and Nour ALAnazi*
Supervisor(s) Name: *Hala A. Attia, Naglaa Al-Orabi*

Abstract:
Background Tamoxifen (TAM) is widely used for the treatment of breast cancer. However, TAM induces oxidative stress and hypertriglyceridemia, leading to acute pancreatitis (AP) associated with high mortality and delay in response to treatment. Cardamom is a spice with antioxidant and anti-inflammatory properties. The aim of this study was to investigate the protective effects of cardamom aqueous extract (CAE) on TAM-induced AP in female rats.
Methods Rats were divided into 8 groups (8 rats each) as follows: normal control, CAE control (10 ml/kg, orally), model group administered 45 mg/kg TAM i.p for 10 days, and CAE +TAM groups treated with 4, 6, 8, 10, 12 ml/kg of CAE orally for 20 consecutive days, starting 10 days before TAM injection. Serum levels of amylase, pancreatic lipase and triglycerides (TG) were estimated. Oxidative stress markers [lipid peroxidation, reduced glutathione (GSH) & nitric oxide (NO)] and inflammatory markers including tumor necrosis factor –α and interleukin-6 were measured in pancreatic homogenate. Histological examination with H&E was performed.
Results TAM resulted in significant increase in amylase and lipase indicating pancreatic damage. Lipid peroxides, NO, TG and inflammatory markers were markedly elevated with reduction of GSH. H&E staining showed marked increase in connective tissue septa, inflammatory cells, atrophic acini with epithelial degeneration. Treatment with CAE ameliorated the biochemical deviations and revealed normal acini and marked decrease of the inflammatory cells with the optimum effect produced by the dose 10 ml/kg.
Conclusions Daily administration of CAE could ameliorate TAM-induced AP by alleviating oxidative stress, inflammation and hypertriglyceridemia.

Abstract Code: PT104

Study of natural product impact on prevention of ovarian failure and kidney damage associated with cancer treatment modalities: Effect on oxidative stress and inflammatory response.

Student(s) Name: *Alhanouf aldosari , Raghad bin zaid*
Supervisor(s) Name: *Amira Badr*

Abstract:
Background Cancer treatment is challenging as it affects both cancerous and normal cells. Radiotherapy; one of the most effective cancer treatments; has a profound impact on ovarian as well as kidney function, leading to renal damage and loss of fertility. Loss of fertility becomes a very critical issue especially for young and premenopausal females. Cisplatin; a highly effective chemotherapeutic agent represents the second modality in cancer treatment; is widely used in breast cancer with nephrotoxicity being a limiting side effect. Therefore, the need for effective agents for ovarian and renoprotection is intensified. Natural products represent a good candidate as expected to be relatively free of side effects. However, some herbal drugs may not be as safe as proposed.
Methods The present study investigated the radioprotective effect of Carvacrol or Thymol; from *Thymus Vulgaris;* on γ irradiation-induced ovarian and renal damage in premature females and adult rats respectively, and the effect of cardamom ethanolic extract on cisplatin-induced nephrotoxicity in rats. Biochemical, and histopathological parameters were assessed.
Results It was found that γ-irradiation produced an array of ovarian and renal dysfunction, evident by hormonal changes, follicular development delay, increase of inflammatory marker (TNF-α), oxidative stress as well as apoptotic markers. Interestingly, morphometric analysis showed that Carvacrol and Thymol significantly enhanced follicular development in ovaries. Additionally, they ameliorated the deleterious effects of irradiation on ovarian and renal tissue. However, cardamom didn't show obvious protective effect against cisplatin-induced nephrotoxicity.
Conclusions In conclusion, Carvacrol and Thymol are promising ovarian and renal rescuer during radiation with thymol showing greater effect.

Abstract Code: PT105

Biological effects of Nephrotoxic-Drugs in Nanoformulation on Human Kidney Cells.

Student(s) Name: *Alanood Al-Qahtani, Hessa Alduhailan, Raghed Qadadeh, Aia Soltan*
Supervisor(s) Name: *Khaldoun Al-Romaih, and Norah Albekairi*

Abstract:
Background Nephrotoxicity is a problem associated with many drugs used to treat chronic diseases. Nanoformulation-based therapy is a promising approach towards overcoming drug toxicity. Docetaxel (DTX) is a potent antineoplastic agent and nephrotoxicity secondary to DTX treatment has been recently reported in lung cancer patients, however the underlying mechanism is not known. This study aims to formulate DTX-poly-lactic-co-glycolic acid (PLGA)-nanoparticles (DTX-NPs) and examine its biological effects on human kidney cells.
Methods A calibration curve was constructed from 0.5 to 10 mg/mL of DTX using UPLC-UV-MS at 230nm. DTX-NPs were prepared by dissolving DTX and PLGA in acetone using a modified solvent displacement method. DTX-NPs were characterized for particle size, polydispersity index by High Performance Particle Sizer. Zeta potential was determined by Laser Doppler Velocimetry. xCELLigence real-time cell analysis system was used to optimize cell titration for HEK293 cells, to measure DTX-NPs related toxicity.
Results DTX validation method showed: linear relationship with R^2=0.9989, retention time at 3.2min, LOQ at 0.3ppm, and LOD at 0.1ppm. DTX-NPs with different drug loading (1, 5, 10, and 15%) were characterized for particle size which ranged from (64 to 89nm) and (105 to 142 nm) and have a PDI range from (0.13 to 0.19) and (0.06 to 0.24) using 1mg/mL and 3mg/mL PLGA concentrations, respectively. All the nanoparticles have a zeta potential between (-46.2 and 24.1 mV). HEK293 cells optimal titration of 200,000 cells/mL was determined to measure DXT-NPs effect on proliferation.

Conclusions DTX-NPs therapy may provide an alternative to DTX therapy with lower nephrotoxic effects.

Abstract Code: PT106

Naringenin enhances the protective effect of losartan against doxorubicin-induced toxicities in rats

Student(s) Name: *Raghad Mustafa, Lulwah Al-Ahmed, Wejdan Al-Yousuf, Raghad Al-Qunebet*
Supervisor(s) Name: *Salim Al-Rejaie*

Abstract:
Background Doxorubicin (DOX) is a member of anthracycline antibiotics, is extensively used as an effective and broad-spectrum anti-cancer agent. The present study aimed to examine whether the co-administration of naringenin (NG) a flavonoid and losartan (LOS) an Ang-II can produce additional protective effects against DOX-induced toxicities in rats.
Methods Forty male Wistar rats were used in present study. NG (100 mg/kg/day) and LOS (0.7 mg/kg/day) were treated alone and in combination for total of 21-days. DOX (15 mg/kg) injected on 15th day of NG and LOS treatments. In serum, creatinine kinase-MB (CK-MB), lactate dehydrogenase (LDH), aspartate aminotransferase (AST), alanine aminotransferase (ALT), creatinine, urea, tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6) and interleukin-1β (IL1β) levels were estimated. In heart, liver,and kidney tissues, thiobarbituric acid reaction substances (TBARS), glutathione (GSH), superoxide dismutase (SOD),catalase (CAT) and glutathione peroxidase (GPx) activities were estimated using the ELISA kits.
Results Dox single injection markedly increased the levels of CK-MB, LDH, AST, ALT, creatinine, urea and cytokine levels in serum. Pre and post-treatments with NG and LOS significantly reduced these levels and found effect that is more protective in combined treated group. DOX-induced oxidative stress expressed by increased TBARS levels,and decreased GSH levels and enzymatic activities of SOD, CAT and GPx in cardiac,hepatic and renal cells. NG and LOS treatments inhibited the oxidative stress in organs, however the more significant effect found in combined treated group.
Conclusion Present results support the supplementation of NG an antioxidant along with LOS an ANG-II for inhibition of DOX-induced toxicities in rats. We recommend usage of NG+LOS therapeutically.

Physical Pharmacy & Pharmaceutics

Abstract Code: PH200

Designing Novel Silica Based Drug Delivery Systems

Student(s) Name: *Hadi Kamal*
Supervisor(s) Name: *Aws Alshamsan*

Abstract:
Background Keloid is a skin disorder characterized by abnormal proliferation of scar tissue in the location of a cutaneous injury. To reduce inflammation, patients usually receive corticosteroids injection which is painful and inconvenient to the patient and the compliance is low. Our work aims at developing a formulation that can potentially be used to treat keloids topically without the use of injections.
Methods Amino functionalized mesoporus silica nanoparticles were synthesized, purified, and characterized by using multiple techniques. CHN analysis was performed to determine the amine content followed by TEM imaging. Dexamethasone sodium phosphate was loaded and the EE%, DL%, drug release studies were performed.
Results We successfully loaded dexamethasone phosphate into the mesoporus silica nanoparticle. TEM analysis confirmed the loading of the drug into the nanoparticle with no significant difference in size (around 200 nm).The DL% was 20% and the EE% was 20%. The zeta potential of the loaded silica was **16.5** ± 4.07 m.v. The in-vitro release study showed a controlled release of the drug from the nanoparticle (about 50% over 24 hrs).
Conclusion The results of our system are encouraging. Future experiments will examine the permeability of the nanoparticles by formulating a topical cream/gel and test formulation on ex-vivo permeability and in vivo release.

Abstract Code: PH201

The use of piperine in combination therapy as combined dosage form to increase the efficacy and oral bioavailability of curcumin using self-nanoemulsifying lipid based formulation

Student(s) Name: *Sofiane M Bouchenak*
Supervisor(s) Name: *Majed Alwadei, Abdelrahman Sherif and Mohsin Kazi*

Abstract:
Background Curcumin (Cur) is a well-known natural polyphenol that exhibits anticancer properties. Piperine (PP), a major component of black pepper is shown to increase the bioavailability of curcumin. The study aims to develop Cur with PP using self-nanoemulsifying drug delivery systems (SNEDDS) and convert liquid SNEDDS into solid SNEDDS as combined dosage form to investigate how the adsorption of drug onto an inorganic high surface area material Aerosil® and Neusilin® affects *in vitro* dissolution performance.
Methods Liquid SNEDDS were designed for Cur and PP using black seed/ivy-rue oils with surfactants. Aeropearl® and Neusilin® were used to solidify the liquid SNEDDS. The characterization of the liquid and solid SNEDDS was performed by particle size analysis, scanning electron micrograph, differential scanning calorimetry, Fourier transform infrared spectroscopy and X-ray powder diffraction. The *in vitro* dissolution studies were conducted to investigate the influence of solidification by adsorption on Cur & PP release.
Results The liquid SNEDDS containing black seed/ivy-rue oils showed excellent self-emulsification performance

with transparent appearance. The results of characterization studies showed that solidification using 50% (w/w) Aeropearl® and Neusilin® in the liquid formulation yield free flowing powder but Aeropearl® produced smooth granules than Neusilin® and kept the drugs stable in amorphous state. *In vitro* dissolution studies indicated that solid SNEDDS formulations using Aeropearl® provided high dissolution rate (> 85%) and reproducibility for both Cur and PP.
Conclusions The SNEDDS could be a potential delivery system for Cur & PP as combined dosage form, which can be used against various cancer cells.

Abstract Code: PH202

Smart Colored Polymeric Nanofiber loaded with Minoxidil as beauty coverage and restore hair loss

Student(s) Name: *Alya Aldahash ,Ghada Altom ,Raghad Aljameel , Sarah Alomair*
Supervisor(s) Name: *Fadilah Aleanizy*

Abstract:
Background Minoxidil known to promote hair growth, yet its instability as liquid formula makes it a candidate as nanofiber formulation. The aim is to prepare colored polymeric nanofiber that are loaded with minoxidil as solid formula, upon application on scalp nanofiber would liquefy and release the minoxidil while it's color provide beauty coverage.
Methods 5% PVA, 5% minoxidil and 5% caffeine dissolve in PBS buffer were electrospun at 15 kV over a 20-cm gap, at flow rates of 25 µl/min. SEM used to examine nanofibers' morphology. DSC and dissolution test were carried out to detect the physical state of the minoxidil-loaded nanofiber and drug release, respectively. FTIR and NMR were conducted to detect the stability and compatibility of drug-loaded nanofibers.
Results Electrospining of polymer either empty or loaded yielded optimum fibers with an average diameter 273 nm, 511nm, respectively, where loaded minoxidil showed as beads in nanofiber, representing encapsulation of minoixdil. Thermal analysis of nanofibers displayed distinguish peak between drug and polymer, indicating no chemical interaction. The FT-IR spectrum exhibited characteristic peak of drug and polymer which confirms stability of nanofiber as there is no interaction between functional groups, this furtherly confirmed by NMR spectra. In vitro drug release of minoxidil from nanofiber showed an initial burst release followed by slowed release pattern for up to an hour.
Conclusions Minoxidil loaded polymeric nanofiber fabricated by electrospinning serves as an ideal formulation for such instable drug in liquid formula taking in advantage the attractiveness of it's beauty colored coverage.

Medicinal Chemistry & Natural Products

Abstract Code: MN301

Quantitative screening of parabens in *Ready-to-eat* foodstuffs available in the Saudi market using HPLC-DAD

Student(s) Name: *Munira Abdulaziz Almeshal, Hawazin Abdullah AlOtaibi, Njoud Naif AlOtaibi*
Supervisor(s) Name: *Hadir Mohamed Shalaby*

Abstract:
Background Parabens are wildly used as preservatives in thousands of consumer's products including, cosmetics, pharmaceutical products, and foodstuffs. Concern in regard to the safety of parabens has been raised where parabens have been classified as "Endocrine distributing compounds" with potential link to many tumor types. Despite their wide spread, the occurrence of parabens in foodstuffs available in the Saudi market has not been studied until now.
Methods In this work, an HPLC-DAD method was developed and validated for the screening of parabens' residues in different categories of *Ready-to-eat* foodstuffs collected from the Saudi market. These categories include: cereals, meat, dairy product, fruits, vegetables, cookies and snacks. Chromatographic analysis of the selected parabens (Methyl paraben MeP ,ethyl paraben EtP, propyl paraben PrP, butyl paraben BuP, and isobutyl paraben isoBuP) was performed on Symmetry® C-18 Colum (4.6×75mm,3.5µm) with methanol/water (57:43,v/v) as the mobile phase.
Results The proposed method was fully validated as per the FDA guidelines. The calibration cure was linear in the range 0.125-1250 µg/g for the five parabens with limit of quantitation LLOQ 0.025 µg/g for MeP, EtP, 0.05 µg/g for PrP, 0.125 µg/g for BuP and isoBuP. The method was successfully applied for quantitative screening of the five parabens in different *Ready-to-eat* foodstuffs (n=200) collected from the Saudi market. The total parabens content was determined and was related to the food category and to the packaging material.
Conclusion
Paraben content in some samples was above the acceptable levels. Parabens were abundant in certain food categories, particularly cookies and snacks.

Abstract Code: MN302

Quantification of β-sitosterol and lupeol by HPTLC method in three different species of *Astragalus* (قتاد) Grown in Saudi Arabia

Student(s) Name: *Abdul Majeed S. Husain and Tariq T. Alnajjar*
Supervisor(s) Name:. *Nasir A. Siddiqui*

Abstract:
Background The medicinal importance of β-sitosterol and lupeol motivated the authors for the development of analytical studies and their quantification in three species of *Astragalus* (*A. annularis*, *A. atrosilosus*, *A. siberi*) grown in Kingdom of Saudi Arabia. Such studies have

motive to produce the quality herbal products and cater the need of local population.

Methods The estimation of β-sitosterol and lupeol in methanol extract of all the three species of *Astragalus* was done by high performance thin layer chromatography method. The chromatography was performed on glass-backed silica gel 60 F_{254} HPTLC plates using solvents hexane: ethyl acetate (8:2 *V/V*) as mobile phase. The linearity range considered for calibration graph was 100-700 ng/spot. The developed HPTLC plate was derivatized with p-anisaldehyde and scanned at 522 nm.

Results The concentration of β-Sitosterol was found to be highest in methanol extract of *A. atrosilosus* (0.927µg/mg) and of lupeol in methanol extract of *A. annularis* (0.135µg/mg). The concentration of β-Sitosterol in *A. annularis* and *A. siberi* was found to be 0.735µg/mg and 0.773 µg/mg. The concentration of lupeol in other two species *A. atrosilosus* and *A. siberi* were found to be 0.104µg/mg and 0.089µg/mg, respectively.

Conclusions This study conceives maiden reporting of quantification of β-sitosterol and lupeol in three different species of *Astragalus* by HPTLC method. This study suggests that *A. atrosilosus* (0.927µg/mg) can be used as good source of β-Sitosterol and for lupeol *A. annularis* (0.135µg/mg) emerged as major source. The proposed method can be used for quality check of herbal products for the above mentioned marker compounds.

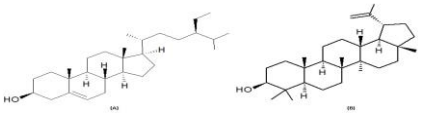


Figure 1: Chemical structure of biomarkers (A) β-Sitosterol and (B) lupeol.

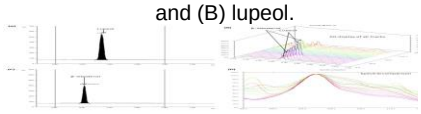


Figure 2: Quantification of β-sitosterol and lupeol in three spp. of *Astragalus*.

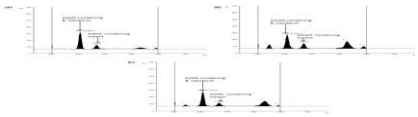


Figure 3: Chromatogram of β-sitosterol and lupeol in three spp. of *Astragalus*.

Abstract Code: MN303

The Effect of Camel Placenta Extract on Degraded Osteoarthritic Joints: *In Vivo* Evaluation

Student(s) Name: *Lamya Alsaggaf, Noor Alhaidar, Fatmah Alsulihem, Nouf Bin awad*
Supervisor(s) Name:. *Raha Orfali, Aliyah Almome*

Abstract:

Background Osteoarthritis (OA) is the most common chronic condition of the joints, affecting 53.3% of male and 60.9% of female in Saudi Arabia, reducing the quality of life. Current OA treatments focus on symptoms alleviation, while new approaches directed toward regenerative medicine are expensive. Based on previous reports indicating the ability of human placental extract to treat OA, the goal of the study is to evaluate the role of camel placental extract (CPE) on the regeneration of damaged cartilage and as an economical alternative to treat OA.

Methods Protein was extracted from fresh camel placenta through enzymatic molecular separation and chemical hydrolysis. The total protein extract was hydrolyzed for a quantitative analysis of the amino acids content using UPLC/MS. The *in vivo* effect of CPE on the eroded osteoarthritic cartilage was tested using a monoiodoacetate (MIA)-induced OA rat model.

Results Quantitative analysis of CPE showed that it consisted of sixteen amino acids, with glutamate composing the majority. CPE intra-articular injections reduced limping and swelling induced by MIA when compared to vehicle treated rats. Although, CPE showed similar results to the diclofenac treated group (positive control) with respect to healing ability, no skin irritation or joint swelling known to occur with diclofenac treatment were apparent. Histopathological analysis and RNA expression levels of matrix metalloproteinase (MMP-2) and (MMP-9) are under processing.

Conclusions Results in this study indicate that CPE might be a promising new economical approach for the management of OA acting possibly by protecting the knee.

Abstract Code: MN304

Development and Validation of Liquid Chromatography Method for Simultaneous Determination of a Novel Anticancer Combination of Palbociclib and Letrozole in Mice Plasma and Application in a Pharmacokinetic Study

Student(s) Name: *Mohammed Alsahli*
Supervisor(s) Name:. *Mohamed Hefnawy*

Abstract:

Background Currently, aromatase inhibitors such as letrozole and endocrine therapies are the standard of care for women with estrogen-receptor (ER)-positive advanced or metastatic breast cancer; however, many patients develop resistance to these therapies. The addition of palbociclib to letrozole significantly improved progression-free survival in women with ER+ and human epidermal growth factor receptor 2-negative (HER2-) advanced breast cancer.

Methods Chromatographies separation was performed on Water Symmetry C18 analytical column (100 Å, 150 mm x 3.9 mm, 5 µm) maintained at ambient temperature. The mobile phase consisted of methanol: 30 mM ammonium acetate (pH 5.5) (60:40, v/v) pumped at a flow rate of 0.8 ml min^{-1} with run time of 5 min.

Results The method was validated over the concentration range of 10-2000 ng mL^{-1} for PLB and 5-2000 ng mL^{-1} for LET ($r^2 \geq 0.998$) in mouse plasma, with a limit of detection (LOD) of 3 and 2 ng mL^{-1}, respectively. Recoveries of both drugs from plasma samples ranged from 94.67 - 99.15 % throughout their linear ranges.

Conclusions In this study, we developed and validated the first simple, sensitive and rapid LC–PDA method for the

quantification of PLB and LET in mouse plasma. This method appears to be very useful for the therapeutic and toxicological monitoring of PLB and LET in clinical practice and for kinetic–metabolic studies of this approved FDA combination therapy. Finally, the developed method was demonstrated to be applicable to pharmacokinetic studies.

Abstract Code: MN305

Prevalence of Complementary and Alternative Medicine Use in Adult Rheumatoid Arthritis Patients in Saudi Arabia: A Cross-sectional Study

Student(s) Name: *Malak AlOwayid, Rawan AlHemiddi, Shahad AlKarni*
Supervisor(s) Name:. *Haya AlMalaq*

Abstract:
Background Rheumatoid arthritis (RA) has become a substantial burden to modern society and is one of the most common chronic autoimmune inflammatory diseases. The prevalence of RA in Saudi Arabia ranges from 0.22-0.3%. The term Complementary and alternative medicine (CAM) refers to any natural products which may be purchased without a prescription. Few studies exist about prevalence of CAM in Saudi RA patients. The main objectives were to determine the prevalence of CAM in Saudi RA patients and most commonly used types of CAM.
Methods A questionnaire-based interview was conducted at rheumatology clinics at the King Khalid University hospital (KKUH), and at the Prince Sultan Military Medical City (PSMMC).
Results A total of 438 patients was recruited from 1st of May 2017 to February 2018. Two-hundred and ninety-two (66.7%) of 438 patients had used CAM. The mean (±SD) age for CAM users was 49(±14) years. Most common CAM users were females (92.1%) compared to males (7.9%). The most frequently used herbal or plant-derived products were honey (15%), ginger (13%), and curcuma (11%). The most highly used minerals and vitamins was vitamin D (47%) and calcium (37%). Most patients (34%) agreed that CAM are safe and (96%) took them because they believed CAM "added benefits".
Conclusion There is a high prevalence of CAM use among RA patients in Riyadh region. Therefore, there is a great need for the education of the public through the media and by health professionals on the use of CAM for the management of RA.

Abstract Code: MN306

Synthesis, Antioxidant Effect and Microbiological Evaluation of New Oxindole Derivatives

Student(s) Name: *Shahad Alsharqi, Lama Aljuhani, Hessa Alshaya*
Supervisor(s) Name:. *Huda S. Al-Salem*

Abstract:
Background Resistance of microbial strains to the existent drugs is one of the most serious problem worldwide which is mainly due to the wrong use of the available antimicrobial drugs. Unfortunately, we still need more researches to produce new antimicrobials that can help us against this problem.
Oxindole family has emerged as a valuable scaffold in medicinal chemistry, possessing diverse range of pharmacological activities. Its value has further been increased by its natural occurrence as alkaloids in variety of plants. A large number of synthetic compounds are known to contain oxindoles moiety and possess useful pharmaceutical properties. Most of these compounds contain a variety of substituents at the 3rd. carbon of oxindole, and many of them are proved to have antibacterial, antiprotozoal, and anti-inflammatory activities. In this research, we designed and synthesized novel oxindole derivatives, then, we tested them for their antioxidant activities which are important to study the availability of the Proton at position 1 for donation, as well as antimicrobial activities.
Methods Chemistry: We started reactions with malonic acid to produce propionic acid using suitable polar solvent and a catalyst. Then, we reacted malonic ester with hydrazine hydrate to produce malonic hydrazide. Finally, we reacted the malonic hydrazide with two different N-substituted oxindoles (methyl and propyl), in addition to the non-substituted one, to have our three new derivatives. Regarding chemical analytical tools: IR , Mass and NMR were used to predict the chemical structure of the formed compounds. Antioxidant assay depends on the following formula: %Inh= [(Abs control- Abs sample)/Abs control]*100, using *DPPH method*, while the antimicrobial ability will be tested using *Agar-Well Diffusion Method* against different gram positive and gram negative bacteria in addition to one fungal strain (*Candida Albicans*).
Results Waiting for the analytical results and the antioxidant results as well as results of microbial evaluation
Conclusion Will depends directly on results.

Poster Presentations

Abstracts

Abstract Code: APP050

Improving Blind People knowledge about medication: A Pilot Study

Student(s) Name: *Bashaer Babaeer, Laila Alkassabi*
Supervisor(s) Name: *Jwaza Alsabhan, Munira Alwhaibi*

Abstract:
Objectives. The blind population still face numerous challenges in communication, health knowledge, medication memorizing and medication use. Evidence indicates that blind patients have a higher rate of medication related as compared to others.
Background To measure the blind participants satisfaction about the information provided on certain medication classes to increase patient's knowledge.
Methods. We did a scientific workshop-the intervention- for blind participants. The workshop covered the following topics: the use of antibiotics, the use of oral contraceptives, the use of vitamin supplements, the use of oral analgesics and medication storage. Information was printed using Braille method. A designed Questionnaire to assess knowledge about the medication was obtained before and after the workshop. We defined medication knowledge as: the patient's ability to understand the detailed information of medication use safely and effectively, knowing the right medication with its right name, use, reason for taking, dose, expiry, storage, refill and side effects.
Results Participants knowledge about medication score was calculated before and after the intervention. Before intervention, the maximum score was 52 out of 55, and the minimum score was 28 out of 11 (Mean = 38.4). After intervention the maximum score was 55 out of 55, and the minimum score was 41 out of 11 (Mean = 47.8) P-value <0.001
Conclusion Our study revealed the importance of scientific workshop for blind patients and meeting their needs to be equally educated with their medications use as rest of general population.

Abstract Code: APP051

Development and Validation of Arabic Version of the Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (Ar-PCOSQ)

Student(s) Name: *Alhanouf Algarawi, Faten Abu-rukaybah*
Supervisor(s) Name: *Sultan Alghadeer, Yazed Alruthia, Mashael Alshebaili*

Abstract:
Background Polycystic Ovary Syndrome (PCOS) is the most prevalent endocrine disorder among women of reproductive age, and it is associated with a comparatively poor health-related quality of life (HRQoL). The Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (PCOSQ) is a disease-specific questionnaire to measure the HRQoL in women with PCOS. A variation in validity and reliability of PCOSQ was noticed among women from different ethnicity and cultures. The aim of this study is to develop and validate an Arabic version of the PCOSQ (AR-PCOSQ) and test its reliability on Arabic women diagnosed with PCOS.
Methods. A cross-sectional study using translated and validated questionnaire (AR-PCOSQ) was conducted by interviewing women with PCOS who attended the obstetrics and gynecology clinics at King Khalid University Hospital during the period from November till December 2017. The PCOSQ was first translated into Arabic by a forward-backward process, validated with 10 gynecologists (content validity) and 30 women with PCOS (face validity), and then the questionnaire was conducted on women with PCOS to assess its reliability by detecting the internal consistency via Cronbach's α and determining the test-retest reliability via intra-class correlation coefficient (ICC). Also, factor analysis was utilized to verify the factor structure of Ar-PCOSQ.
Results A total of 117 women with PCOS were interviewed to assess the reliability of AR-PCOSQ. The average age and BMI of enrolled women were 30 years and 27 respectively. Almost 65% of women have post-secondary school degree. The test-retest reliability was good with intra-class correlation coefficients from all domains being above 0.9 (0.911-0.986, P<0.001). The Cronbach's alpha coefficients of internal consistency were above 0.7 in all domains except that for menstrual problems, which scored 0.697. Content validity index (CVI) was 0.9, satisfactory validity. The factor analysis of the Ar-PCOSQ revealed six factors; emotions and feelings, body hair, weight, infertility, menstrual problems and new factor (psychosomatic characteristics). The total percentages of explained variances are 64.44%.
Conclusion It is anticipated that Ar-PCOSQ is valid and reliable to the extent that will make it able to evaluate the effectiveness of treatment, identify the specific needs of patients with PCOS, and to develop appropriate interventions for Arabian women with PCOS.

Abstract Code: APP052

Identifying Trends in Co-prescription of Tamoxifen with CYP2D6 Inhibitors

Student(s) Name: *Khalid Yakout, Ammar Alsharif*
Supervisor(s) Name: *Azher Arafah, Hussain Al-Omar*

Abstract:
Background Tamoxifen is prescribed as adjuvant therapy for breast cancer. CYP2D6 enzyme inhibitors are prescribed to alleviate tamoxifen side effects thus might increase risk of cancer recurrence. Our aims were to identify the prevalence of co-prescription of CYP2D6 inhibitors with tamoxifen and to identify tamoxifen supply coverage.
Methods. This was a retrospective cross-sectional study utilizing pharmacy prescription data of two tertiary hospitals in Riyadh from June 2015 to June 2017. Patients who received at least one tamoxifen prescription were included. CYP2D6 inhibitors that were co-prescribed with tamoxifen were identified. First year supply coverage of tamoxifen in patients who received it for ≥ 1 year was calculated. Descriptive statistics including frequencies, mean and standard deviation (SD) were applied to data.

Results Total of 435 patients received tamoxifen during the study period. Majority of patients were female ≥ 45 years old (52.1%). Around 40% of patients had supply

coverage for ≥ 12 months. Of those patients, 29.7% had supply coverage of < 85% during the first year of prescription. In first year of study, strong and weak inhibitors were prescribed to 0.4 % and 6.4 % of patients, respectively. In the second year there was increase in the prescription of weak inhibitors (8.3%) vs decrease in the prescription of strong inhibitors (0.3%).
Conclusion Increase in co-prescription of weak inhibitors with tamoxifen might increase risk of breast cancer recurrence in patients receiving them given that weak inhibitors are considered contraindicated in moderate metabolizers of tamoxifen. One-third of patients who used tamoxifen for ≥ 1 year did not get enough supply in their first year which might result in increase in mortality in those patients.

Abstract Code: APP053

The Prevalence of Osteoporosis among a Sample of Inflammatory Bowel Disease Patients in Saudi Arabia

Student(s) Name: *Abdulkarim Aljenaide*
Supervisor(s) Name: *Yazed AlRuthia*

Abstract:
Background Patients with inflammatory bowel disease (IBD) are at increased risk of osteoporosis due to a multitude of factors such as the use of corticosteroids, smoking, and vitamin D deficiency. The prevalence of osteoporosis among IBD patients in Saudi Arabia is largely unknown. Therefore, aim of this study was to estimate the prevalence of osteoporosis among a sample of IBD patients in the Kingdom.
Methods. This was an electronic medical records review cross-sectional study of IBD patients. Patients with confirmed diagnosis of IBD and osteoporosis were included in the study. Those with no prescription medications or calcium supplements for osteoporosis were excluded.
Results The number of electronic medical records of IBD patients that were reviewed was 508 records. There were 252 patients with ulcerative colitis (UC) and 256 patients with Crohn's disease (CD). The mean age of the patients was 36 years. The number of patients with confirmed osteoporosis diagnosis was 292 patients (57.48%). Most CD patients (66.41%) had a diagnosis of osteoporosis and were on medications or calcium and vitamin D supplements compared to 48.41% of UC patients (p<0.0001). The diagnosis of osteoporosis among IBD patients was positively associated with female gender (r=0.134, p=0.0025).
Conclusion The high prevalence of osteoporosis among this young population of IBD patients should highlight the need to screen all IBD patients for osteoporosis and optimize their treatment regimen.

Abstract Code: APP054

Utilization Patterns of Non-biological Therapies among Patients with Inflammatory Bowel Disease: Hospital-Based Cross-Sectional Study

Student(s) Name: *Abdulaziz Atham, Ahmed Alanazi*
Supervisor(s) Name: *Yazed AlRuthia*

Abstract:
Background Inflammatory Bowel Disease (IBD) is a debilitating medical conditions that are most prevalent in the western countries with increasing incidence in Saudi Arabia. The disease has been categorized into ulcerative colitis (UC) and Crohn's disease (CD) based on the extent, distribution, and depth of inflammation. The aim of this study was to explore the utilization patterns of non-biological agents among CD and UC patients in a large university affiliated tertiary care hospital.
Methods. This is a cross-sectional chart review study. The medical record numbers of patients with UC and CD were provided by three medical consultants in the department of gastroenterology. The following groups of medications were identified as non-biological agents used in the management of IBD and were linked to the patients' diagnoses: corticosteroids, immunosuppressants, 5-ASA (5-aminosalicylate acid), and antimicrobials. The patients were treated and followed up for at least one year.
Results The medical charts of 508 IBD patients were reviewed in which 252 had UC and 256 had CD. The percentage of patients with CD on immunosuppressants was significantly higher than their counterparts (71.88% vs. 42.46%, p <0.0001). On the other hand, the percentage of patients on 5-ASA agents was significantly higher among UC patients compared to their counterparts with CD (80.95% vs. 12.50%, p<0.0001). No difference was found in the percentages of UC and CD patients on antimicrobials and corticosteroids.
Conclusion Future studies should examined the factors that contributed to the differences in the utilization of immunosuppressants and 5-ASA agents among UC and CD patients.

Abstract Code: APP055

The Utilization Patterns of Biologics among Inflammatory Bowel Disease Patients: A Hospital-Based Cross-Sectional Study

Student(s) Name: *Khalid AlMalki*
Supervisor(s) Name: *Yazed AlRuthia, Bander Balkhi*

Abstract:
Background The biological agents have revolutionized the treatment of Inflammatory Bowel Disease (IBD) and led to significant improvements in the quality of life between patients with moderate to severe IBD. However, their utilization patterns among IBD patients in Saudi Arabia is largely unknown. The aim of this study was to explore the utilization patterns of biological agents among IBD patients at a university affiliated tertiary care hospital.
Methods. This was a cross-sectional chart review study. Patients who are ≥18 years with a confirmed diagnosis of ulcerative colitis (UC) or Crohn's disease (CD) were treated for at least a year were recruited in the study.
Results The number of patients with confirmed diagnosis of UC (n=252) or CD (n=256) were 508 patients. The percentage of CD patients on infliximab was significantly higher than their UC counterparts (41.41% vs. 15.08%, p<0.0001). Likewise, the percentage of CD patients on

adalimumab was significantly higher than their UC counterparts (23.83% vs. 9.92%, p<0.0001). In addition, the percentage of CD patients on certolizumab was significantly higher than their UC counterparts (3.13% vs. 0.00%, p<0.0001).
Conclusion The difference in the utilization rates of different biologics among CD and UC patients should be examined to explore whether this was based on higher response rate among CD versus UC patients in Saudi Arabia or vice versa.

Abstract Code: APP056

Price Analysis of Antidiabetic Drugs Marketed in Arabic Countries

Student(s) Name: *Mohammed Obaidallah Almutairi*
Supervisor(s) Name: *Ahmed Alghamdi*

Abstract:
Introduction The incidence of diabetic in MENA region estimated as 9.7% with annual heath expenditure reached $16.8 billion in 2014. One of the tools to lower diabetes cost is control antidiabetic prices.
Objective To provide an overview and comparisons of the prices of antidiabetic drugs in the four Arabic countries: Saudi Arabia, Jordan, Oman, and Lebanon.
Methods. A cross-sectional study that looked at the prices of antidiabetic drugs marketed in four Arabic countries as of January 2018. Regulatory information and prices were obtained from ministries of health and food and drug authorities. Retail prices were used as a unit of analysis. Prices were converted to 2018 Saudi riyals (SR). Descriptive statistics were performed.
Results Prices of antidiabetic drugs varied by therapeutic classes. Price of insulins varied type, Saudi Arabia had the lowest prices of rapid acting insulins (median 168.00 SR) while Lebanon had the highest (203.00 SR) (P=0.0012). Saudi Arabia had the lowest prices biguanides and sulfonylureas with median prices of (12.55, 22.25 SR respectively). Median DDP4 prices ranged from 113.00 SR in Saudi Arabia to 146.00 SR in Jordan. Median SGLT-2 prices ranged from 159.00 SR in Saudi Arabia to 233.00 SR in Lebanon. Median GLP-1 prices ranged from 416.00 SR in Saudi Arabia to 613.00SR in Oman.
Conclusions The prices of antidiabetic drugs were lower in Saudi Arabia compared to some Arabic countries, which might indicated the usefulness of reference based pricing for such products to lower the increased expenditure in Saudi Arabia.

Abstract Code: APP057

Exploring the knowledge and Perception of Generic Medicine Use among Community Pharmacists in Saudi Arabia

Student(s) Name: *Mohammed Abanmi*
Supervisor(s) Name: *Ahmad Alghamdi*

Abstract:
Background Generic medicines are one of the main avenues for reducing health care spending by all payers. There are no clear guidelines for generic and brand substitution in Saudi Arabia's community pharmacies. Our objectives are assessed knowledge, attitude, perception, factors and current practices among community pharmacists towards generic medicines substitution in Saudi Arabia.
Methods. A cross-sectional study was conducted between November 2017 to January 2018 including licensed community pharmacists from different regions in Saudi Arabia. A 38-item validated self-completed questionnaire, the data were analyzed using SPSS, and descriptive statistics were applied.
Results Out of 1928 responses, 75.8% believed that pharmacists are allowed to change between generic and brand medications without consulting physicians. Almost 30 % believed that generics are less effective than brands. Almost 55.8% of participants support generic substitution where generic is available. However, 67% thinks that promotional activities by pharmaceutical companies plays important role in choosing the dispensed generic product. Generally, 35 % of pharmacists believe they would dispense generic products for their clients. However, 29% believed they would not. The main reasons pharmacists cited for not consulting the physician before substitution was the over the counter drugs (78%), and unavailability of physicians' contact numbers (54%). The two most common reasons for recommending generics were patient demand and cost (79%, 78% respectively).
Conclusion The community pharmacist's knowledge and perception about generic medicines were somehow limited and needs improvement. Patients demand and marketing activities influences the substitution decision. There is a need to implement polices to improve proper use and awareness generic medicines in Saudi Arabia.

Abstract Code: APP058

Evaluation of Colistin use in Saudi Hospitals

Student(s) Name: *Abdulaziz Ahmed Alghamdi, Abdulaziz Saad Alrashed*
Supervisor(s) Name: *Abdullah Alsultan*

Abstract:
Background Colistin is an old antibiotic used for the treatment of multi-drug resistant gram-negative infections. Its dosing is very challenging, and any errors could lead to fatal results. Our objective is to conduct an online survey to evaluate the use of colistin in Saudi hospitals.
Methods. To assess colistin use, a 14-question survey was developed. The purpose of the survey is to collect information on the characteristics of the respondent, availability of colistin, dosing of colistin, units used to dose colistin and frequency of use. The survey was sent on March 1st using the survey website (https://www.surveymonkey.com) to the E-mails of 32 clinical pharmacists from different hospitals. Data was analyzed using Microsoft Excel.
Results So far, only 45.45% of the pharmacists responded to the survey. Respondents in 60% of the hospitals indicated they had patients hospitalized in the last year but did not receive colistin due to unavailability. Most had IV form of colistin (83.3%) and only 33.33% had the aerosolized form. Most respondents (60%) dosed colistin using mg of colistin base, while 40% dosed colistin using

International units. Of the respondents, 40% used ideal bodyweight and 40% used actual body weight to dose obese patients.
Conclusion The dosing of colistin varied widely between hospitals. In terms of both units used to dose colistin and the doses used. A unification of the unit used, and dose calculations is required to minimize the errors that could arise during colistin use.

Abstract Code: APP060

Global Review of Biosimilars Policies and Regulation

Student(s) Name: *NASSER ABDULAZIZ ALWAHBI*
Supervisor(s) Name: *Ahmad Alghamdi*

Abstract:
Background Biosimilars are products that are highly similar to an originator biologic, with no clinically meaningful differences in terms of safety or efficacy. Biosimilars has lower prices compared to originator biologic. The objective of this study is to explore the different policies and legislations regarding biosimilrs.
Methods. A literature search was conducted using PubMed and Embase electronic database. Search terms included biosimilars, biosimilars pricing, and interchangeability. In addition, manual searches were performed in the European Medical Agency (EMA) United States FDA, and Saudi FDA websites databases. Trends in biosimilars approvals, regulations of interchangeability and pricing in the period of 2007-2108 were examined.
Results As of January 2018, there were 38, 9 and 5 biosimilrs approved by EMA, FDA, and SFDA respectively. Biosimilars interchangeability varied between countries. In United Kingdom, Sweden, and Italy the interchangeability and substitution are not allowed. In comparison, countries like Germany, Turkey, automatic substitution is allowed. Generally, the price of the first biosimilar ranged from 9% like in Norway to 35% in some Eastern Europe countries. In the US, the price reduction of biosimilars at market entry ranged from 15-35% of originator. In Saudi Arabia, where pricing of biosimilars treated as generics, the price reduction ranged from 14-41%.
Conclusion There are discrepancies globally in biosimilars pricing and interchangeability. In addition, there is no clear guidelines in Saudi Arabia to encourage pharmaceutical companies to launch and register its biosimilars in the kingdom, which might lead to decreeing the access to lowered price medication that may help lowering the cost due biologics.

Abstract Code: APP061

Drivers Affecting Pharmaceutical Companies' Sales, Revenue and Performance in Saudi Arabia in the Era of Healthcare Transformation

Student(s) Name: *Yazeed AlKhnizan*
Supervisor(s) Name: *Hussain Al-Omar*

Abstract:
Background Pharmaceutical companies encounter complex issues that grow more challenging by the day. Healthcare reforms, changes in technology, changes in government policy, and generics competition are revolutionizing relationships with key stakeholders and impacting business in unforeseen ways. The purpose of this research is to explore the micro- and macro- factors that might drive pharmaceutical companies sales, revenue and performance in Saudi Arabia.
Methods. A mixed method approach was used to meet the objectives of this research. A validated quantitative questionnaire was sent to a representative sample of national and international companies followed by qualitative open-ended questionnaire with a qualitative case study of five companies' sales and revenue over the last ten years.
Preliminary Results All participated companies were in the Saudi pharmaceutical market for a period more than 21 years. About 60% of them, were selling both prescribed and over the counter medications. All pharma companies reported an average annual income of more than 100 Million Saudi Riyals for the last five years. Factors such lack of effective sales-force, economic uncertainty, drug approval times and process, key opinion leader development and changing the structure of competition and intensity of competitiveness were reported to as the major pharmaceutical business drivers in Saudi Arabia.
Conclusion Several factors might impact pharmaceutical companies business in Saudi Arabia. Nevertheless, the companies will continue to be under pressure because payors look to contain their healthcare budgets by curtailing expenditures. Therefore, companies should consider proactive measures by coming more flexible in their entire operations and strategies to limit or overcome the impact of several drivers.

Abstract Code: APP062

Impact of Healthcare Expenditures on Health Care Outcomes: A cross nation comparison ,1995-2015

Student(s) Name: *Abdullah Aloatibi, Tareq Alfozan*
Supervisor(s) Name: *Bander Balkhi*

Abstract:
Background Healthcare system worldwide is facing an enormous challenge to keep up with increasing demands for healthcare mainly because high price of the health technology, increase awareness about health, change in lifestyle along with the rapid growth in the population. It is a policymaker concern to measure the extent to which the increasing in health expenditure is keeping pace with the increase in health outcome, which is important factors for assessing if a country has an efficient health system.
Methods. A cross-national comparison conducted to analyze the relationship between healthcare expenditures per capita, adjusted to 2015 US dollar and health-outcomes. Life expectancy at birth was used as indicator for health status in each country. Data were analyzed of Middle-East and North-Africa and several developed and developing countries from 1995-2015. All required data were obtained from WHO Health Statistics and World-Bank database.
Results Countries spending on healthcare were continue to rise, the highest healthcare spending per-capita on health

care were United states, Norway and Switzerland were the with highest healthcare spending ranging from $9200 - $9600 per-capita. Among MENA countries, we found that Emirates and Kuwait spending more per-capita on health $1711 and $1420 respectively than any other country in the region. Although, there were a significant relationship between health care spending and health outcomes, some countries spending more on healthcare but have shorter life expectancy.
Conclusion In most countries the efficient and effective utilization of healthcare resources are the key strategies for improving health-outcomes in any countries.

Abstract Code: APP063

Predictors of Opioid Prescription among a Sample of Patients with Musculoskeletal Pain at a Tertiary Care Hospital in Saudi Arabia

Student(s) Name: *Khaulah Alokili, Nouf Alanazi*
Supervisor(s) Name: *Yazed AlRuthia*

Abstract:
Background Musculoskeletal pain is one of the most complex and debilitating types of pain. Although different pharmacologic treatment options are available, very few studies have explored the predictors of different analgesics prescription to manage this type of pain. The aim of this study was to explore the predictors of opioid prescription among patients with different types of musculoskeletal pain.
Methods. This was a single centered cross-sectional medical chart review study of patients with confirmed diagnosis of shoulder, neck, back, lower limb, upper limb, fractures, pelvic, knee, or ligament pains. Patients' comorbidities, number of prescription medications, type of analgesic prescribed (opioid vs. non-opioid), age, and gender were collected. The association between each of the above-mentioned variables and opioid prescription was examined.
Results The number of patients with non-cancer musculoskeletal pain who were recruited in the study was 382 patients with a mean age of 39 years. Almost 64% of them were prescribed opioid analgesics. Age, number of comorbidities, number of prescription medications, duration of pain as well as knee, neck, back, lower and upper limbs, and fracture pains were positively associated with opioid analgesic prescription ($p<0.05$). Interestingly, shoulder pain was negatively associated with opioid analgesic prescription ($r=-0.582$, $p<0.0001$).
Conclusion Future studies should explore the impact of different opioid prescribing policies to improve the quality of patient care and reduce the unnecessary prescribing of opioids among non-cancer musculoskeletal patients.

Abstract Code: APP064

Evaluation of the readiness of community pharmacy to provide services to blind people

Student(s) Name: *Abdulaziz Mohammed AL-Hamyan, Saleh Abdullah Almarzouq*
Supervisor(s) Name: *Abdulaziz Alhossan*

Abstract:
Background Based on the latest report from the World Health Organization (WHO), there are 1.5% blind people in Saudi Arabia. In this research we focus on evaluation of the readiness of community pharmacy to provide services to blind people. Also, we aim in the study to provide solutions for community pharmacy to provide different services to blind people.
Methods. This is a cross-sectional survey based study that was conducted in Riyadh, Saudi Arabia, between January and March 2018. The representative sample size was calculated to be 120 pharmacies. The included pharmacies were randomly selected according to their geographical distribution (north, south, east, and west). They represent about 10.93% of all community pharmacies in the city. The questionnaire administration conducted via both in person and online. The questionnaire was validated and the result analysis was performed using Microsoft Excel.
Results A total of 77 community pharmacies completed the study with a response rate of 65%. The study found that only 13% of the pharmacies provide braille labels to blind people. Furthermore, only 22% of the interviewed pharmacies can provide touchable drug information and 26% of them can provide drug information in audio format.
Conclusion The community pharmacies in Saudi Arabia are not well equipped with the devices and special labels for blind patients. Blind people at higher risk of medication-related side effects due to lack of suitable counseling and reading materials. Community pharmacies need to have minimum standards to serve people with special needs.

Abstract Code: APP065

Comparing Proton pump Inhibitors in Saudi Arabia, United Arab Emirates, Oman and Jordan: Prices and Availability

Student(s) Name: *Muhannad Alabdulwahab*
Supervisor(s) Name: *Hamoud Almutairi*

Abstract:
Background The prices and availability of many of the medications are always questioned in Saudi Arabia and other developing countries. Proton pump inhibitors (PPIs) are one of the most prescribed medications worldwide. Therefore, we selected this therapeutic class to describe the prices and availability of PPIs in Saudi Arabia in comparison with other regional countries, such as the United Arab Emirates (UAE), Jordan, and Oman.
Methods. The price data are obtained from official websites of these countries. All prices are adjusted to the year 2018 and converted to US dollars. For each drug, the difference between the lowest and the highest price is calculated and presented as a percentage.
Results The results showed that all countries have six PPI drugs, except for Jordan, which has five. In Saudi Arabia, the range from lowest to highest prices was 6% to 78%, while the UAE, Jordan, and Oman were 11% to 74%, 5% to 89%, and 14% to 89%, respectively. The number of brand names available was 58 in Saudi Arabia, 83 in the UAE, 57 in Jordan, and 46 in Oman.

Conclusion The study showed that for countries that have a larger number of brand names, such as Saudi Arabia and the UAE, the difference between high and lowest prices was lower than countries that had a small number of brand names. This issue could be associated with the respective pricing systems in these countries.

Abstract Code: APP066

Pharmacy students' attitudes toward scientific researches in Saudi Arabia

Student(s) Name: *Muteb Ahmed Alhassan*
Supervisor(s) Name: *Mohammed N Alarifie*

Abstract:
Background Academic research has been recognized as crucial component for the undergraduate and post graduate students to become a professionally qualified health care professional (QHCP). Internationally many universities and colleges have undertaken initiatives to promote research among undergraduates students. As it influences the career of the students, therefore the objective of this study was to evaluate the student's attitudes towards scientific research and or academic career in Saudi Arabia.
Methods. A cross -sectional study was carried out among pharmacy student at king Saud University. A self-administered survey was carried over a period of 3 months from January, 2018 to March 2018.
Results A total of 174 male students were returned the survey. More than one third of students (66.3%) agreed that participation in research increased interest in pursuing a career in research/academic pharmacy, most of students 75.3% were interested in participating research during course of study. Most of students (73.6 %) believed that research training should be a compulsory part of pharmacy school curriculum. In addition, more than half of students (54.5%) were interested for higher studies PhD after graduation, 70.3% of the students considered earning potential as an important. 73.6% of students reported that lifestyle is an important consideration when choosing a specialty.
Conclusion This study shows that pharmacy students had positive attitudes towards research activities and they desired to be involved more in research publications. However, taking steps by faculty to address the barriers and improve the involvement of pharmacy students in research activities.

Abstract Code: APP067

Prevalence of Potential Drug Interactions in the Ambulatory Setting and Clinician's Perception of Drug Interaction Alerts

Student(s) Name: *Dana Alsugeir*
Supervisor(s) Name: *Ghada Bawazeer*

Abstract:
Background Drug interactions (DI) can adversely affect patient outcomes. The premise of electronic prescribing through computerized physician order entry systems is to improve medication safety during prescribing and dispensing. Unfortunately, excessive DI alerts result in "alert fatigue" and increase the likelihood of overriding alerts thus jeopardizing the efficiency of such systems. This is a retrospective study aiming to assess prevalence of drug interactions, and clinician's perception on DI alerts.
Methods. Patients' prescriptions dispensed between March 1st to August 31st of 2017 from ambulatory clinics in King Saud University Medical City (KSUMC) were reviewed. Moreover, a validated questionnaire was distributed to PCC clinicians to obtain their perceptions on the DI alerts program.
Results A total of 208,366 patients were included with 755,767 drug orders dispensed. Drug alerts occurred in 19% of these prescriptions, and the prevalence of DDI was 4%. Age was an associated factor with 40% of patients over 65 ($p<0.001$). More than half of DDI involved cardiovascular medications (54%); of which 41% was a statin. Almost all alerts were overridden by the clinicians (99%). Most clinicians (n=16) believed that DI system is useful (73.3%), but the relevance of DI explanation is not adequate (53.3%) and it doesn't provide adequate management alternatives for DDI alerts (60%).
Conclusion Drug interaction alerts were common in the primary care setting. Computerized decision support software is assisting the clinicians but it needs further optimization to ensure efficient utilization by clinicians at the point of care.

Abstract Code: APP068

Heath related quality of life measurement in osteoporosis patient: prospective cohort study

Student(s) Name: *Abdullah Mohammed Althenayan*
Supervisor(s) Name: *Bander Balkhi*

Abstract:
Background Osteoporosis is a decreased bone mass and increased susceptibility to fractures. Worldwide, osteoporotic fracture happened every 3 seconds. This study explored the level of Health Related Quality of life (HRQoL) in osteoporosis patients and to investigate the factors that influence quality of life in patient with osteoporosis.
Methods. This is a prospective follow up study of patient with osteoporosis who visit the orthopedic clinic at king Saud University medical city (KSUMC). Patients HRQoL measure at the baseline and then subsequently after six months (2^{nd} follow-up) and twelve months(3^{rd} follow-up) . The baseline data collected by calling the patient .All participants will be asked to complete a SF36, Eq-5D questionnaire at the baseline and during the two follow up visit.
Results We have a sample of 200 patients an we already collected data from 6% of the total sample and we are committed to complete the data collection before April the twenty fifth.
Conclusion Pending .

Abstract Code: APP069

Quality of life and complementary and alternative medicine use among women with breast cancer

Student(s) Name: *Hadeel A Albabtain*
Supervisor(s) Name: *Yousif Asiri, Monira Alwhaiibi, Khalid Alburaikan*

Abstract:
Background Complementary and Alternative Medication (CAM) is commonly used among women with breast cancer to improve their quality of life (QoL). However, few studies examine the prevalence of CAM and its' relation to the patients' QoL among women with breast cancer.
Methods. A cross-sectional study was conducted among 95 women with breast cancer at a tertiary hospital in Saudi Arabia. The outcome measure of interest was the QoL. The correlation was used to assess the association between CAM use and QoL. Bivariate and multivariate analyses were used to examine the factors that affect the use of CAM. The data was analysed using Statistical Package for the Social Sciences (SPSS) version 24.0.
Results CAM use was reported by 81.1% of the study participants. The most commonly used CAM therapy was spiritual therapy 70.5%, followed by honey 36.8%, olive oil 24.2% and 23.2% herbal therapy. We found that those who were undergoing cancer treatment had a significantly higher percentage of CAM usage as compared to those not undergoing cancer therapy (72.6% vs. 8.4%, P=0.008). With regards to QoL, there was a statistically significant difference between CAM users and non-CAM users in global health status (73.2% vs. 64.8%, P = 0.049).
Conclusion CAM therapy was commonly used among women in our study sample which was correlated with higher overall global QoL. As CAM is widely used, health care providers may need to discuss the use of CAM with breast cancer women and be up to date on the benefi

Abstract Code: APP070

Community pharmacists' knowledge and pharmacological management of Alzheimer's disease (AD)

Student(s) Name: *Turki Almoharib*
Supervisor(s) Name: *Mohammed Alarifie, Salmeen Babelghaith*

Abstract:
Background The purpose of this study was to evaluate the knowledge of community pharmacists (CPs) about pharmacological management of Alzheimer's disease (AD)
Methods. A descriptive cross sectional study was used among CPs in Riyadh city, Saudi Arabia to evaluate the pharmacological management of Alzheimer's disease (AD).
Results A total of 115 Cps were completed the survey. Only 20% of them had Training about Alzheimer's disease. Only 34.8% of CPs had high levels of knowledge about Alzheimer's disease. About 59.1% of the CPs agreed that Community pharmacists must take the necessary training and skills in Alzheimer's disease management, only 50.6% of CPs reported that offer their adequate community services for individuals with AD. A minority of CPs stated that there are adequate communication between community pharmacists and other healthcare professionals in Alzheimer's disease management. Also minority of CPs stated that CPs are in a position to advice patients and relatives on AD management
Conclusion Study results showed that CPs had inadequate knowledge about Alzheimer's disease. Thus, there is need for training and education programs for CPs to improve knowledge about Alzheimer's disease its management in Saudi Arabia
Conclusion The results of this study showed that parents' knowledge and practice about fever managements vary from guidelines' recommendation. However, health authorities should develop programs that educate parents and provide them with adequate knowledge and practice to better manage their children's fevers at home.

Abstract Code: APP072

Prevalence and Predictors of Irritable Bowel Syndrome among University Students: A Cross-sectional Study in Saudi Arabia

Student(s) Name: ***Abeer AlHarbi , Maha Aleiban , Sarah AlZahrani***
Supervisor(s) Name: *Lamya Alnaim , Muneera Alwhaibi*

Abstract:
Background Irritable bowel syndrome (IBS) is one of the functional gastrointestinal disorders characterized by gastrointestinal symptoms. IBS is often unrecognized or untreated. Therefore, accurate and timely diagnosis, together with appropriate intervention, is critical for optimal management of this condition **.**
Objectives This study aimed to investigate the prevalence of IBS and assess the factors, management pattern of irritable bowel syndrome IBS among university students studying in Saudi Arabia**.**
Methods. A cross-sectional multicenter study was conducted using a survey tool distributed to college students. The survey included the following: Rome III questionnaire as diagnostic criteria for **IBS**, red flag items to aid diagnosis, hospital anxiety and depression scale (HADS), sociodemographic factors, and the number of medication to treat symptoms of IBS and herbal remedy use. All analysis was conducted using SPSS version 24.0
Results The study sample composed of 1,023 **college** students with complete data. We found that 28% of the participants perceived that they have IBS; however, using Room III criteria, the prevalence of IBS was 5.1%. The majority of the participants were single, female, living with family, with normal BMI, and their sources of income were mainly from their families. The prevalence of IBS was significantly higher among students who are not working compared to student working (84.6% vs. 67.3% respectively, P-value <0.005). The use of herbal remedies was significantly higher with the student with IBS (51.9% vs. 27.6%, P-value <0.005), other factors were not significantly associated with IBS **.**
Conclusions This study revealed that IBS is prevalent among university students. Different life factors addressed showed no association with IBS prevalence.

Abstract Code: APP073

The Safety and Efficacy of Lesinurad in Combination with Allopurinol versus Allopurinol Alone in Patients with Gout: A Systematic Review and Meta-Analysis

Student(s) Name: *Hanin Aljohani*
Supervisor(s) Name: *Haya Almalag, Hadeel Alkofide*

Abstract:
Background Lesinurad FDA approved in 2015. the study objective to assess the efficacy and safety of the combination of lesinurad and allopurinol in patients with gout who are non-responsive to allopurinol alone.
Methods. We performed a systematic search in databases MEDLINE, EMBASE, CINAHL and the Cochrane Central Register of Controlled Trials from inception to 2017. Peer-reviewed, randomized controlled double-blinded trials of lesinurad in combination with allopurinol versus allopurinol in patients with inadequate response to standard of care. Two investigators independently extracted data from each eligible study and assessed risk of bias of included studies.
Results Three studies with a total of 922 patients met our inclusion criteria. The relative risk (RR) showed a significant reduction in serum uric acid (sUA) levels <6 mg/dL in lesinurad 400mg group versus allopurinol alone with low heterogeneity (RR =2.51, 95% confidence interval [CI] =2.12- 2.98, I^2= 36.0%). Two studies reported significant reduction in gout flares and non-significant difference in tophus resolution between both groups (RR=-0.07, 95%CI=-0.08 --0.05, I^2= 0%, and RR=0.79, 95%CI=0.42-1.49, I^2= 0%, respectively). Lesinurad group showed a significant higher percentage in serious treatment emergent adverse event in all three studies compared with allopurinol alone (RR=1.87, 95%CI=1.09-3.21, I^2= 0%).
Conclusion Lesinurad 400mg in combination with allopurinol showed a significant reduction in sUA <6 mg/dL and reduction in number of gout flares with no significant difference in tophus resolution when compared with allopurinol alone. However, there was a significant higher percentages of adverse events with the combination therapy of lesinurad and allopurinol.

Abstract Code: APP074

Assess the knowledge of antifungal prescription for treatment of oral candidiasis among dentists in Saudi Arabia

Student(s) Name: *Abdullah Alwakeel*
Supervisor(s) Name: *Wael Mansy*

Abstract:
Background Candida albicans is the most prevalent species among oral fungal infections. This study was designed aiming at assessing the knowledge and attitude of antifungal prescription for the treatment of oral candidiasis among dentists in a university teaching hospital, Riyadh Saudi Arabia.
Methods. A self-administered questionnaire were distributed among dentists to assess their knowledge and attitudes toward antifungal prescription for the treatment of oral candidiasis. Statistical analysis was made to describe the properties of the sample in terms of frequencies and distribution while chi squre test was used to compare the results between groups at level of significant <0.5 using the Statistical Packages for the Social Science (SPSS) Program.
Results A total 130 dentists of different disciplines were recruited, 3.1% of them only were non Saudis and males contributed 55.4% compared to 44.6% female counterparts. Topical antifungals were preferred by 85.4% of the participants. Among antifungals, topical Nystatin and oral fluconazole chosen by the dentists for local (55.4%) and systemic (58.4%) fungal infections respectively. On the other hand, chlorhexidine was the most favorable (70.8%) adjunct therapy used with the antifungals. Almost 46% of the respondents stated that their main challenge as regards antifungal medications is lack of knowledge about the proper dose used.
Conclusion The attitude towards the treatment of oral candidiasis is better among the least experienced Saudi general practitioner dentists. Nystatin and miconazole are the most popular choices of antifungal agents in our institute.

Abstract Code: APP076

Parents' knowledge, practice and attitudes towards childhood fever management in Saudi Arabia

Student(s) Name: *Bandar yahya Hasn Azeepe*
Supervisor(s) Name: *Mohammed Alarifie, Salmeen Babelghaith*

Abstract:
Background Studies investigated that parents have negative beliefs and inadequate knowledge about fever, its management, and its role in disease. Parents are generally nervous about maintaining a “normal” temperature in their sick child, which leads many parents to give drugs to their children even if there is slight or no fever.
Methods. This was a prospective, sectional -study was conducted in Saudi Arabia to assess parents’ knowledge attitudes, and beliefs regarding childhood fever management.
Results This study reported that more than half of parents (58.8%) normally use digital thermometers, then by using their hand (34.8%). However, slight more than half of parents believed a child with a temperature of 38 °C is feverish. Nearly one-third of parents considered the threshold of 38 °C to start a drug treatment to decrease fever. The most common antipyretics are paracetamol (82.3%) followed by antibiotic (20.1%), and ibuprofen (11.2%). However, antipyretic drugs selection based on previous prescription for the same child (53.1 %), followed by pharmacist’s recommendation (19.4%), and pediatrician’s recommendation (15.2%). In order to calculate the appropriate dose of antipyretic drug administered to the feverish child, 39.8% of parents based on previous dose, reading the package leaflet (32.9%) and pharmacist’s recommendation (14.8%).
Conclusion The results of this study showed that parents’ knowledge and practice about fever managements vary from guidelines’ recommendation. However, health authorities should develop programs that educate parents

and provide them with adequate knowledge and practice to better manage their children's fevers at home.

Abstract Code: APP077

Physician Attitudes and Practices in Considering Cost When Prescribing Medications

Student(s) Name: *Abdullah Alzaidiy*
Supervisor(s) Name: *Ibrahim Al-Jafali, Hussain Al-Omar*

Abstract:
Background Healthcare costs are rising continuously dramatically as a result of population growth and aging, technological advances, and increasing access to expensive medications. Physicians can play a crucial role in containing excessive medications spending. The aim of this study was to examine physicians' attitudes, understanding, and practice of different cost concepts during their daily prescribing practice.
Methods. A cross-sectional study was conducted in a representative sample of physicians, using an online validated survey as a tool for data collection. A Likert scale was used to assess physicians' levels of awareness about cost-consciousness while prescribing medications.
Preliminary results Of the 90 respondents, only 14.4% received a prior training in health/pharmaco-economics before. Majority of physicians neither have heard about cost-consciousness nor cost-containment before in (64%) and (72.2%), respectively. On the contrary, 77% of the physicians have heard about cost-effectiveness before. Less than one-third reported an appropriate understanding of cost-effectiveness concept and purpose but they do not recall its indications. More than two-thirds believe that there is increasing emphasis on medications cost lately, however, less than half of them stated that they are too busy to worry about the cost of medications during their daily prescribing practice.
Conclusion Physicians have a poor awareness, understanding, and practice of different concepts of costs in prescribing practice. Interventions must emphasize the benefits of different health economic approaches as an anchor for both cost containment and quality care, as well as providing assistance to physicians in accepting economic decision-making as part of their professional role.

Abstract Code: APP078

Knowledge and perceptions of the risks of non-steroidal anti-inflammatory drugs among orthopaedic patients in Saudi Arabia

Student(s) Name: *Khaled S Alenazi and Hathal H Al Helal*
Supervisor(s) Name: *Mohammed N Alarifie, Salmeen D Babelghaith , Abdulaziz Alomar*

Abstract:
Background This study aimed to evaluate the knowledge of patients on safe medication use in relation to Non-Steroidal Anti-inflammatory Drugs (NSAIDs)
Methods. A descriptive cross sectional study was conducted among orthopedic out patients of King Khalid university hospital.
Results A total of 200 respondents were interviewed, about half of respondents were female 54 % and 46% were males. About 34 % of respondents aged between 34-51 years**.** Only 45% of respondents often use NSAIDs daily, 38% as needed (38%). For administration of NSAIDs, 36.5 % of patients once daily, 2 times/day (34.5%). Only 21% of patients were taking before meal. Most of patients don't receive health care providers counseling on safety of NSAIDs include adverse drug reactions and its monitoring, management of side effects, drug interactions and food interactions. In this study, only 25.5% of patients were counseled by a health care provider on risks of NSAIDs. Almost all patients (94%) were in agreement on "*physicians should have a role to inform you about adverse drug reactions (ADRs)"*. Approximately all patients (90.5%) agreed that pharmacists should play a direct role in providing ADR information. More than one -third of respondents stated that their healthcare setting provide them insufficient knowledge of ADRs.
Conclusions This study found that the most of patients were not counseled by a health care provider on risks of NSAIDs. This study revealed that the vital roles of health care providers include physicians, pharmacists and staff nurses offer counselling and knowledge of any medication taken by patients.

Abstract Code: APP079

Prevalence of Polypharmacy and Factors Associated with it Among Saudi Older Adults; Results from the Saudi National Survey for Elderly Health (SNSEH) 2007-2015

Student(s) Name: *Nouf M. Alaboud*
Supervisor(s) Name: *Mohammad Aljawadi*

Abstract:
Background and objectives The percentage of Saudi older adults(SOA) is increasing overtime. With advanced age, the prevalence of chronic and multiple diseases is increasing. This leads to increase utilization of multiple medications. The objectives of this study were to describe medication utilization, determine the prevalence of polypharmacy (PP) and factors associated with it and its effect on overall mortality.
Methods. This is a cross-sectional study that was carried out among community-dwelling SOA aged 60 or more using the Saudi National Survey for Elderly Health (SNSEH) on a nationally representative sample of SOA between 2006-2007. Vital status of participants was recorded in 2015. Bivariable and Multivariable logistic regression were used to study factors associated with PP. In addition, Cox-Proportional hazards model was used to assess the effect of PP on overall mortality. All analyses were done using STATA 14.
Results The study included 2,946 SOA; 50.7% were males. The most common medications used among SOA were: Paracetamol (67%) Steroid and DMARDs (50%) NSAIDs (50%). PP was identified in (51.5%) of participants. There was a strong association between PP and diabetic, hypertension, having pain or having depression. Compared to patients with no urine incontinence, subjects with sever urine incontinence was more likely to have PP Similarly, compared to low income

(<2500 SR), higher incomes were more likely to have PP. On the other hand, compared to central region, southern region was less likely to have PP. While northern region was less likely to have PP, western and eastern did not differ from central region. PP was associated with 30% increase in mortality over 9-years.
Conclusion The prevalence of PP among SOA was very high. It was associated with many factors such as region, income, diabetes, hypertension, urine incontinence and depression. PP may increase the hazard of death by 30%. Therefore, raising the knowledge of health care providers on consequences of PP, and providing medication therapy management services may help in decreasing the negative consequences of PP and improving therapy outcomes.

Abstract Code: APP080

Monitoring of low-molecular-weight heparin dose in obese versus morbidly obese Patients

Student(s) Name: *Assma Althobaity*
Supervisor(s) Name: *Wael Mansy, Hussain Al-omar*

Abstract:
Background In obese patients, the higher ratio of fat tissues to lean tissues might potentially lead to higher concentrations of the hydrophilic enoxaparin in the blood and lean tissues. Therefore, as enoxaparin concentration increases, the risk for bleeding also increases.
This study is designed to monitor enoxaparin dose in obese versus morbidly obese patients by measuring anti-Xa as well as exploring the possible adverse effects.
Methods. in this cross-sectional retrospective study obese (BMI ≥ 30 Kg/m^2) and morbidly obese (BMI ≥ 40 kg/m^2) patients were recruited from King Saud Medical City (KSMC) from September 2015 to September 2017. Patients' Data were collected from patients' electronic medical record using hospital information system (HIS) as age, gender, weight, height, BMI, anti-Factor Xa level and diagnosis. Descriptive and inferential statistics were performed using IBM® SPSS® version 24
Results A total of 42 patients met the inclusion criteria. Obese patients (BMI≥30) composed 76% (n=32) while morbidly obese patients (BMI≥40) composed 24% (n=10). The sample has a mean ± SD weight 96.5 ± 18 kg (range 74-151 kg), BMI 38 ± 6 kg/m2 (range 30-54 kg/m2) and age 41 ± 12 year (range 21-76 year). The mean anti-Factor Xa among the total sample was 0.56 IU/ml ranged between 0.1-2 IU/ml .
By assessing anti-Factor Xa, the therapeutic level is between 0.5-1.1 IU/ml it was achieved in only 33% of the cases while 24% supratherapeutic and 43% subtherapeutic. Documented bleeding cases accounts for 9% of the sample, while 2% swelling lower limb in the HIS. There was no difference in mean between the obese and morbidly obese group based on anti-Xa level.Bivariate analysis revealed no correlation between anti-Xa level and either BMI or age explained by the small sample size. Also, 93% of the subtherapeutic anti-Xa level cases are for BMI < 40 kg/m^2 and 77% for patients younger than 50 years.
Conclusion There was no statistically significant association between anti-Xa level and other variables in population recruited.

Abstract Code: APP081

Evaluation of Therapeutic Drug Monitoring Services for Antibiotics

Student(s) Name: *Alanoud Esam Al-Humoud*
Supervisor(s) Name: *Saeed Alqahtani, Bander Balkhi*

Abstract:
Purpose The main objective of this study was to evaluate therapeutic drug monitoring services of antibiotics at King Saud University Medical City.
Methods. This was a retrospective; cross sectional, single center study was conducted using electronic health records, included all hospitalized patients who received antibiotics (vancomycin, gentamicin, and amikacin) with requested TDM over one-month period. The adherence to the TDM guidelines was measured by reviewing all of the following: appropriate indication as per the guidelines, sampling time (based on medication), results reporting, and clinical pharmacist intervention. All data analysis was conducted using SPSS for windows (Chicago, Inc.).
Results A total of 105 patients have TDM requests during July 2017 were included in our study. Upon assessment of the appropriateness of sampling times we found that around 18% were withdrawn at wrong time and on over 40% of the TDM service were not adhere to the guidelines. Although the physicians accepted the majority of pharmacists' intervention related to TDM service, the pharmacist did not provide any recommendation in more than one- third of the cases. Nephrotoxicity were the most common adverse reaction and it is observed in fourteen patients.
Conclusion A reliable TDM service depends on the collaboration between health care team including; doctors, nurses, clinical pharmacist, and lab staff. TDM service offer a great opportunity in improving clinical practice, optimizing treatment outcome and minimize drug related problem like toxicity, and prolong hospitalization. Improving TDM service in this hospital would results in avoiding unnecessary costs to patient and health care system.

Abstract Code: APP082

A Prospective Cross-Sectional Study of Prescribing Errors Prevalence and Nature in Emergency Department

Student(s) Name: *Mona Nasser Bin Anzan*
Supervisor(s) Name: *Tariq Alhawassi , Mansour Almetwazi, Monira Alwehaibi, Khalid Alburikan, Salma Alkhani*

Abstract:
Background Prescribing errors (PEs) are common threat to patient safety; however limited data are available on their prevalence and potential factors in emergency department (ED).
Methods. A prospective observational cross-sectional study at ambulatory ED in a tertiary teaching hospital, Saudi Arabia between July to December 2017 was conducted. A reporting tool customized to suit the purpose of this study were used. PEs were categorized and potential PEs were discussed with the prescriber for further

confirmation of PE. This study has included patients of all age groups who were discharged from ED with a prescription.
Results Among 504 prescriptions included in this study, 13.5%(n=68) PEs were identified and categorized as 22% wrong dose, 19.8% wrong frequency and 14% wrong strength. Several PEs causative factors were identified; the leading human-related causes for PEs were lack of knowledge(40.9%) and improper selection from a list by computer operator(31.8%). The leading PEs' systems-related factors were pre-printed medication orders(50%), lack of training(31.5%) and noise level(13.0%). As the most commonly involved medications were antibiotics, analgesics, and gastrointestinal medications. PEs were mostly by residents(39.4%) followed by specialists (30.3%), and general practitioners(24.4%). Of the identified PEs, 88.0% were resolved while 12.0% of them have been rejected by the physician as per their clinical judgment.
Conclusion PEs are common in the ED setting and many human and systems related factors contributed to the development of PEs. This study highlights the need of future research to explore the role of educational programs and strategies to minimize PEs in the ED setting.

Abstract Code: APP083

Clinical Pharmacy Post-Graduate Research Project Publication: Perceptions of Graduates and Mentors

Student(s) Name: *Heba A. AlShammari*
Supervisor(s) Name: *Abdullah Alhammad, Hadeel Alkofide*

Abstract:
Background Research projects are a mandatory component of various pharmacy practice postgraduate programs. The aim of this study was to describe the practices and perception of publishing research projects from the perspective of postgraduates as well as project mentors.
Methods. A cross-sectional study was conducted in Saudi Arabia between April and December 2017. We targeted two groups of participants: 1) graduates from either pharmacy residency, or master in clinical pharmacy programs; 2) research mentors who supervised these research projects. Two separate questionnaires were developed, and a pilot test was done with some modification regarding the general layout of the questionnaire. Questionnaires focus on: 1) characteristics of participant, 2) perception toward research projects, 3) challenges toward research project process and publication. Questionnaires were distributed electronically. Data were analyzed using SPSS version 22. Frequencies and percentages were used to describe the data.
Results In total, 23-mentors and 49-postgraduates filled the questionnaires. Of the mentors, 83% reported that they had published at least 1 research project in the last five years. Only 10% of postgraduates have already published their research work, while 25% are not planning to publish their projects. One of the most reported challenges encountered by mentors in selecting a potential student is the limited experience of the students in conducting a research study. Postgraduates reported the unfamiliarity with the process of publication, and the lack of time to complete the manuscript
Conclusion This study shows that a majority of graduation projects unfortunately remain unpublished. Several challenges have been described by both students and mentors preventing or delaying manuscripts publication.

Abstract Code: APP084

Population Pharmacokinetics of Valproic Acid in Saudi Adult Patients

Student(s) Name: *Norah Alandas*
Supervisor(s) Name: *Abdullah Alsultan, Saeed Alqahtani*

Abstract:
Objective The objective of this study is to determine the population pharmacokinetics of valproic acid(VPA) in Saudi adult patients and identify factors that explain variability.
Methods A retrospective chart review was performed at King Saud University Medical City on patients who received oral VPA. The population pharmacokinetic models were developed using Monolix4.4. After development of the base model, we investigated four covariates including: age, gender, weight and total daily dose(TTD).
Results The analysis included a total of 54 valproic acid plasma concentrations from 54 patients. Patients' mean(±SD) age was 36.3±13.5years and body weight was 82.5±26.8kg. The patients received a valproic acid TDD of 867 ± 514.2mg/day, which resulted in trough concentration of 69.5±27.5mg/L. The data were sufficiently described by one compartment model with linear absorption and elimination processes. Average parameter estimates for valproic acid CL/F and V/F were 0.17L/h, 37.7L(fixed), respectively. The inter-individual variability (coefficients of variation) in CL/F was14%. The most significant covariates on valproic acid CL/F were patients' age, body weight, and TDD. The population CL/F of valproic acid in the final model was expressed as $CL=0.14\times(Age/36.3)^{0.84}\times(Body\ weight/82.5)^{0.16}\times(TDD/867)^{2.13}$.
Conclusion The population pharmacokinetic model of VPA in Saudi adult was established and significant covariates on the valproic acid model was recognized. This model showed the significant inter-individual variability between subjects. In addition, our findings showed that patients' age, body weight, and TDD are the most significant covariate on valproic acid CL. Further studies are required to understand the factors that may influence the pharmacokinetics of valproic acid and may assist in drug dosage decisions.

Abstract Code: APP085

Adherence to Vaccination Recommendations Prior to Biological Agents Administration: Mixed Methods Approach

Student(s) Name: *Hadeel Sherif*
Supervisor(s) Name: *Ahmed Mayet, Hussain Al-Omar*

Abstract:
Background Anti-TNFs have been used to manage several diseases such as Inflammatory Bowel disease (IBD). However, their use is associated with an increase in infection risk thus requiring vaccines use. This study intended to investigate Anti-TNFs' consumption, determine the vaccination status of those prescribed Anti-TNFs, and explore the physicians' behavior towards vaccinating patients receiving Anti-TNFs.
Methods. The study was carried out in a form of mixed methods approach composed of a retrospective drug utilization review (DUR) to examine Anti-TNFs' consumption and to audit physicians' adherence to vaccination recommendations, followed by a qualitative study in a form of phenomenographic design, from September 2015 to September 2017.
Results A total of 310 patients were included. The most common diagnosis was IBD 65%, while Infliximab was found to be the most frequently ordered Anti-TNF making up 96% and 89% of total orders in each year respectively. Only 13.9% of the patients were vaccinated, even though 71% were found to be at high risk of infection. Findings revealed that most of the physicians were aware of the vaccination recommendations; only two declared to adhere to them. Nevertheless, seven physicians admitted vaccinating all their patients. Barriers that hinder the adherence to vaccination recommendations include the lack of physicians' knowledge of the recommendations, advanced disease state, and occasional vaccine unavailability.
Conclusion Vaccination recommendations for patients using Anti-TNFs do exist, nevertheless only a few patients are vaccinated. Variations among physicians' practice may be the reason behind the low vaccination status.

Abstract Code: APP086

Estimation of Lithium Clearance from Routine Clinical Data in Saudi Bipolar Patients: Using Population Pharmacokinetics Approach

Student(s) Name: *Noha Ibrahim Aljomah*
Supervisor(s) Name: *Saeed Alqahtani*

Abstract:
Background Lithium has been used in the treatment of acute mania and prophylaxis of bipolar disease. It has a narrow therapeutic window ranges from0.6-1.2mEq/L. The narrow therapeutic range and the large IIV have led to the study of population pharmacokinetics.
Objective The objective of this study is to develop a model for the estimation of lithium clearance in Saudi patients with BPD to individualize lithium therapy in order to achieve target plasma concentrations.
Methods A retrospective chart review was performed at KKUH on patients who received oral lithium. The average and SD for age, weight, Scr, total daily dose(TDD), and trough levels were analyzed. The PPK models were developed using Monolix4.4. Five covariates were tested, specifically age, gender, weight, Scr, and CLcr.
Results The analysis included a total of 170 lithium concentrations from 31(77% female) patients with a mean (±SD) age of 36.3 ± 10.5years and body weight of82.7 ± 14.8kg. They received a TDD of 750 ± 260 mg/day, resulted in trough concentration of 0.73 ± 0.26mmol/L. The mean(Clcr) for the subjects was119.2 ± 32.8ml/min. The data were adequately described by two compartment open model with linear absorption and elimination. Average parameter estimates for lithium CL, volume of the central and peripheral compartment (V1,V2),and inter-compartmental clearance (Q) were 1.15L/h,22.1L(fixed),3.35L fixed),and 0.44L/h (fixed),respectively. The IIV(coefficients of variation) in CL was 42%. The most significant covariate on lithium CL was Clcr.
Conclusion The PPK model of lithium in Saudi patients was established. Significant covariate on lithium final model was identified;Clcr. This model showed a significant IIV between subjects.

Abstract Code: PP010

The Utilization of Nonprescription Medications in Saudi Patients with Cardiovascular Diseases

Student(s) Name: *Eman Mohammed Shorog*
Supervisor(s) Name: *Khalid Alburaikan*

Abstract:
Background Cardiovascular diseases (CVDs) are the most common cause of disease-related death in Saudi Arabia. The incidence of CVDs continues to increase, presenting a major health care problem. Nonprescription medications are widely used by patients with CVD and may cause adverse drug events, either by worsening the disease or by harmfully interacting with prescribed medications. We investigated the patterns of nonprescription medication utilization and the factors associated with their use in patients with CVD.
Methods This was a cross-sectional study conducted at the Cardiology Clinics of an academic tertiary health care center. Participants were asked about their sociodemographic characteristics, medical history and frequency of using nonprescription medications including over-the-counter (OTC) products, dietary supplements, and herbal products. Moreover, we investigated the participants' sources of information about nonprescription medications. Multivariate logistic regression analysis was conducted to examine the predictors of nonprescription medication use.
Results A total of 209 participants were interviewed. The mean age of the participants was 56±15 years, and 110 (52.6%) were female. Of the 209 participants, 116 (55%) reported routine use of nonprescription medications. Black seeds and garlic were the most frequently used herbal products. Acetaminophen, cold/cough remedies, and ibuprofen were the most commonly reported OTC drugs. Of the surveyed patients, 54 (46.5%) used nonprescription medications to manage cardiovascular conditions specifically. Compared with other comorbidities, diabetes mellitus was associated with a higher use of nonprescription medications.
Conclusion In patients with CVD, the routine use of nonprescription medications was common for a number of reasons. Health care providers should proactively discuss nonprescription use with their CVD patients to avoid potential harmful outcomes.

Abstract Code: APT150

Dasatinib induces gene expression of hypertrophic markers in H9C2 cells through aryl hydrocarbon receptor-independent pathway

Student(s) Name: *Sami BinSalman and Waleed Al-Qahtani*
Supervisor(s) Name: *Abdulaziz Alsaad*

Abstract:
Background Dasatinib is a new selective tyrosine kinase inhibitor that targets certain kinases involved in cellular growth and development. This drug belongs to a novel anticancer therapy aiming to increase the survival in patients with imatinib-resistant mutations. However, the dasatinib toxicity was reported as a side effect leading to arrhythmias and/or heart failure. Here, we investigated the possibility of dasatinib-induced cardiotoxicity in rat H9C2 cells through AhR-independent pathway. Our objectives were to investigate the ability of dasatinib to induce expression cardiac hypertrophy markers (BNP, β-MHC) genes in H9C2 cells.
Methods To test this hypothesis, H9C2 cells were incubated with dasatinib at two concentrations (20 and 40 μM). Thereafter, BNP and β-MHC were determined at gene expression level.
Results Our findings showed that dasatinib induces the BNP and β- MHC mRNA. The involvement of AhR pathway in dasatinib toxicity was tested by resveratrol (RES), an AhR antagonist. Interestingly, the increase in mRNA of different genes by dasatinib was not affected by RES, which confirms that these effects are not mediated through AhR. In addition, this was accompanied by a significant inhibition of constitutive expression of these genes by RES.
Conclusion The current work provides the first evidence for the ability of dasatinib to induce hypertrophic markers in H9C2 cells through AhR-independent pathway.

Abstract Code: APT151

Resveratrol and Simvastatin attenuates Arsenic Trioxide induced liver fibrosis in experimental rat model

Student(s) Name: *Amani Alorf, Amani Sabbagh, Eman Aldawood, Hajar Al-Nefaie, Reem Altamimi*
Supervisor(s) Name: *Maha Al-Amin, Nouf Al-Rasheed, Hatun Alomar*

Abstract:
Background Chemotherapy-induced liver fibrosis represents a major side effect associated with Arsenic trioxide (As_2O_3) treatment. Exposure to As_2O_3 increases the generation of reactive oxygen species leading to hepatic stellate cell activation, thus increasing accumulation of collagen, tissue inhibitor of metalloproteinase-2 (TIMP-2), matrix metalloproteinases. Therefore, we aim to investigate hepatoprotective effect of Resveratrol, Simvastatin, and their combination on As_2O_3 induced liver fibrosis.
Methods Sixty-four adult Albino Wistar rats weighing 150-250g were divided into eight groups equally: 1) normal control, 2) As_2O_3 (3mg/kg), 3) Resveratrol (8mg/kg), 4) Simvastatin (10mg/kg), 5) Resveratrol and Simvastatin, 6) As_2O_3 and Resveratrol, 7) As_2O_3 and Simvastatin, and 8) a combination of As_2O_3, Resveratrol and Simvastatin. Fibrosis was induced through the administration of As_2O_3 for one week, and rats were treated according to the indicated treatment protocol one hour before As_2O_3. The liver homogenate was prepared for evaluation of oxidative stress markers and liver enzymes by a spectroscopic method. In addition, western blot and Masson's trichrome stain were performed to assess the level of TIMP-2 and collagen respectively.
Results Rats treated with As_2O_3 had significantly higher liver enzyme levels and oxidative stress markers. However, Pretreatment with Simvastatin significantly decreases liver enzymes in comparison with the As_2O_3 group. Furthermore, pretreatment with Resveratrol and Resveratrol combined with Simvastatin have significantly improved oxidative stress markers. In addition, western blot and Masson's trichrome stain both showed improvement of protein expression in treated groups.
Conclusion The results suggest that Resveratrol, Simvastatin, or their combination could prevent As_2O_3-induced liver fibrosis through their anti-fibrotic activity.

Abstract Code: APT152

Carnitine deficiency provokes hypoglycemia-induced hypertension

Student(s) Name: **:** *Yousef Alotaibi, Abdullah Albogami*
Supervisor(s) Name: *Wael Alanazi*

Abstract:
Background Iatrogenic hypoglycemia is often happened during the therapeutic management of insulin-dependent diabetes mellitus. Numerous studies have found correlation between hypoglycemia and renal-cardiovascular complications in diabetic patients. On the other hand, L-carnitine, which is known as a quaternary ammonium compound, has been found in regulation of diabetic complications. For further investigations, we planned to evaluate roles of acetyl-L-carnitine (ALCAR) in attenuating the complications of hypoglycemia via activation and/or deactivation of various cellular mechanisms.
Methods In the current study, we produced hypoglycemic animal model via insulun glargine (InG) treatment and carnitine-depleted animal model via D-carnitine (DC) treatment. Group of male rats were divided into six groups, saline, DC, ALCAR, InG+saline, InG+DC and InG+ALCAR treated group. In all treated animals, blood glucose levels and hemodynamic function were monitored among 15 days of treatment. On day 15th, all animals were anesthetized for blood and hearts harvesting to be analyzed.
Results During animal treatment, we found that carnitine deficiency significantly provokes hypoglycemia-induced hypertension (InG+DC) (MAP=123mmHg) as compared with InG+saline treated animals (MAP=100mmHg).

Carnitine supplementation (ALCAR) regulated hypoglycemia-induced hypertension and returned MAP to the normal levels (InG+ALCAR) (MAP=68mmHg) as compared with control groups (MAP=78mmHg). Moreover, we detected a significant reduction in the white blood cells and red blood cells during hypoglycemia with carnitine deficiency.
Conclusion On the molecular levels, we now try to identify how ALCAR can attenuate hypoglycemia-induced hypertension and blood cells lysis via targeting heme oxygenase-I (OH-I), glutathione (GSH) and endothelial nitric oxide synthase (eNOS) that have pivotal roles in regulation of hypertension.

Abstract Code: APT153

A Newly Synthesized Compound (AD 140) Sensitizes Doxorubicin-treated HeLa Ovarian Cancer Cells Via Inhibition of Autophagy

Student(s) Name: *Omar Alyanbawi, Turki Binduhaim*
Supervisor(s) Name: *Moureq Alotaibi*

Abstract:
Background Resistance of ovarian cancer cells to currently used chemotherapeutic agents is quite high. Although there are many mechanisms of resistance, chemoresistance of HeLa cells seems to be autophagy-mediated. While using very effective anti-cancers such as Doxorubicin as well as cisplatin, cells overcome the cytotoxicity of these drugs through promotion of what so-called cytoprotective autophagy. Here in this study, we would introduce a new compound that has an anti-cancer activity accompanied with autophagy inhibition.
Methods Autophagy in HeLa cells was promoted pharmacologically by doxorubicin and genetically by siRNA IL-10. We performed acridine orange staining to assess for autophagy under microscope and using flow cytometry. We measured protein level of autophagy markers p62 and LC3 by western blot and qRT-PCR. We determined the ability of AD 140 to inhibit autophagy via measuring PI3K activity.
Results Our data indicated that both siRNA IL-10 or Doxorubicin promote autophagy with no evidence of apoptosis or other cell killing markers. On the other hand, data showed that AD 140 has a very potent cytotoxicity against HeLa cells at lower doses with accumulation of p62 protein, indicating that AD 140 may block the process of autophagy. Thus, we combined autophagy promoters Doxorubicin plus siRNA IL-10 with AD 140, and measured the markers of autophagy. AD 140 prevented both pharmacologically- and genetically- induced autophagy.
Conclusion We concluded that AD 140 exerts its cytotoxicity via inhibition of autophagy, and it could be a promising agent to treat cancer cells that depends on autophagy for chemoresistance.

Abstract Code: APT154

Evaluation of the Protective Mechanisms of Selenium and Curcumin in Diclofenac Sodium/ Lipopolysaccharide-Induced Hepatotoxicity Model

Student(s) Name: *Manal Aldossari*
Supervisor(s) Name: *Laila Fadda*

Abstract:
Background Diclofenac (DCL), an extensively used anti-inflammatory drug, it is well known to induce severe hepatotoxicity. Herein we used a small, nontoxic dose of lipopolysaccharide (LPS) which rendered a non-hepatotoxic dose of DCF injurious to the liver. The goal of the present work is establishing an innovative research on molecular mechanism implicated in DCL/LPS-toxicity and to evaluate whether the combination of Selenium and Curcumin exerts a synergistic hepatoprotective effect, considering Silymarine as standard.
Methods Rats were allocated into six groups. Group I: Control rats, Group II Rats were treated with a single dose of LPS (10 µg/kg) i.v. 2 hours later they were receive a single dose of DCF (20 mg/kg).Group III: Selenium treated (0.1 mg/kg/day). Group IV: Curcumin treated (200 mg/kg/day) Group V: Selenium and Curcumin treated. Group VI: Silymarine treated. All the treatments with the afore mentioned antioxidants were one week before LPS/DCF administration then another two doses were given 2 and 8 hours after LPS/DCF administration. Serum ALT, AST, LDH and CRP levels and hepatic lipid peroxidation NOx, SOD, GSH, TNFα, IL6, protein expression of TLR4, NFκB and JNK were evaluated. Histopathological examination using H&E and immunohistochemistry for HO-1.
Results The treatment with the antioxidants in question ameliorated all the previouse-studied parameters. The combination protocol achieved most hepatoprotective efficacy
Conclusion The use of the combination of Selenium and Curcumin is a promising candidate against hepatotoxicity and protein expression of TLR4, NF-κB and JNK are implicated in hepatotoxicity

---

Abstract Code: APT155

Cotreatment with Resveratrol and Quercetin ameliorate cardiac dysfunction in *db/db* type 2 diabetic mice

Student(s) Name: *Ali Asiri, Sultan Al-Mutairi*
Supervisor(s) Name: *Abdullah AlAsmari*

Abstract:
Background Diabetes is at epidemic proportions globally, with the major form of fatality is due to congestive heart failure triggered by myocardial infarction (MI). It is estimated that 420 million people have diabetes worldwide. The impaired insulin signalling in the diabetic heart leads to contractile dysfunction and myocardial energy dysregulation, which compromises the cardioprotection mechanisms. Attenuation of these mechanisms is associated with increased morbidity and mortality in diabetic patients. It is reported that quercetin and resveratrol have anti-oxidant and anti-diabetic effects with the exact mechanism on the heart is to be elucidated. Therefore, we hypothesize that combination treatment of resveratrol and quercetin can protect the heart from the damaging effect of hyperglycemia through upregulating the mitochondrial protein frataxin.

Methods 16 db/db (type 2 diabetic mice) and C57BL/6 (Wt) mice were randomly assigned to 4 groups of 4 mice each. In groups 1&2, Wt mice received DMSO or combination treatment of resveratrol plus quercetin for 14 days. Db/db mice in groups 3&4 received the same treatment as Wt. Heart tissues were used for measuring protein expressions of oxidative and anti-oxidants markers.
Results Resveratrol and quercetin treatment notably reduced the body weight of db/db mice. Furthermore, this treatment restored the elevation in blood glucose levels and the changes in the blood count demonstrating the anti-hyperglycemic effect of treatment. The increase in oxidative stress markers and the decrease in anti-oxidant proteins in db/db mice were abolished in the treated group.
Conclusion Resveratrol and quercetin cotreatment protect the heart of db/db mice from damage through upregulation of frataxin.

Abstract Code: APT156

Architecture of Voltage-Gated Sodium (NaV) Channels in BTBR Autistic Mouse Model

Student(s) Name: *Abdulaziz Alshehri, Abdullah Albogami, Majed Almuhaya, Abdulmajeed Alruzyhi, Yousef Alotaibi*
Supervisor(s) Name: *Musaad Alshammari*

Abstract:
Background The axon initial segment (AIS), a specific region for action potential initiation in neurons, is a critical determinant of neuronal excitability. The appropriate recruitment of AIS macro-complex is essential for synchronized neuronal electrical signals. Any disruption of AIS structure is linked to the etiology of many disorders including autism spectrum disorder (ASD), a disease characterized by deficits in social communications, stereotyped behaviors, and limited interest. In this study, we examined the structure of axon initial segment accessory proteins including voltage-gated sodium channels, (NaV1.1, NaV1.2, and NaV1.6) in Black and Tan, Brachyury (BTBR) T+ Itpr3tf/J transgenic mouse model, a valid model that exhibits behavioral, electrical, and molecular features of autism.
Methods To evaluate the architectural integrity of AIS and NaV channels in BTBR versus control mice, we employed Western blot studies, cresyl violet staining, immunofluorescence labeling, light microscopy and high-resolution confocal microscopy and cutting-edge image analysis technique. These techniques equipped us to track the structure of AIS accessory proteins in BTBR and C57/B6 mouse models.
Results Our studies showed that the gross morphology of cortex is comparable at both genotypes. The immunofluorescence expression of Ankyrin is a slightly increased in the BTBR compared to the control mice. The second protein to be recruited at the AIS is the intracellular fibroblast growth factor 14 (FGF14), our histological examinations suggest that the overall FGF14 expression is significantly increased in BTBR cortex, indicating that FGF14 might be disrupted in BTBR mice. Western blot analysis revealed a decrease in NaV1.1 and 1.6 expression, suggesting a deficit in neuronal firing in BTBR mouse model. Furthermore, we tested the expression profile of Caspr protein, a critical protein for maintaining Node of Ranvier in the neuronal axon. We found that Caspr expression is comparable in both genotypes
Conclusion Our results provide evidence for novel markers that might provide new insights into the pathogenesis of autism disorder.

Abstract Code: APT157

Assessment of DNA repair efficiency in the inbred BTBR *T⁺tf*/J mouse model of autism spectrum disorders exposed to gamma radiation

Student(s) Name: *Sattam M. Alsokihy, Ahmed A. Al-Amri and Haneen A. ALMazroua*
Supervisor(s) Name: *Sabry M. Attia*

Abstract:
Background Information regarding DNA repair in autism is limited to few investigations and have reported inconsistent results, thus further research is required to ascertain whether or not DNA repair mechanism is changed in this disorder. Moreover, searching for early genetic biomarkers in autism and repair enhancers are required. Thus, the aims of this study are to evaluate the level of DNA repair efficiency in BTBR *T⁺tf*/J mouse, a relevant mouse model of autism and to identify early genetic biomarkers associated with DNA repair-signaling pathways in this disorder.
Methods Groups of BTBR *T⁺tf*/J and C57BL/6J mice were exposed to 4Gy of gamma radiation and sacrificed at 0, 15, 60 and 120 min or 24 h post-radiation. Bone marrow cells were collected then ROS generation and comet assay were performed. Alterations in the relative gene expression of 84 genes associated with DNA repair were evaluated in brain tissues using an RT² Profiler PCR Array 24 h post-irradiation.
Results Levels of DNA damage in the autistic mice differed significantly from the age matching C57BL/6J mice at all-time points. C57BL/6J mice showed faster repair than autistic mice post-irradiation. Accumulation of ROS was profoundly observed in autistic mice. Panels of genes involved in DNA repair signaling pathways were down-regulated in the BTBR *T⁺tf*/J mice compared to C57BL/6J mice.
Conclusion These results revealed that autistic disorder induce DNA damage and co-exposure with radiation showed a decreased repair capacity indicating that autistic disorder inhibits the expression of DNA repair genes. Evaluations of repair enhancers are in progress.

Abstract Code: APT158

Rivaroxaban Showed Protection Against Sunitinib-Induced Toxicity.

Student(s) Name: *Ibrahim Al-Shehry, Abdullah Al-Angari and Yousef Al-Anezi*
Supervisor(s) Name: *Naif Al-Harbi*

Abstract:
Background Sunitinib (SUN) is recently approved multi-targeted tyrosine kinase inhibitor (TKI) used for the treatment of gastrointestinal stromal tumors (GIST) and renal cell carcinoma (RCC). Serious cardiac adverse

events associated with sunitinib, limiting its use clinically. Rivaroxaban (RIVA) is a highly selective and potent inhibitor of FXa (free form) and prothrombin activity. It inhibits various inflammatory signal pathways.
Methods Male Wistar albino rats weighing 220 ± 20 g were used in this study and kept under ideal laboratory conditions during the whole experimental period.
During sacrifice, collected whole blood and removed heart. Serum were separated form blood for serum biochemical analysis. Heart perfused with ice-cold normal saline. Homogenized a portion of heart in chilled phosphate buffer for estimation of oxidative stress parameters or in TRIAzol reagent for gene expression by RT-PCR respectively.
Results The administration of SUN resulted an increase in serum lactate dehydrogenase (LDH), aspartate transaminase (AST) and Creatine Kinase (CK), which represents cardiac tissue damage. Other parameters like serum cholesterol, HDL and TG also increased. Treatment with RIVA significantly reversed to normal. SUN significantly decreased GSH levels and glutathione reductase activity but increased MDA levels in heart tissue that reversed by treatment with RIVA. To further, evaluate the protective effects of RIVA against SUN-induced toxicity we performed gene expression. The gene expression of GST, BNP and α-MHC were done. To proof the mechanism of toxicity, we evaluated the mRNA expression of TGF-β, Smad-2 and Smad-3.
Conclusion We concluded that, Rivaroxaban can be used against SUN-induced cardiotoxicity.

Abstract Code: APT159

Examining a Possible Role of Azithromycin in Anxiety and Depressive-like Behavior

Student(s) Name: *Amani Ali Alqhtani , Eman tawfiq Alhowiriny , Khadijh Abbas Al-Nakhli , Norah Ibrahim Alhumud*
Supervisor(s) Name: *Yieldez Bassiouni, Tahani K. Alshammari*

Abstract:
Background Azithromycin is a commonly prescribed macrolide antibiotic. In human, multiple flags have been raised to connect between azithromycin consumption and anxiety and depression. So far there is no experimental study to investigate the effect of azithromycin on mood status. Thus, this study was undertaken to examine the involvement of azithromycin in the pathogenesis of anxiety and depression.
Methods A 100 mg/kg of azithromycin administered orally for five days. Then, we employed multiple approaches to validate our research goal. To assess the depression, we examined the despair by performing forced swim test (FST). Next, we utilized marble burying test to explore the anxiety. Biochemically, we investigated the level of various inflammatory mediators in the periphery including IL-6, TNF-α, and INF-γ. Finally, we examined the blood-brain barrier (BBB) markers and IL-6 using RT-PCR in the hippocampus, a brain region relevant to anxiety and depression.
Results We found that compared to the control, azithromycin treatment results in increased number of buried marbles indicating an anxiety-like behavior (n= 6/group; P<0.05). During performing FST the immobility time was not altered suggesting that in our model there is no indication of depression. The molecular and biochemical profiling of inflammatory mediators revealed alterations in the periphery and the hippocampus (n= 4/group; P<0.05). Besides, azithromycin treatment altered BBB integrity and permeability(n= 4/group; P<0.05).
Conclusion Here we provide new insights into the involvement of antibiotic administration and anxiety. Our findings suggest that azithromycin would increase the risk of anxiety, and special precautions should be taken in susceptible populations.

Abstract Code: APT160

Role of nicotine in modulation of behavioural profile in autistic mice

Student(s) Name: *Yasser alOtaibi*
Supervisor(s) Name: *Shakir AlSharari*

Abstract:
Background Autism is a complex neurodevelopmental disorder characterized by communication deficits, repetitive stereotyped behaviors with restricted interests, abnormal social interactions. The inbred BTBR T+tf/J (BTBR) mouse strain exhibits all diagnostic symptoms of autism, so this mouse strain is used as an animal model to investigate mechanisms underlying behavioral abnormalities of autism. Since various aspects of its behavioral phenotype are not well characterized yet, we examined the role of nicotinic receptors in anxiety, depression– and sociability– like behavior tests for their behavioral profiling.

Methods We used both BTBR and C57BL/6J adult female mice. Elevated Plus Maze, Light/Dark Box, and Forced Swim tests were used for anxiety & depression-like behavioral tests, and Three Chamber Social Preference Test for sociability test. Mice were treated with nicotine and nicotinic receptors ligands.
Results Interestingly, BTBR mice spent more time in open arm with significantly higher number of head dipping and entries in open/close arms in elevated plus maze test. Similarly, BTBR mice spent more time in lit compartment with significantly higher number of transitions between light/dark compartments in Light/Dark Box test. BTBR mice also exhibit more swimming time than C57BL/6J mice strain. However, C57BL/6J showed more social memory and novelty than BTBR in Three Chamber Social Preference test.
Conclusion BTBR female strain exhibit significantly different anxiety, depression and sociability–like behavioral profiles than C57BL/6J in the respective behavioral tests.

Abstract Code: APT161

Effect of Tumor Necrosis Factor (TNF) Inhibitor on Anxiety-like behaviors in Obese (db/db) Mouse Model

Student(s) Name: *Majed Almuhaya, Abdulmajeed Alruzyhi, Hafiz M. Arshad, Dafeer Alhareeth, Yousef Alotaibi, Sultan Almutairi, Ali Asiri*

Supervisor(s) Name: *Musaad Ali Alshammari, Homood Moqbel Assobeai*

Abstract:

Background Studies have shown a link between anxiety and metabolic disorders such as obesity, however, the mechanisms remain unknown. In this study, we investigated the effect of tumor necrosis factor (TNF) inhibitor (Etanercept), a commonly used drug to treat autoimmune diseases, in anxiety associated with obesity in db/db mouse model, a widely used preclinical model in obesity and diabetes research.

Methods To evaluate the role of Etanercept on anxiety-like behavior in db/db mice, we employed behavioral tests and biochemical studies. Behavioral tests include open-field, elevated-plus maze, light-dark, social interaction, and marble-burying tests. Biochemical studies include Western blot studies, cresyl violet staining, immunofluorescence labeling, light microscopy and high-resolution confocal microscopy and cutting-edge image analysis technique. These techniques equipped us to test anxiety-like behavior that may underlie changes in inflammatory mediators in db/db mouse model.

Results Locomotor behavioral studies showed that all genotyped mice homozygote (-/-) mice display abnormal motor behavior compare to wild type (+/+) and heterozygote (+/-) mice. However, het (+/-), and hom (-/-) mice show an increase anxiety-like behaviors in the open-field, the elevated plus-maze, and marble-burying tests. Ongoing biochemical studies might show upregulation of inflammatory mediators in the db\db mice compared to the littermate control mice. Etanercept might exhibit a potential antianxiety-like effect in anxiety associated with obesity by reversing the altered inflammatory mediators in db/db mice.

Conclusion This study advances our knowledge of the therapeutic effects of TNF inhibitor (Etanercept) in anxiety-like behavior in db/db mice. Also, it provides new insights into the link between obesity and metabolic disorders.

Abstract Code: APT162

Novel thiazole derivatives as adrenergic alpha2a receptors in the locus coeruleus dexmedetomidine-induced LORR.

Student(s) Name: *Lama Aleid, Wafa BinRabba'a, Lujain Alsa'aran, Shaden Alsofayan*
Supervisor(s) Name: *Sara Alrashood*

Abstract:

Background The locus coeruleus is a very small cluster in the brainstem, it is involved in many behaviors including wakefulness, sedation, attention, memory and stress response. These functions are mediated by adrenergic receptors in the LC. Especially Alpha-2 agonists which play a significant role due to their multiple effects like decreasing sympathetic tone along with diminishing the neuroendocrine and hemodynamic responses to anesthesia and surgery, such as Clonidine which is considered to be the first agent in this class. However, then other agents also appeared thereafter such as dexmebetidine, guanbenz and xylizine. The aim of this study was to explicate the hypnotic effects of these novel alpha-2 adrenergic drugs.

Methods In vivo and vitro testing on the alpha-2 adrenergic receptors were both carried out.

Results The initial data from both tests showed positive results. However, Further tests to confirm the data are still under processing.

Conclusion The novel thiazole derivatives (dexmebetidine, guanbenz and xylizine) which act as alpha-2 adrenergic agonists possess a hypnotic effect by inhibiting the adrenergic receptors in the locus coeruleus.

Abstract Code: APT163

Protective effect of rutin supplementation against cisplatin-induced Nephrotoxicity in rats

Student(s) Name: *Abdulaziz Turki Bin Jumaiah*
Supervisor(s) Name: *Othman A. Al-Shabanah*

Abstract:

Background Cisplatin (CP) is used in the treatment of cancer but nephrotoxicity has been a major limiting factor. Therefore, the present study aimed to study the possible protective effect of rutin against cisplatin-induced nephrotoxicity in rats.

Methods To achieved the goal of this study, forty male Wistar albino rats were randomly divided into 4 groups. Rats of group 1 control group were received 2.5 ml/kg intraperitoneal (i.p.), group 2 CP group received single dose 5 mg/kg cisplatin i.p. group 3 rutin group received 30 mg/kg rutin orally group 4 (CP plus rutin) received CP and rutin as in group 2 and 3. After the end of study protocol animals were sacrificed after euthanasia then kidneys were removed and harvested for histopathology and for the study gene expression.

Results Administration of single dose of cisplatin to rats induced nephrotoxicity associated with a significant increase in blood urea nitrogen (BUN) and serum creatinine and associated with significantly increase in the expression levels of the IL-1α (260%), TNFα (300%) and P38 (410%) compared to control group. Additionally, histopathological examination showed that cisplatin-induced interstitial congestion, focal mononuclear cell inflammatory, cell infiltrate, acute tubular injury with reactive atypia and apoptotic cells. Rutin administration attenuated cisplatin-induced alteration in gene expression and structural and functional changes in the kidney.

Conclusion The present study suggested that the anti-inflammatory effect of rutin may prevent CP-induced nephrotoxicity via decreasing the expression levels of IL-1α/TNF/P38 signaling pathways, and repairing the histopathological changes against cisplatin administration.

Physical Pharmacy & Pharmaceutics

Abstract Code: APH250

Development and Characterization of Doxorubicin and Pipirine Nanoparticles for MDR Cancers

Student(s) Name: *Solaiman Alzaidan*
Supervisor(s) Name: *Musaed Alkholief*

Abstract:
Background Drug resistance of cancer is a major problem for treating cancer. In most cases, the resistance is caused by PGP efflux pump. Piperine is a known inhibitor for PGP. Our work aimed at formulating a nanoparticle encapsulating both doxorubicin and piperine to potentially treat drug resistant cancers.
Methods Lecithin/chitosan nanoparticles were prepared via inject 4 ml of ethanolic solution containing lecithin (2.5% w/v), Piperine (0.1%), and IPM (2%) into 46 ml of chitosan solution, which was prepared by dilution of 4 ml of 1% chitosan solution containing 10 mg of Dox in 2% acetic acid .DLS used to measure particle size and zeta potential. The supernatant containing the vesicles was taken for further analysis. Encapsulation efficiency(EE) and drug loading (DL) was determined by indirect method.
Results We have prepared Lecithin/chitosan nanoparticle with varying ratios of L/CS (10:1, 5:1, 3.33:1, 2.5:1) .On basis of physical characteristics the formulation 2 (5:1) was found to be good in terms of encapsulation(EE) and loading(DL) of both of Doxorubicin (EE=44.63 ±2.32, DL =8.92±0.46) and piperine (EE=52.91±2.06, DL= 8.46±0.32). The particle size, polydispersity index and zeta potential of the formulation was found to be 160.96 ±4.171, 0.271 ±0.0046, 28.13 ±0.49, respectively.
Conclusion Our results have demonstrated the successful encapsulation of doxorubicin and pipierine. Future studies will examine the biological activity in vitro against Dox-resistant cancer cells.

Abstract Code: APH251

Comparative Dissolution Testing of Furosemide Immediate Release Tablets.

Student(s) Name: *Abdul Rahman Faisal Alqumayzi*
Supervisor(s) Name: *Mohd Aftab Alam, Fahad Ibrahim Al-Jenoobi, Yousef A Bin Jardan*

Abstract:
Background Comparative dissolution studies are performed to establish the similarity of generic products with brand. To investigate the similarity between furosemide immediate release tablets the dissolution studies were carried out and the dissolution profiles of generics products (Code: GIRT-1 and GIRT-2) were compared with brand product (Code: BIRT).
Methods The dissolution studies were performed using Sotax UV-Online apparatus (USP apparatus-II). Dissolution parameters were: 900 mL quality media (pH 5.8 phosphate buffer), paddle speed 50 rpm, temperature 37 ± 0.5 ° C. Samples were analyzed online at 276 nm using UV-spectrophotometer.
Results Dissolution profiles of six tablets of each product were studied. The automated calculations performed by WinSotax plus software were based on calibration curve data: E11 = 625.362. Dissolution data reveals that release from BIRT at 5, 10, 15, 30, 45, 60 and 75 minutes time points was 70.3%, 85.2%, 91.1%, 96.1%, 97.4%, 97.3% and 97.3%; respectively. While from GIRT-1 the release was 36.5%, 50.4%, 59.8%, 74.7%, 82.3%, 87.1% and 89.9%; respectively. From GIRT-2 the release was 71.1%, 80.9%, 85.6%, 90.4%, 91.8%, 92.4% and 92.9%; respectively. Similarity factor f2 and difference factor f1 for GIRT-1 were calculated as 31 and 24, respectively. Similarity factor f2 and difference factor f1 for GIRT-2 were calculated as 67 and 5, respectively.
Conclusion Dissolution data of GIRT-1 revealed that it has failed the similarity test (f2 = 31), though it passed USP quality test. GIRT-2 passed both similarity test (f2 = 67) as well as USP quality test. BIRT also passed USP quality test.

Abstract Code: APH252

Utilizing Spray Drying Technique to Improve Hydrocortisone Solubility

Student(s) Name: *Fahad Hammad Alenzi*
Supervisor(s) Name: *Mohammad A. Altamimi*

Abstract:
Background Improvement in aqueous solubility of a drug yields higher dissolution rate and overall bioavailability. Therefore, exploiting a spray drying technique renders an amorphous drug with higher solubility.
Methods Hydrocortisone was selected as BCS II model drug, such that an improved dissolution rate and concentration in the gastrointestinal tract should increase oral bioavailability. Spectrophotometric method was developed to establish the standard curve for the drug. In addition, Differential Scanning Calorimetry (DSC) was used to analyze the crystalline content of the model drug. Also, spry drying technique was utilized for the drug in different combinations with selected polymer. Scanning electron microscopy is used to study the morphology and the size of the spray dried particles.
Results A standard curve for the drug was obtained with R^2 of 0.9996. DSC showed a reduced melting that indicated an amorphous form. SEM showed spherical shape particles.
Conclusion Hydrocortisone has low aqueous solubility. The solubility was found to be comparable to that in the literature. Establishing and validating the spectrophotometric methods gives the ability to detect the solubility improvement. The solubility was improved such that an increase in the overall bioavailability is expected.

Abstract Code: APH253

Comparative Dissolution Testing of Metformin Prolonged Release Tablets

Student(s) Name: *Mohammed Ahmed Al husain*
Supervisor(s) Name: *Fahad Ibrahim Al-Jenoobi, Mohd Aftab Alam, Yousef A Bin Jardan*

Abstract:
Background Comparative dissolution studies are performed to establish the similarity of generic products with brand. To investigate the similarity between metformin prolonged release tablets, dissolution studies were carried out and the dissolution profiles of generics

products registered in Saudi Arabia (GPRT-1 and GPRT-2) were compared to the brand (BPRT).
Methods Studies were performed using Sotax Off-line dissolution apparatus (USP apparatus-I). Dissolution parameters were as: basket 100 rpm, temperature 37 ± 0.5 ° C, 1000 mL quality media (pH 6.8 phosphate-buffer). Samples were withdrawn automatically using CP-Xtend pump. Collected samples were diluted and analyzed at 232 nm using UV-spectrophotometer.
Results Dissolution profiles of six tablets of each product were studied. Calculations were based on calibration equation Y = 0.0775 X + 0.0246. Value of r2 was 0.9997. Dissolution data reveals that release from BPRT at 1, 2, 3, 5, 6, 8 and 10 hour was 26.2%, 36.4%, 51.0%, 67.1%, 73.8%, 85.0% and 94.9%; respectively. The release from GPRT-1 was 28.3%, 44.0%, 55.6%, 73.6%, 79.2%, 89.5% and 99.5%; respectively. Release from GPRT-2 was 31.3%, 48.5%, 60.7%, 78.6%, 86.3%, 97.0% and 101.3%; respectively. Similarity factor (f2) and difference factor (f1) for GPRT-1 were calculated as 63 and 9, respectively. The f2 and f1 for GPRT-2 were calculated as 48 and 19, respectively.
Conclusion GPRT-2 has failed the similarity test (f2=48), though it has passed the USP performance test. While the GPRT-1 has passed the similarity test (f2 = 63), as well as USP performance test. BPRT also passed USP performance test.

Abstract Code: APH254

Formulation and evaluation of sublingual and buccal hydralazine tablets

Student(s) Name: *Wail Ghassab Almotairi*
Supervisor(s) Name: *Gamal Mahrous , Wael Mahdi*

Abstract:
Background hydralazine hydrochloride has a half-life of 2 to 4 hours with an oral bioavailability of 26-50% due to its first pass metabolism**.** The objective of this research is to prepare and evaluate double compression sublingual and buccal tablets for rapid release by the sublingual part and sustained release by the buccal part of hydralazine HCl..
Methods Hydralazine sublingual tablets (10mg), hydralazine buccal tablets (20mg), and the combined tablets contain both were prepared by direct compression and evaluated according USP
Results Content uniformity, dissolution, disintegration, hardness and friability of these preparations were within the compendial limits (USP). The ex vivo adhesion of the buccal tablets exhibited good bioadhesion. The combined tablets exhibited biphasic dissolution pattern.
Conclusion The results clearly indicate a promising potential of using a combined formula that provides initial rapid dose by sublingual part and sustained dose by buccal part in order to enhance the bioavailability of hydralazine.

Abstract Code: APH255

Engineering of Folate Labeled Chitosomes as Promising Platform for 5-Fluououracil Delivery

Student(s) Name: *Ahmed Y. AlGhar*
Supervisor(s) Name: *Gamaleldin I. Harisa, Mohamed M. Badran, Ehab I. Taha , Mohamed A. Ibrahim*

Abstract:
Background Despite 5-Fluorouracil (5-FU) is a good candidate for cancer therapy, it still has multiple therapeutic problems. This attributed to high dosing and lack of tumor cells selectivity. The engineering of addressed chitosome, "liposomes coated with chitosan", in nanosize forms could resolve 5-FU therapeutic problems. Folic acid (FA) labeled nanocarriers have tendency to be directed to the folate receptor that highly expressed on the cancer cells. Herein, loading of 5-FU into such cargoes is expected to enhance therapeutic index of 5-FU. The aim of this study to develop folate labeled chitosomes as targeted delivery systems for 5-FU.
Methods Liposomes were prepared by the thin film hydration method, then, chitosomes were prepared by coating of liposomes with chitosan. Next, FA was coupled to the surface of chitosomes. Afterward, the prepared chitosomes were characterized for particle size distribution, percentage entrapment efficiency and drug release profiles. Finally, the cytotoxicity study is under investigation using MTT.
Results The results of the present study revealed that, the prepared chitosomes showed nanosized range (174 – 32 nm), desirable entrapment efficiency (6% - 24%), and prolonged drug release pattern compared to liposomes. This indicated that, folate labeled chitosomes will be a promising drug delivery systems for targeting cancer tissues.
Conclusion These results demonstrated that 5-FU loaded folate decorated chitosomes portended as promising tools for tumor targeting.

Abstract Code: APH257

E Thermal stability of yeast alcohol dehydrogenase at different PH

Student(s) Name: *Fahad Hamdan Alanazi*
Supervisor(s) Name: *Mohammad Alsenaidy*

Abstract:
Alcohol dehydrogenases (ADH) are a group of dehydrogenase enzymes that could be found virtually in all organisms. They facilitates the interconversion between alcohols and aldehydes or ketones with the reduction of nicotinamide adenine dinucleotide (NAD+ to NADH). Alcohol dehydrogenases consists of homo-tetramer with subunit size of approximately 40 kDa. In humans, these groups of enzymes serve to break down alcohols that otherwise are toxic, additionally, they participate in the generation of useful aldehydes, ketones, or alcohol groups during biosynthesis of various metabolites. Yeast alcohol dehydrogenase (ADH) is an enzyme widely studied for biotechnological applications due to its involvement in the fermentation industry. In this project, we planned to investigate the thermal stability of Yeast alcohol dehydrogenase at different pH conditions (pH 1.0-12.0). First, we analysed the purity of the commercial yeast alcohol dehydrogenase using SDS-PAGE and quantified protein concentration spectrophotometrically. Next, protein were equilibrated at different pH conditions overnight and the protein thermal stability was assessed sing fluorescence spectroscopy technique.

Abstract Code: APH258

Influence of the heating technology on the physical-chemical properties of bioflavonoid luteolin solid dispersion

Student(s) Name: *Omar Khalil Alanazi*
Supervisor(s) Name: *Sultan Alshehri*

Abstract:
Background The objective of this study was to evaluate the influence of Heating techniques (microwave and fusion technologies) on the physical-chemical properties of binary mixture of Luteolin with selected polymer (PEG 4000).
Methods Luteolin (LUT) was selected as a model drug due to its poor water solubility and was blended with the selected polymer at a drug polymer ratio of 1:1, 1:2 and 1:4 w/w. Sample of interest was placed in a porcelain dish and subjected to 1- microwave one by one at the exact place, 2- water bath for fusion method. The time was calculated depends on the melted sample and obtained a homogenous mass to form solid dispersion system. The melted sample were pulverized using mortar and pestle, then sieved by USP mesh (#35). Thermogravimetric (TGA) analysis was performed on drug and polymer to recognize the thermal stability of each component. The solid state of pure drug and each formulation was characterized using differential scanning calorimetry (DSC) and powder X-ray diffraction (PXRD) techniques. The API and polymer interactions were determined using FTIR
Results TGA studies revealed that the drug and polymer were stable under employed heating temperatures. PXRD confirmed that the crystalline form of LUT was completely transformed to the amorphous state in the Heating technique binary formulations with this polymer, PEG 4000, as the corresponding peaks of LUT were disappeared.
Conclusion LUT was found to be completely miscible at these drug loads and forms an amorphous solid dispersion on this combination.

Abstract Code: APH259

Development and evaluation of self-nanoemulsifying drug delivery system of bioflavonoid luteolin

Student(s) Name: *Moad Mohammed Alamer*
Supervisor(s) Name: *Ibrahim A. Alsarra, Fars K. Alanzi, Faiyaz Shakeel, Nazur Haq*

Abstract:
Background Luteolin is a poorly water-soluble bioflavonoid which shows poor bioavailability upon oral administration. Therefore, the objective of this study was to develop self-nanoemulsifying drug delivery systems (SNEDDS) of luteolin in order to enhance its in vitro dissolution and therapeutic efficacy which in turns results in enhanced oral bioavailability.
Methods Different SNEDDS of luteolin were developed by aqueous phase titration method via construction of pseudo-ternary phase diagrams using Capryol-PGMC (oil phase), Tween-80 (surfactant) and Transcutol-HP (cosurfactant). Prepared SNEDDS were subjected to various thermodynamic stability and self-nanoemulsification tests and characterized for droplet size, polydispersity index, zeta potential, refractive index and % transmittance.
Results Developed SNEDDS showed significant release of luteolin from all SNEDDS in comparison with luteolin suspension. Optimized SNEDDS of luteolin showed droplet size < 40 nm, polydispersity index < 0.3, zeta potential of -32.4 mV, refractive index < 1.40, % transmittance > 98 % and drug release profile > 96 %. Optimized SNEDDS was selected for in vivo hepatoprotective evaluation in rats. Hepatoprotective studies indicated significant hepatoprotective effects for optimized luteolin SNEDDS in comparison with luteolin suspension.
Conclusion The results of this study suggested the potential of SNEDDS in enhancing dissolution rate and therapeutic efficacy of bioflavonoid luteolin.

Abstract Code: APH260

Comparative dissolution assessment of brand and generics of glibenclamide tablets marketed in Saudi Arabia

Student(s) Name: *Abdulmalik N Alshetwi*
Supervisor(s) Name: *Yousef A Bin Jardan, Abdul A. Ahad, Mohd Aftab Alam, Fahad I. Al-Jenoobi*

Abstract:
Background Glibenclamide is one of the most widely prescribed drugs for diabetes mellitus. The key rationale for this study was to compare the in vitro dissolution study of glibenclamide generic and marketed products. The generic form of the drug should be generally prescribed to decrease the medication cost and make the treatment economical to the patients.
Purpose The main objective of the present study was to evaluate between two different brands of glibenclamide which are commercially available in the Saudi Arabian market in comparison with innovator product. All the marketed brands were evaluated for quality control test such as hardness, weight variation, friability, and in vitro dissolution test.
Methods In vitro release testing of innovator, and generics was carried out as per the USP monograph using Sotax dissolution system. The tests were performed according to pharmacopoeial specifications using Apparatus II (paddle method), 75 rpm at 37°C.
Results All the investigated two generic brands of glibenclamide passed the standards of the USP regarding hardness, friability, and weight variability. Among all brands, Innovator brand, generic I and generic II tablet show 108.60%,104.40% and 93.04% drug release, respectively. The in vitro drug release result shows insignificant differences in dissolution behavior were observed between the innovator and different generic brands with similarity factor f2>50
Conclusion Based on the obtained results and in comparison with the originator product, all the tested brands are assumed to be chemically and pharmaceutically equivalent. All these products can be used as generic substitutes for the originator product.

Abstract Code: APH261

Clobetasol-loaded Polymeric Micelles for topical application

Student(s) Name: *Faisal Fahad Gonayah*
Supervisor(s) Name: *Abdullah Alomrani, Mohamed Badran*

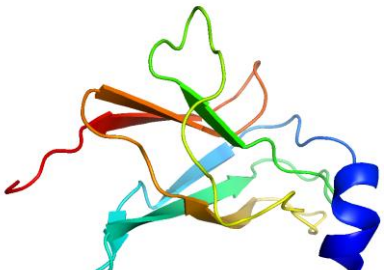
Abstract:
Background Clobetasol propionate (CP) is one of the potent steroid that is frequently used for treatment of psoriasis. It is soluble in organic solvent such ethanol and DMSO and sparingly soluble in water. The oral administration of steroids for skin diseases is associated with unpleasant systemic side effects. Therefore, administration of CP directly on the skin can reduce the dose and is expected to eliminate the systemic side effects associated with oral therapy. In this project polymeric micelles (PM) will be utilized to deliver clobetasol topically.
Methods CP-loaded PM were prepared using novel amphiphilic copolymers. These systems will be prepared by solvent diffusion method. The formed PMs will be characterized for their micelle size, zeta potential and entrapment efficiency (EE%).
Results The prepared PM showed micelle size in the range of 68 to 115 nm and having negative zeta potential. The EE% of the prepared PM were in the range of 44 to 78%.
Conclusion PM could be a promising approach to deliver CP topically.

Abstract Code: APH262

Stability and Modeling Assessments of Envelope Domain III (EDIII) of Zika Viral Proteins for Therapeutic Purposes

Student(s) Name: *Fahad Alqarni*
Supervisor(s) Name: *Ahmed Alaofi*

Abstract:
Background Recently zika virus causes serious diseases such as microcephaly in congenitally infected infants. The structural proteins of zika virus (ZIKV) located at the polyprotein N-terminal which composed of envelope, membrane, and capsid proteins. Envelope (E) protein has three different domains, domain I, domain II, and domain III. The domain III (DIII) is essential for ZIKV interaction to the host cells. The EDIII considers a potential target for researchers in term of developing potential therapeutics entities. Here we are investigating structure and stability of EDIII.
Methods RP-HPLC was used to conduct EDIII stability experiment. Since protein is a hydrophilic protein the retention time was increased to 2.5 min on HPLC as we went to more water composition in the mobile phase; i.e. 90% H_2O + 10% ACN. Dynamic conformers: The obtaining of dynamic conformers of EDIII was conducted using simulation. The steps started with initial x-ray structure by generating top files, charged residues were treated at physiological pH, the system was, then, solvated and neutralized to generate a neutral system with close to physiological concentration. Energy minimization was established for 100ps before the run.
Results The conformers of EDIII revealed importance 2ndry structure close the binding interaction of EDIII to host cell. The conformers were compared to NMR structure of EDIII to as a standard and RMSD were less than 2 °A. The tail part of EDIII showed higher flexibility in comparison to other parts of EDIII.
Conclusion The obtained conformers from 100ns run reveal better understanding with the domain III flexible part. The rigid parts of EDIII residues showed potential target for making therapeutic entities such antibodies or protein fragments to hinder the viral-host interaction.



Abstract Code: APH263

Anti-microbial evaluation of different topical formulation containing mixture of natural components

Student(s) Name: *Arwa abdulmajeed bin Rakhiss, Rania dahham alanaze*
Supervisor(s) Name: *Lubna Yousef Ashri*

Abstract:
Background Many medicinal materials have potential antimicrobial activities such as Myrrh extract, a resin collected from bark and stem of commephora molmol tree. Myrrh extract has antimicrobial and antifungal properties and usually used in medicinal preparations as an antiseptics and pain relief agent.
Another component is Chamomile extract (Matricaria recutita), which is an infusion of the flowers that is taken internally for its anti-inflammatory and antiseptic effect. Finally, pomegranate peel extract that considered a source of antioxidants, phenols and also possesses antibacterial and antifungal activity.
Methods The cup plate agar diffusion method was used to evaluate the antimicrobial activity of an ointments and a cream containing a blend of chamomile, myrrh and pomegranate peel extracts. The standard strains used to evaluate the antibacterial and antifungal activities of the topical formulations were Pseudomonas aeruginosa, Staphylococcus aureus and Candida albicans. A 100 µg of each formulation was placed into each well and 100 µg of gentamycin ointment was used as positive controls. The detected diameters of the inhibition zones were measured using a ruler. The experiment was carried out in duplicate and the mean diameter was taken.
Results Both cream and ointment gave the desired results on all types of organisms.
Conclusion We identified the antimicrobial activity of topical formulations (cream- ointment) containing a mixture of medicinal plant extracts against three type of organism that are located on the skin. The preparations

showed potential antimicrobial activities against the tested organisms.

Abstract Code: APH264

Fluconazole Nail Lacquer for Treatment of Onychomycosis: Compounding verse Enhanced Formulation

Student(s) Name: *Razan Osama Alfahad and Salma Mohammed Aljared*
Supervisor(s) Name: *Fars Alanazi, Hisham Radwan, Khalid Alyahya, Doaa Al-Ahora*

Abstract:
Background The prevalence of onychomycosis is high with 50% of all nail disorders. Onychomycosis, without treatment becomes thicker causing irritation, pain, and spread to the nearby tissues. Topical therapy is attractive approach due to reducing the systemic sever adverse effects. In this study comparison between presence of Fluconazole in compounding and enhance nail lacquer formulation was evaluated.
Methods Lacquer formulation was prepared containing: ethyl cellulose, salicylic acid, ethyl acetate, propylene glycol and toluene. Lacquer was evaluated in term of nonvolatile content, drying time, smoothness to flow and gloss. Also, different concentrations from fluconazole were incorporated to marketed product and enhanced nail lacquer formulation. Then, antimicrobial activity against *Candida albicans* was evaluated.
Results The formulation showed desired film formation, good smoothness of flow and drying time. The nonvolatile matter leaving a thin film was about 57.9 ± 2.3 %. Drying time was found in range of 53-120 sec. The zone of inhibitions of the marketed lacquer (compounding) were 15 and 24 mm for 5 and 10 µg of fuconazole, respectively. Indicating the effectiveness even in presence of the marketed formula. The nail formulation results were 24, 20.6 and 15.7 mm for 10, 5, 2.5 µg of fluconazole, respectively. These results indicate the superiority of enhanced formulation even with low concentrations (2.5 µg). Also, it is higher than positive control by 20%.
Conclusion The data shows the medicated nail lacquer can be used effectively in the treatment of onychomycosis either in form of compounding (marketed nail lacquer) or the enhanced on.

Medicinal Chemistry & Natural Products

Abstract Code: AMN350

Evaluation of Anti-inflammatory and Anti-oxidant effects of different Extracts of Qustal-Hindi and Qustal-Bahri

Student(s) Name: *Rawan Alofi, Dana Kelabi Norah Alsowidan*
Supervisor(s) Name: *Nawal Al-Musayeib*

Abstract:
Background The different parts of Costus spicatus (or Qust Al-Bahri) are used in traditional medicine as an anti-inflammatory, antiseptic, anthelmintic, antineoplastic, antipleuritic, and as a snake-venom antidote.
Saussurea lappa (or Qust Al-Hindi) is a traditionally known for its medicinal uses in different indigenous Indian systems of medicine.
This research aims to evaluate the Anti–inflammatory and Anti-oxidant effects of both S.lappa and C.spicatus.
Methods The Anti-inflammatory effect of different Extracts of S.lappa were identified using carrageenan induced paw Edema test.
The Anti-Oxidant Activity of both C.spicatus and S.lappa at different concentrations was evaluated using 1,1-diphenyl-2-picrylhydrazine (DPPH RADICAL) assay.
Results The organic plants (C.spicatus, S.lappa) in comparison with ascorbic acid percentage inhibition (34.05%) shows that S.lappa and C.spicatus has moderate antioxidant effect at high concentration (500mg/ml) at percentages of (12.04%) and (9.09%) respectively.
S.lappa chloroform extract showed the highest anti-inflammatory activity at percentage reduction of (79.82%at 30mins, 187.87% at 1hr) in comparison to indomethacin which showed a (22.78% at 30mins) percentage reduction of edema.
Conclusion Our extracts exhibited a moderate anti-oxidant action in a concentration of (500mg/ml) S.lappa showed higher anti-oxidant effect than C.spicatus where the highest percentages of radical scavenger are (12.04%) and (9.09%) respectively in comparison to Ascorbic acid (34.05%).
As for the anti-inflammatory action, the highest percentage of reduction of edema is seen with S.lappa CH3Cl extract 79.82% , 187.8% at 30 minutes and 60 minutes, while at 2 hours interval alcoholic extract showed 172.8% of reduction indicating a potent anti inflammatory action .

Abstract Code: AMN351

Characterization of antimicrobial, antioxidant, and anti-inflammatory activities of *Plectranthus tenuiflorus* leaves extract

Student(s) Name: *Fatima Altarraf, Hajar Almohandis, Madhawi Alharbi, Noura Almusallam and Rawan Bawazir.*
Supervisor(s) Name: *Fulwah Alqahtani.*

Abstract:
Background *Plectranthus* is a large and widespread genus with a diversity of ethnobotanical uses. It plays a dominant role in traditional medicine. Therefore, *Plectranthus tenuiflorus* was collected from Asir, southern region of Saudi Arabia aiming to study the antimicrobial, antioxidant and anti-inflammatory properties of the polar and non-polar extracts from its leaves, in an attempt to prove whether the medicinal uses of this plant are supported by pharmacological effects.
Methods Polar extract was obtained by continuous hot extraction, while the non-polar was extracted by cold percolation. Antibacterial activity was determined using microbroth dilution method. In addition, growth of

bacteria and fungi in the presence of polar and non-polar extracts was studied over 24 hours. DPPH Scavenging Assay was used for the determination of antioxidant activity, while anti-inflammatory activity was investigated in vitro by membrane stabilization method.

Results The result of antimicrobial test showed no antifungal activity of both herbal extracts. Polar extract produced antibacterial activity against gram positive strains, particularly B. subtilis. On the other hand, non-polar extract showed antimicrobial activity against tested gram negative bacteria. DPPH Scavenging Assay revealed a dose dependent antioxidant activity for both extracts. The anti-inflammatory activity was more pronounced with the polar extract.

Conclusion In comparison between polar and non-polar extracts of *P. tenuiflorus* leaves, the non-polar has higher antioxidant activity while the polar has higher anti-inflammatory activity. Both of them have antibacterial activity on different microorganisms.

Abstract Code: AMN352

SPME-GC-MS Assessment of Volatile Composition and Biological Evaluation of the Oil and Alcoholic Extract of *Ruta graveolens* L. Growing in Saudi Arabia

Student(s) Name*: Rawan Abdullah Alrowais – Sara Mohammed Alburaidi*
Supervisor(s) Name: *Shaza Mohamed Al-Massarani*

Abstract:

Background Ruta graveolens L., family Rutaceae, is a medicinal herb used in several traditional systems to treat respiratory disease, heart problem, diabetes and many other ailments.

The present study aims to investigate the chemical composition of the essential oil of R. graveolens leaves, growing in Saudi Arabia, and to assess the biological activities of the oil and extract in different in vivo and in vitro assays.

Methods The essential oil of the fresh leaves of *R. graveolens*, collected from a local farm in Riyadh was obtained by hydrodistillation. The identification and quantification of the volatile components were accomplished by solid phase micro-extraction (*SPME*) *coupled* with *gas* chromatography and *mass spectrometry (GC-MS)*. The free radicles 2, 2-azinobis 3-ethylbenzothiazoline- 6-sulfonic acid (ABTS) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) were used to assess the antioxidant activity, while, different *In vivo* assay methods were used to assess the other investigated biological activities.

Results A total of 19 compounds representing 100% of the oil were recognized. In the ABTS scavenging assay, the volatile oil displayed a strong antioxidant activity with an IC_{50} value of 84.10±9.33 µg/mL compared to ascorbic acid (IC_{50} 90.50±7.77 µg/mL). The strongest analgesic effect was exhibited by the alcoholic extract with 55.26% inhibition using the Hot Plate method in mice compared to indomethacin (58.53% inhibition). The extract caused statistically significant ($p<0.001$) decrease in the values of serum cholesterol (156.33±3.99) mg/dl and VLDL (25.60±0.79) mg/dl compared to the untreated control.

Conclusion The present study is the first investigating Saudi cultivated *R. graveolens*. It revealed many important biological activities that can be further investigated.

Abstract Code: AMN353

Synthesis of Novel Coumarin Derivatives as Potent Cytotoxic Agents

Student(s) Name*: Monerah AlTamimy,Nouf Al-Zaid*
Supervisor(s) Name: *Maha Al-Mutairi*

Abstract:

Background Breast cancer is the leading cause of death in women both in the developed and the developing world. The anticancer agents that are currently used in clinical practice have a high incidence of side effects and multidrug resistance. There is a need for chemotherapeutic agents with fewer side effects. Coumarin and its derivatives has become an attractive subject for the researchers as it exhibits anticancer activity and possesses minimum side effects.

The objective of this investigation is to synthesize, structure elucidation and to evaluate the anticancer activity of four new 5,7,8-trimethyl coumarin-4-acetic acid derivatives.

Methods Chemistry: Four target compounds have been synthesized by direct amidation between 5,7,8-trimethyl coumarin-4-acetic acid with four different aniline derivatives utilizing EDC as a catalyst. 5,7,8-trimethyl coumarin-4-acetic acid has been synthesized by Pechmann condensation reaction.

Biology: The in vitro cytotoxicity of the target coumarin derivatives was examined using MTT cytotoxicity assay for two cell lines (MCF-7 and NM3\MDA-231).

Results Two of the target compounds showed a significant cytotoxicity against MCF7 cell line compared to camptothecin. All of them showed cytotoxic activities against MDA-MB-231 cell line, which are more potent than camptothecin.

Conclusion The results of the present investigation have demonstrated that 5,7,8-trimethyl coumarin-4-acetic acid derivatives inhibit the cell viability of hormone dependent and hormone independent breast cancer cell lines, therefore suggesting that the target compounds have potential as therapeutic agents for treatment of breast cancer

---

Abstract Code: AMN354

Multi-class method for the screening of antibiotic residues in milk by ultra-performance liquid chromatography-tandem mass spectrometry

Student(s) Name*: Shaima Fahad Alyabes, Reem Ibrahim Asulaim, Hanan Saud Alrashid*
Supervisor(s) Name: *Mona Alshehri*

Abstract:

Background The use of veterinary drugs may result in the presence of drug residues in foods of animal origin, which creates a potential health risk for consumers. Residue monitoring requires methods able to detect non-compliant samples with residues above the authorized limits in order

to ensure food safety. Ultra-performance liquid chromatography tandem mass spectrometry (UPLC-MS/MS) is a widely used and powerful analytical tool for multiclass monitoring of drug residues since it is possible to detect a large number of analytes from different classes in a short time, with high selectivity and sensitivity. The aim of our work was to develop a multi-class screening method for monitoring the residues of 3 antibiotics from 3 different classes (tetracycline, quinolone, and sulfonamide) in bovine milk using UPLC-MS/MS.

Methods Analysis was performed using UPLC-MS/MS in the multiple reaction monitoring (MRM) mode with positive electrospray ionization (ESI+). A simple sample extraction procedure based on protein precipitation using acetonitrile and liquid-liquid extraction was used and optimized to achieve efficient recovery for all compounds. A validation procedure was applied for screening purposes in accordance with European Union requirements (2002/657/EC), by evaluating the detection capability (CCβ), specificity/ selectivity, recovery, and stability.

Results The validation proved that the method has sufficient sensitivity to detect the antibiotics below the maximum residue limit (MRL), and it is successfully applied to the screening of oxytetracycline, enrofloxacin, and sulfadiazine residues in bovine milk samples collected from the local market at levels below the MRL permitted for each drug

Conclusion The results showed the applicability of the developed UPLC-MS/MS method for screening of oxytetracycline, enrofloxacin, and sulfadiazine residues in bovine milk samples at levels below the MRL. The results were acceptable in terms of detection capability (CCβ), specificity/ selectivity, recovery, and stability.

Abstract Code: AMN355

Concurrent analysis of iridoid glycoside and ursolic acid in aerial parts of *Nepeta deflersiana* by using validated HPTLC method

Student(s) Name: *Osman Mohammad Ramadan and Kenan Alghamyan*
Supervisor(s) Name: *Perwez Alam Shaikh*

Abstract:

Background The extensive use of Saudi folk medicinal plant *Nepeta deflersiana* (Lamiaceae) as anti-inflammatory, antiseptic, antimicrobial, antioxidant, and antirheumatic agent motivated us to standardize it with two biomarkers (iridoid glycoside and ursolic acid) by HPTLC method.

Methods The HPTLC analysis of iridoid glycoside and ursolic acid in the butanol and ethanol extracts of *N. deflersiana*: NDBE and NDEE, was carried out on 10×10 cm precoated HPTLC plate using chloroform, methanol and formic acid (8.9:0.8:0.3; v/v/v) as the best mobile phase. The developed plate was dried, derivatized with p-anisaldehyde, and quantitatively analyzed (UV λmax= 515 nm) by CATS 4.

Results The developed system furnished compact and sharp bands for iridoid glycoside (R_f = 0.07) and ursolic acid (R_f = 0.57). The regression equation (Y) & coefficient co-relation (r^2) of iridoid glycoside and ursolic acid were found to be 4.128X+806.99 & 0.9971 and 11.91X+237.26 & 0.9955, respectively in the linearity range of 100-1000 ng/spot. The limits of detection & quantification (LOD & LOQ) for iridoid glycoside and ursolic acid were 10.51 & 31.85 and 12.49 & 37.86 ng, respectively. The estimated contents (µg/mg dry weight) of iridoid glycoside & ursolic acid were 11.97 & 21.26 and 9.59 & 84.63 in NDBE and NDEE, respectively.

Conclusion The developed HPTLC method was found to be very effective in separation of biomarkers and phytoconstituents present in the *N. deflersiana* extracts. This method can be applied in quality control of herbal formulations containing iridoid glycoside and ursolic acid and in the study of their degradation kinetics.

Abstract Code: AMN356

Novel Utilization of Nanotechnology in Drug Discovery

Student(s) Name: *Khalid A. Albarqi*
Supervisor(s) Name: *Hatem A. Abuelizz*

Abstract:

Purpose The use of the microorganisms to produce secondary metabolites depends on finding the best culture condition to excel the maximum capacity of the microorganism to produce specific compound. This is affected by silence gene in the biosynthetic cluster or the low expression to be detected by the assay. Therefore, we utilize the nanotechnology concept to enhance the microorganisms to produce number of secondary metabolites.

Methods The bacterial were grown in 2 liters for 7 days. Then centrifuged, and the supernatants were extracted twice with equal volumes of ethyl acetate. Then the organic solvent evaporated and the residue dissolved in MeOH and analyzed by reversed-phase HPLC. Cytotoxic activity of *Streptomyces scabies* production media was evaluated in MTT-based assays with human cervical cancer cells (HeLa) and colon cancer cell line (LoVo).cells were seeded in 96-well plates. After 24 h incubation at 37°C in a humidified atmosphere of CO2, the medium was removed and replaced with fresh RPMI 1640 medium with FBS (10%) and MTT (0.5 mgmL1).The cells were incubated for 3 h at 37°C and then the MTT-containing media was removed and replaced with isopropanol containing HCl. Reading The plate absorbance at 570 nm by using a microplate reader. Cells treated with trichloroacetic acid in H2O for 24 hrs were used as positive controls (100% lethality). Repeat the process three times.

Results The IC_{50}s of the bacterial with gold nanoparticles in LoVo and HeLa cell lines were 7ng/mL and 5ng/mL, respectively. Compared with no nanoparticles, the IC50 was 19ng/mL in HeLa cell line and 34ng/mL in LoVo cell line.

Conclusion The new compound was concomitant with the disappearance of a produced compound which was confirmed by HPLC. Moreover, the production of the new compound was because of the nanoparticles effect which we anticipate it can be used in the gene manipulation of the biosynthetic clusters.

Abstract Code: AMN357

A New Method to Determine the Novel Multi-Kinase Inhibitor "Foretinib" in Biological Fluids Using Micellar-Enhanced Spectrofluorimetry

Student(s) Name: *Abdulrahman Alqhtani*
Supervisor(s) Name: *Hany Darwish*

Abstract:
Background Foretinib is an oral multi-kinase inhibitor which is indicated in treatment of various types cancers including cancer.The purpose of this study is to determine and quantify foretinib in biological fluids such as urine using simple and highly sensitive spectrofluorimetric method
Methods The proposed method is based on the investigation of the fluorescence spectral behavior of foretinib in HCO40 micellar system. In aqueous solution, the fluorescence intensity of foretinib was greatly enhanced (five folds) in the presence of HCO40. The fluorescence intensity was measured at 344 nm after excitation at 280 nm.
Results The fluorescence –concentration plot was linear over the range 70–2000 $ngmL^{-1}$, with lower detection limit of 25.50 $ngmL^{-1}$. The proposed method was successfully applied to the determination of foretinib in spiked urine. Recovery values of foretinib with the current method was 99.68±0.88 and 100.44±3.91 % for pure powder and spiked urine, respectively.
Conclusion The suggested method is simple, less time consuming and does not require the elaborate treatment associated with other chromatographic methods; moreover, it is sensitive, with no need for derivatization reactions.

Abstract Code: AMN358

Development of Specific New ELISA for Bioanalysis of Cetuximab: A Monoclonal Antibody Used for Cancer Immunotherapy

Student(s) Name: *Manal El-Gendy*
Supervisor(s) Name: *Ibrahim Darwish*

Abstract:
Background Cetuximab (CET) is a monoclonal antibody that inhibits epidermal growth factor receptor (EGFR) used for immunotherapy of different types of cancer. Additionally, CET used in combination therapy, potentiates the effects of chemotherapy and radiation therapy in eradicating well established tumors. Recently, a combination of CET and newly developed chemotherapeutic candidate drugs are being investigated for use as new-generation chemotherapy.
Methods The assay involved the non-competitive binding reaction of CET to its specific antigen (human epidermal growth factor protein; EGFR) followed by a chromogenic enzyme reaction for immune detection of the CET- EGFR complex and color development. Technically, CET was captured by EGFR antigen protein immobilized onto a 96-well assay plate. The CET- EGFR complex formed onto the plate wells was quantified, for the first time, using alkaline phosphatase enzyme labeled anti-human IgG (ALP-IgG) and para-nitrophenyl phosphate substrate (pNPP) as a chromogenic substrate for alkaline phosphatase enzyme.
Results The optimum conditions for conducting the proposed ELISA were established and its analytical performance was evaluated as per the guidelines for the validation of immunoassays for bioanalysis. The assay limit of detection (LOD) was 1.5 ng/mL and the effective working dynamic range was 5-6250 ng/mL. The accuracy and precision of the assay were proved.
Conclusion We have developed and validated a highly sensitive and selective ELISA for quantitation of CET in plasma samples. The proposed ELISA method for CET shows acceptable precision and, accuracy and adequate sensitivity to contribute to study its PK, PD, and TDM and appears to be suitable for employment in all clinical laboratories.

Abstract Code: AMN359

Unraveling the binding characteristics of the anti-HIV agent efavirenz to bovine serum albumin using spectroscopic and molecular simulation approaches

Student(s) Name: *Manal El-Gendy*
Supervisor(s) Name: *Ibrahim Darwish*

Abstract:
Background Efavirenz (EFV), is a non-nucleoside reverse transcriptase inhibitor indicated as the antiretroviral of choice for first-line treatment against HIV-1. The present study attempts to study the binding characteristics between EFV and BSA.
Methods Fluorescence measurements (emission, synchronous and 3D) were accomplished on a Jasco FP-8200 (Jasco Int. Co. Ltd. Tokyo, Japan) utilizing a 1 cm quartz cuvette. For the spectral determinations, λ_{em} was set in the range 290-500 nm following excitation at λ_{ex} 280 nm. Molecular docking study was executed to define the binding pocket for EFV on the BSA surface.
Results EFV was found to statically quench the intrinsic fluorescence of BSA with binding constants of 10^4 $Lmol^{-1}$. Fluorescence quenching results were further interpreted to obtain the thermodynamic features of the interactions which revealed spontaneous interactions between EFV and BSA with ΔH° value of -2.56 $kJmol^{-1}$ and ΔS° value of 74.14 $Jmol^{-1}K^{-1}$. Synchronous fluorescence measurements showed that the intrinsic fluorescence of BSA was being quenched by EFV with no alteration in the microenvironments around the tryptophan and tyrosine residues of the BSA upon binding. Furthermore, markers of the BSA binding sites were incorporated to identify the binding site(s) on BSA for EFV. It was found that EFV binds to Sudlow site I on the BSA which was further supported with the molecular docking findings.
Conclusion The acquired data in the present study can aid in investigating the pharmacodynamics and pharmacokinetics properties of such an important anti-HIV drug.

Abstract Code: AMN360

Development of Specific New ELISA for Bioanalysis of Cetuximab: A Monoclonal Antibody Used for Cancer Immunotherapy

Student(s) Name: *Abdullah Saud Mohammed*

Supervisor(s) Name: *Ibrahim A. Al-Suwaidan, Alaa A.-M. Abdel-Aziz*

Abstract:

Background Imide moiety is an integral part of structures of various important molecules such as granulatimide, isogranulatimide, and thalidomide. Moreover, cyclic imides, such as succinimide, maleimide, and phthalimide possess structural features, which confer potential biological activity and pharmaceutical use, such as antitumor, anticonvulsant, anti-inflammatory, hypoglycaemic, anti-hyperlipidemic, carbonic anhydrase inhibitors and COX-2 inhibitors.

Methods Cyclic imides are prepared by refluxing an appropriate acid anhydride and 4-(2-aminoethyl)benzenesulfonamide in glacial acetic acid for a proper time. The crude samples are purified by recrystallization and the target molecules were confirmed by reported melting points.

Results Synthesis of five cyclic imides, purification by efficient recrystallization, and apply the technique of melting point determination and yield calculations. The chemical structure of synthesized imides was determined by spectroscopic analyses. The antitumor activity was evaluated against 48 human tumor cell lines taken from nine different organs. Some of the target compounds showed moderate activity against some cancer cell lines.

Conclusion Cyclic imides were successfully prepared and easily assigned on the basis of spectroscopic data analysis. The antitumor activity of the target molecules was investigated.

Abstract Code: AMN361

Development of HPLC with fluorescence detection method and microwell plate assay with fluorescence reader for analysis of linifanib in its bulk and dosage forms

Student(s) Name: *Mamdouh Alanazi*
Supervisor(s) Name: *Ibrahim Darwish, Nasr Khalil, Mohammed Hamidaddin*

Abstract:

Background Linifanib (LFB) is a receptor tyrosine kinase inhibitor with potential antineoplastic activity. Most of the existing methods for analysis of LFB in bulk and dosage form do not meet the requirement of quality control analysis. Therefore, the present study was devoted to the development of two methods with high analytical throughputs for LFB. These methods are: HPLC with fluorescence detection (HPLC-FL) and 96-microwell plate assay with fluorescence reader (MWP-FR).

Methods ***HPLC-FL:*** HPLC was a Shimadzu system. The chromatographic separations of LFB and quinine sulphate (QS) as internal standard were performed on µ-Bondapack CN column in isocratic mode. The mobile phase consisted of acetonitrile:water (60:40, v/v) pumped at 1 ml/min. The fluorescence detector was set at 324 nm for excitation and 480 nm for emission.

MWP-FR: LFB solution (50 µl containing 0.02 – 12 µg) was transferred into each well of 96-microwell white-opaque assay plate. The fluorescence signals were measured at 360 nm for excitation and 500 nm for emission.

Results ***HPLC-FL:*** The retention times for LFB and QS were 2.85 and 5.25 min, respectively. The linear range of the method was 4 – 20 ng/ml. The limit of detection (LOD) and limit of quantitation (LOQ) were 4.38 and 14.45 ng/ml, respectively.

MWP-FR: The linear range of the method was 0.02 – 12 µg/well. The LOD and LOQ were 0.35 and 1.14 µg/well, respectively.

Conclusion HPLC-FL and MWP-FR methods with high throughputs have been developed and validated for analysis of LFB in its bulk and dosage forms in quality control laboratories.

Abstract Code: AMN362

Isolation and Identification of Antidiabetic compound from the Saudi Arabian plant Teucrium oliverianum (Ulhen)

Student(s) Name: *Saud A. Asaad*
Supervisor(s) Name: *Adnan J. Al-Rehaily*

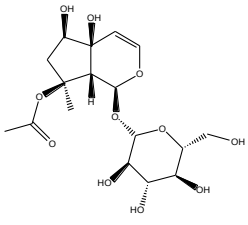
Abstract:

Background *Teucrium oliverianum* Ging and Benth (*T. oliverianum*), locally known as Ulhen, is a medicinal plant commonly grown in Saudi Arabia. *T. oliverianum* belonging to the family of *Lamiaceae* is wide spread in flood plains and wadis in the eastern, central and northern regions. *T. oliverianum* is a medicinal plant used in traditional and herbal medicine for the treatment of diabetes, liver diseases and inflammatory conditions. The aim of this study was to isolate, identify and evaluate the active compound from active fraction of the plant.

Methods Dried and finely powdered aerial parts of T. oliverianum were defatted with hexane and extracted with MeOH. The n-butanol soluble part (active fraction) of the methanolic extract was separated by column chromatography on silica gel to afford several fractions. A polar fraction was subjected to repeated column chromatography and HPLC on a RP18 semi-preparative column, resulting in the isolation of compound 1. The structure of the compound was elucidated from its 1D and 2D nuclear magnetic resonance profiles, and by comparison to literature. The compound was tested in vivo hypoglycemic and antidiabetic using mice and α-glucosidase activities

Results 8-O-acetyl harpagide (1) was isolated as the active compound. It showed significant in vivo hypoglycemic activity with 44.39% of glucose inhibition compared to the standard drug glibenclamide (55.29%) and significant antidiabetic activity with 46.36% of glucose inhibition compared to the standard drug glibenclamide (52.26%). In addition, it displayed weak □-glucosidase inhibition activity (IC_{50} 1.90Mm).

Conclusion We isolated hypoglycemic and antidiabetic compound from *T. oliverianum* by chromatography. The active compound was identified by its 1D and 2D NMR spectra.

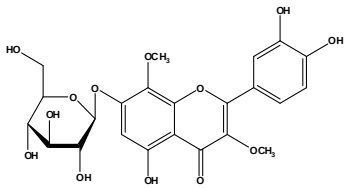


Abstract Code: AMN364

Phytochemical Study of *Nuxia congesta*

Student(s) Name: *Abdullah Abdulaziz Aljulayfi, Mussab Youseff Alakeel*
Supervisor(s) Name: *Ali A. El Gamal*

Abstract:
Background *Nuxia congesta* is one of the rare plants growing in Saudi Arabia (family Buddlejaceae). Several *Nuxia* species are plants of economic and medicinal interest with a rich diversity of ethnobotanical uses.The main goal of the present study is to emphasize the phytochemical constituents of the aerial parts of *Nuxia congesta* and to develop HPTLC profiling for the plant extracts and qualitative identification of β-sitosterol and ursolic acid markers.
Methods The aerial parts of *Nuxia congesta* was extracted with 80% ethanol at room temperature. The hydroalcoholic extract was concentrated under reduced pressure. The obtained extract was successively partitioned with *n*-hexane, chloroform, ethyl acetate and *n*-butanol. Eethyl acetate extract was subjected to CC over silica gel and eluted with CH_2Cl_2/MeOH, gradient. Similar fractions were pooled together. Direct crystallization afforded one pure compound. Additionally, the HPTLC analysis of β-sitosterol and ursolic acid in the obtained fractions was carried out on precoated HPTLC plate using pet. ether/EtOAc (75:25) as a solvent system. The developed plate was dried and derivatized with *p*-anisaldehyde reagent. The derivatized HPTLC plate was visualized at 520 nm wavelength by CATS 4.
Results Chromatographic separation and purification of EtOAc fraction of *Nuxia congesta* led to isolation of new flavonoid glucoside. Measurement of 1D and 2D NMR for the isolated compound revealed its chemical structure as 5,3',4'-trihydroxy-3,8-dimethoxy flavone- 7-O-□-D-glycopyranoside. Moreover, the qualitative analysis for β-sitosterol and ursolic acid as biomarkers was achieved by HPTLC. *n*-Hexane, methylene chloride and total alcoholic extracts proved the presence of β-sitosterol while ursolic acid was detected in chloroform , ethyl acetate and total alcohol extracts.
Conclusion One new flavonoid glucoside has been isolated from the aerial parts of *Nuxia congesta* Moreover, HPTLC analysis proved the presence of the biomarkers, β- sitosterol and ursolic in different extracts.



Abstract Code: AMN365

Liquid chromatographic method for the determination of Rociletinib following incubation in rat liver microsomes: A metabolic stability application

Student(s) Name: *Emad Fayez Almudarre*
Supervisor(s) Name: *Adnan A. Kadi*

Abstract:
Background Rociletinib (ROC) is a new oral tyrosine kinase inhibitor that acts mainly by inhibiting vascular endothelial growth factor receptor (VEGFR). A fast, specific, sensitive and validated LC method was established for the determination of ROC in rat liver microsomes (RLMs). This method was applied in metabolic stability investigation of ROC.
Methods Preparation of RLMs was made in-house utilizing Sprague Dawley rats. Six rats (Sprague-dawley) were obtained from the experimental animal care center (College of pharmacy, KSU, Riyadh, Saudi Arabia). Reversed phase C18 column (50mm, 1.8□m, 2.1 mm i.d) and isocratic binary mobile phase (55% 0.1% formic acid: 45% ACN) were used for chromatographic separation of ROC and internal standard (bosutinib). The flow rate, total run time and injection volume were fixed at 0.2 mL/min, 4 min, 5 µL respectively. The metabolic stability assessment of ROC in RLMs was applied by the proposed method depended on disappearance rate of ROC in the course of its incubation with RLMs. The $t_{1/2}$ and CL_{int} were used in vitro for expressing the metabolic stability.
Results The linearity of the established method ranged from 50 to 500 ng/mL ($r^2 \geq 0.9997$) in RLMs. Retention times were 1.05 and 2.23 minutes for internal standard and ROC, respectively. The intra- and inter-day precision and accuracy were 2.66% and 99.17with an average recovery of 100.74%.
Conclusion The suggested methodology was beneficial in evaluating ROC metabolic stability. This methodology may be applicable for pharmacokinetic and bioequivalence studies**.**

Abstract Code: AMN366

Development And Validation Of Ciprofloxacin In Solid Oral Formulation And Mice Plasma By Rp-Hplc

Student(s) Name: *Mohammed ali Altuwaijri*
Supervisor(s) Name: *Mostafa Saied, Abdullah Alhossaini*

Abstract:
Background Ciprofloxacin, is a widely prescribed antibacterial agent for the treatment of in urinary tract and respiratory tract infections, as well as against skin infections. A rapid and sensitive reversed phase high performance liquid chromatographic method (RP-HPLC) has been developed and validated for the determination of the ciprofloxacin in both tablets and mice plasma samples.
Methods The HPLC method was preformed using a C-18 column (LichroCART® 125x4mm, 5µm) and an isocratic mobile phase consisting of acetonitrile: phosphate buffer (40:60 v/v) at a flow rate of 1.0 mL/min. The drug was detected using UV detector at the wavelength of 278nm.
Results The retention time was under 3 minutes. The method was validated and was found to be an accurate, repeatability and consistent.
Conclusion The developed HPLC method can be successfully used for the analysis of the drug in marketed formulations without any alteration in the chromatography conditions.

Abstract Code: AMN367

Synthesis and Antimicrobial Activity of dipeptide candidate Linked to Nicotinic Acid as a Starting Material

Student(s) Name: *Hamad A. Alhabeeb*
Supervisor(s) Name: *Abdul-Rahman M. Al Obaid, Ahmed M. Naglah*

Abstract:
Purpose Nicotinic acid plays a vital role in biological processes such as the production of energy. Otherwise, some of peptides have been studied with respect to antimicrobial activities. Therefore, in the present study we aimed to conjugate dipeptide and nicotinic acid as a starting material expecting to possess antimicrobial activity.
Methods Nicotinic acid (**1**) was converted to nicotinoyl chloride (**2**) through thionyl chloride, while (**2**) was coupled with a free glycyl-glycine-methyl ester to give nicotinyl-glycyl-glycine-methyl ester (**3**). Hydrazinolysis of (**3**) with hydrazine hydrate (99%) led to the corresponding dipeptide hydrazide (**4**). The antimicrobial activity of the compound (**4**) was evaluated by agar well diffusion.
Results The produced compound was confirmed by means of their spectral data. Compound (**4**) gave the promising activity in this study and possessed good MIC value.
Conclusion In our study, the peptide candidate (**4**) was synthesized using solution method. This compound was evaluated for its antimicrobial activity, showing significant results.

Abstract Code: AMN369

Green Synthesis of Cobalt Phosphate Nanoplatelates using *Pandanus odorifer* leaf extract for water oxidation reaction

Student(s) Name: *Saad Ammash Alrashidi*
Supervisor(s) Name: *Mohamed Fahad Alajmi*

Abstract:
Background Cobalt phosphate nanoplatelates were synthesized by a green route using microwave irradiation method for water oxidation reaction.
Methods The nanoplatelates of cobalt phosphate were synthesized by microwave reaction method using *Pandanus odorifer* leaf extract as reducing agent. The reaction mixture was sonicated for 30 min, followed by microwave irradiation at a power of 600 W for 15 min. Cobalt phosphate nanoplatelates as the electrocatalysts were examined for water oxidation reaction in alkaline medium (1.0 M KOH) vs. Ag/AgCl electrode.
Results The synthesized nanoplatelates were characterized by scanning electron microscopy (SEM), EDX, powder X-ray diffraction (XRD), and BET analyses. XRD and EDX studies confirmed the phase purity of cobalt phosphate nanoplatelates. The SEM images showed that cobalt phosphate was grown in platelets or sheet like nanostructures with thickness ranging from 90-150 nm, and length of about ~4 µm. BET analysis showed that nanoplatelates have high specific surface area with uniform pore size distribution. Cobalt phosphate nanoplatelates as the electrocatalysts were examined for water oxidation reaction in alkaline medium (1.0 M KOH) vs. Ag/AgCl electrode. Low overpotential, low tafel, and low onset potential values of cobalt phosphate electro-catalysts revealed the low energy loss during the electrochemical water oxidation process. Chronoamperometry and long-term cyclic voltammetry also confirm the durable nature of cobalt phosphate electrodes in alkaline medium.
Conclusion The synthesized cobalt phosphate nanoplatelates were found crystalline and showed low overpotential, low tafel, and low onset potential values reveal the low energy loss during the electrochemical water oxidation process.

Abstract Code: AMN370

Bioassay-guided fractionation and identification of α-amylase inhibitors from *Commiphora myrrh* Resins

Student(s) Name: *Muhammad Alganem and Mohannd Alabdulsalam*
Supervisor(s) Name: *Ali S. Alqahtani*

Abstract:
Background Pancreatic α-amylase inhibitors serve as important strategies in the management of diabetes mellitus. The oleo-gum resins of *Commiphora myrrh* (Myrrh) is traditionally used to treat various inflammatory and metabolic diseases. However, there is no scientific evidence was reported for its antidiabetic effects.
Methods Ethanolic extract and different solvent fractions of *Commiphora myrrh* resins were investigated for α-amylase inhibitory activity and radical scavenging capacity. The Bioassay-guided fractionation was continued with isolation and identification of α-amylase inhibiting compounds. 80% ethanolic extract was fractionated with various polarity solvents (hexane, cholorform, ethyl acetate, butanol and water). Solvent fractions were evaluated for *in vitro* α-amylase inhibitory assay. ethyl acetate fraction was carried out for further studies to isolate the inhibitory compounds. Structures of the isolated compounds were elucidated using 1H and 13C NMR depth 135 spectroscopic analysis respectively .
Results All the samples exhibited antioxidant activities, among which ethyl acetate fraction was found to contain the highest amounts of phenolic compounds. Among the various extracts, ethyl acetate fraction showed significant α-amylase inhibition, which was further sub-fractionated to isolate the active compounds. The ethyl acetate fraction inhibited porcine pancreatic α-amylase with an IC50 of 54.3 µg/mL.
Conclusion The present study revealed strong α-amylase inhibitory effects of *Commiphora myrrh* resins. The present findings showed that studied myrrh samples may have some promising antidiabetic compounds.

Abstract Code: AMN371

A Way to Discover Small Molecule Inhibitors of PsaA: A Potential Target for *Streptococcus pneumoniae*

Student(s) Name: *Khalid Saad Almutairi*
Supervisor(s) Name: *Ahmad J. Obaidullah*

Abstract:

Background Due to development of multidrug resistance in *Streptococcus pneumoniae* over the last few years, research has begun to define new drug targets for pneumonia therapy. Multiple experiments with *Streptococcus pneumoniae* performed by different research groups have identified a lipoprotein PsaA that is important for pneumonia virulence and is also a promising target for pneumonia therapy. PsaA is a high-affinity manganese transporter that is required not only for pneumonia virulence, but also for aerobic growth of *Streptococcus pneumoniae*. We hypothesized that targeting PsaA by small molecule inhibitors may offer a new avenue to an effective treatment for pneumococcal infections.

Methods We have employed computer modeling and computational chemistry to virtually screen small-molecule databases for inhibition of PsaA function. We targeted the metal binding pocket and performed structure-based virtual screening using the flex search in UNITY of SYBYL. Then, we performed molecular docking and scoring to the hits by using GOLD. After that, we analyzed the result.

Results A pharmacophore model that consists of the structural features thought to be important for binding of small molecule inhibitors to the metal binding site was built. More than 15 million compounds were screened from different databases based on the constructed pharmacophore template using the flex search in UNITY. Using a virtual filter, about 1045 hits were identified and then docked into the binding cavity and scored using GOLD. The best hits were analyzed and then selected.

Conclusion We concluded the structure-based virtual screening with 100 compounds that will inhibit *Streptococcus pneumoniae* growth. We will next experimentally test the compounds' effect on Mn uptake and their PsaA dependence.

Abstract Code: AMN372

Evaluate the Affinity of Nonsteroidal Anti-inflammatory Drugs Against Fatty Acid Amide Hydrolase

Student(s) Name: *Mehdi Mourad bouchenak*
Supervisor(s) Name: *Nawaf A. AlSaif*

Abstract:

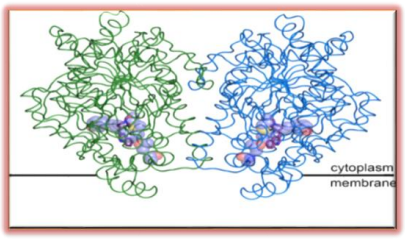
Background Fatty acid amide hydrolase (FAAH) is one of the serine hydrolase enzymes that have the ability to hydrolase fatty acid amides. Pharmacological inactivation of FAAH produces analgesic, anti-inflammatory, anxiolytic, and antidepressant phenotypes. The current study focuses on the use of molecular modeling to evaluate the affinity of nonsteroidal anti-inflammatory drugs against the FAAH enzyme.

Methods The affinity of the tested non-steroidal anti-inflammatory drugs (NSAIDs) was established using a molecular modeling approach

Results

Drug name	Binding Affinity	Drug name	Binding Affinity
OL-135	-8.8	lornoxicam	-8.1
Aceclofenac	-8.9	nabumetone	-8.6
Acemetacin	-9.5	naproxen	-8.5
diclofenac	-8.4	nimesulide	-9.2
Dexibuprofen	-8	Piroxicam	-9
Dexketoprfen	-9.7	proglumetacin	-11
Etoricoxib	-9.9	rofecoxib	-9.3
flurbiprofen	-9.1	tenoxicam	-8.2
ketoprofen	-9.7	tiaprofenic	-8.6
valdecoxib	-8.5		

Conclusion This study demonstrated that some of NSAIDs have affinity to FAAH. The docking results of lornoxicam and tenoxicam indicated low affinity to the FAAH enzyme. On the other hand, the docking results of Acemetacin, Dexketoprfen, Etoricoxib and ketoprofen showed higher affinity to the enzyme than OL-135. Proglumetacin has the highest affinity among the other NSAIDs. Docking helps to decrease the tremendous expense and time required to search for new drugs and encourages the advancement of more specific therapeutic agents with fewer undesirable reactions.



Abstract Code: AMN373

Pharmacophore Modeling and Virtual Screening for PI3K Inhibitors

Student(s) Name: *Mohammed S. Alghdieyr*
Supervisor(s) Name: *Abdulrahman A. Almehizia*

Abstract:

Background Phosphoinositide-3-kinases (PI3Ks) belong to a family of signal transducing enzymes involved in the regulation of multiple biological processes, including cell growth, survival, differentiation, proliferation and migration. PI3Ks are divided into three classes (I, II, and III). Class I PI3Ks are further divided into two groups: Class IA, which includes PI3K-α, β, and δ, and Class IB, which contains PI3K-gamma (γ). The PI3K/AKT/mTOR pathway is of critical importance in tumor development.

Methods Pharmacophore modelling was performed using the GALAHAD pharmacophore modelling module to analyze the important features of ten known PI3K inhibitors. The National Cancer Institute (NCI) Chemical database 2012 was obtained and filtered to match the pharmacophore features. Followed by sequential filters to ensure drug-like as well as good physicochemical properties. Molecules passing the filters were used to perform virtual high-throughput screening utilizing the crystal structure of the PI3Kγ (PDB ID: 3MJW). Screening results were ranked on the bases of binding energy and the docking scores. Molecules baring a docking score of more than 6 were further analyzed for binding interactions with known amino acid residues reported in the crystal structure. Finally, molecules with strong binding

interactions with the PI3Kγ receptor were used to measure their anticancer activity.
Results we were able to discover several promising compounds with therapeutic potentials. Molecules were discovered after the application of several computer-aided methods, such as pharmacophore modelling, virtual screening, as well as molecular docking experiments. Three molecules showed promising anticancer activities on breast cancer cell-lines as PI3K inhibitors.

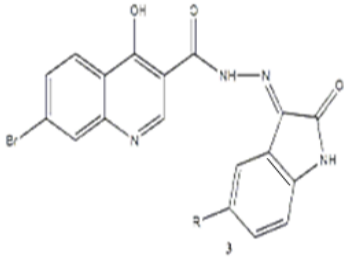
Abstract Code: AMN374

Design And Synthesis Of Some Quinoline-Isatin Hybrid As Antibacterial Agent

Student(s) Name: *Anhar A. Alhariqi, Manal A. Alghamdi, Monera I. Alrofaiq, Sarah A. Sheer*
Supervisor(s) Name: *Reem Alwabli*

Abstract:
Background Bacterial infection is considered one of the leading causes of many diseases and death. So recently, novel antibacterial agents with low resistance probability have been focus many of research. Quinoline has antibacterial, antifungal, antimalarial, and anticancer activities. Furthermore, isatin moiety has antibacterial, anticancer, antifungal, and anticonvulsant activities. These observations gave us motivation to design and synthesize a hybrid quinoline ring with isatin moiety linked through azomethine linkage and to test their antibacterial activity.
Methods Synthesis of (15E)-7-bromo-N'-(5-R-1,2-dihydro-2-oxo-3aH-indol-3(7aH)-ylidene)-4-hydroxyquinoline-3-carbohydrazide: the acid hydrazide and the appropriate isatin derivative was refluxed in ethanol, using catalytic amount of glacial acetic acid. Investigating the susceptibility of microorganisms to the tested compounds was conducted using the agar diffusion method.
Results The target compound structure was confirmed using different spectroscopic tools. The antibacterial activity were tested against gram +ve and gram –ve bacteria. The results revealed some antibacterial effect on Gram-negative organisms.

Conclusion Quinoline-isatin schiff's bases were synthesized and tested against some bacterial strains. Some of the compounds showed moderate activity, while the bromo derivative revealed a comparable activity to ampicillin against Klebsiella and can be the focus of further researches in the future.



Others

Abstract Code: AO450

A spectroscopic and computational insight into the molecular interaction of Schiff base organometallic complexes with α-acid glycoprotein (AGP)

Student(s) Name: *Mutlaq Edah Almalki*
Supervisor(s) Name: *Mohamed Fahad Alajmi*

Abstract:
Background AGP is an acute phase plasma protein which acts as immune-modulatory protein by binding and transporting various exogenous and endogenous compounds. Previously, our group has synthesized and characterized novel Schiff base organometallic complexes exhibiting prominent anti-inflammatory properties. In the present study, the mechanism of interaction between Schiff base organometallic complexes with AGP was evaluated.
Methods We examined the interaction between organometallic complexes and AGP by fluorescence spectroscopy, circular dichroism (CD) and molecular docking techniques. Quenching in AGP fluorescence was measured in 285-400 nm range after excitation at 280 nm. Synchronous fluorescence was measured to evaluate the contribution Tyr and Trp residues in quenching. Intermolecular distance between quencher and organometallic complex was measured by FRET. Effect of organometallic complexes binding on the overall AGP structure was measured by far-UV CD. Insight into molecular interaction between AGP and organometallic complexes was gained by molecular docking.
Results Results suggested that organometallic complexes quenched the fluorescence of AGP by binding near to Trp. Binding constants of organometallic compounds were of the order of 10^5 M^{-1}. FRET demonstrated that the distance between organometallic complexes and Trp residue varied in 2.50 – 3.50 nm range. A conformational change in AGP structure was observed upon organometallic complexes binding. Molecular docking results indicated that hydrophobic interactions and hydrogen bonding played significant role in stabilizing the complex between organometallic complexes and AGP.
Conclusion Knowledge of interaction between AGP and organometallic complexes will lead us to evaluate the pharmacokinetics and pharmacodynamics of the organometallic complexes used in this study.

Abstract Code: AO451

Pharmacokinetic Behavior Of Thymoquinone In Kidney Disease And Liver Dynsfcuntion In An Animal Model

Student(s) Name: *Mohammed S. Alghdieyr*
Supervisor(s) Name: *Abdulrahman A. Almehizia*

Abstract:
Background Thymoquinone (TQ) is an active naturally occurring small molecule. TQ has displayed a plethora of

pharmacological activities including antioxidant, anti-inflammatory and immunomodulatory properties. The present work investigates the effect of kidney disease and liver dysfunction on the pharmacokinetics of TQ in an animal model.

Methods Wistar male rats (n=5 per group) were used in the study. Acute kidney injury was induced by injecting animals with gentamicin 80 mg/kg IM for 15 consecutive days, while a liver injury was elicited by the administration of D-galactosamine 800 mg/kg IP as a single dose. A Single dose of TQ (5 mg/kg) was administered IV to animals and blood samples were collected at specific time points. The concentrations of TQ in plasma samples were measured by ultra-high performance liquid chromatography (UHPLC), and the pharmacokinetic parameters were determined using a non-compartmental analysis.

Results The C_{max} of TQ was 9.58 ±1.36 µg/ml in the kidney disease group, and 15.33 ±1.03 µg/ml in the liver dysfunction rats as opposed to normal controls (11.73 ±1.06 µg/ml; p = 0.001). The area under the plasma concentration-time curve ($AUC_{0-\infty}$) was 36.86 ±1.69 µg/ml*h in rats with kidney impairment; however, it was 43.24 ±2.76 µg/ml*h in the liver dysfunction group compared with healthy rats (38.41 ±2.22 µg/ml*h, p =0.002). The calculated systemic clearance (CL) of TQ was 1.35 ±0.06 ml/h/kg in the kidney disease group; while it was 1.16 ±0.07 ml/h/kg in the liver dysfunction group as compared with normal rats (1.30 ±0.07 ml/h/kg, p =0.001). The volume of distribution (Vd) was 49.41 ±1.91 ml/kg in rats with acute kidney injury (p = 0.001) and 27.20 ±2.98 ml/kg in rats with liver injury compared to normal controls (31.41 ±2.43 ml/kg).

Conclusion Both kidney disease and liver dysfunction have a modest influence on TQ disposition in rats following IV administration.

Abstract Code: AO452

Autosomal Recessive Cerebellar Ataxia Caused by a Novel Cys89Ser Mutation in a Saudi Family

Student(s) Name: *Hadeel Jaber, PharmD.*
Supervisor(s) Name: *Maha AlRasheed, Namik Kaya*

Abstract:

Background Hereditary ataxias are genetic disorders manifesting with gait imbalance as well as hand, speech and/or eye movement incoordination. They are inherited as autosomal dominant, autosomal recessive, X-linked, or mitochondrial traits. Autosomal recessive cerebellar ataxia (ARCA) is a rare, complex ataxia subtype, encompassing a heterogenous group of neurodegenerative disorders of the cerebellum. This study aims to identify causative mutation(s) in a consanguineous Saudi family with children having ARCA.

Methods The family comprised 6 members including 3 affected children. DNA was extracted using PureGene DNA Purification Kit, then quantified and used for SNP Axiom Arrays and autozygosity mapping. The proband's DNA was also subjected to exome sequencing using TruSeq Exome Enrichment Kit. Utilizing autozygosity mapping coupled with exome sequencing, candidate exonic and splicing variants were identified, then filtered based on homozygosity and low frequency (<0.0001) in genomic databases. Polymerase chain reaction was performed using suitable designed primers, and DNA amplicons were Sanger sequenced to verify variant presence and segregation.

Results We identified a novel missense mutation in *GBA2* (c.266G>C; p.Cys89Ser), which was segregated, absent in Saudi controls, and reported internationally only as heterozygous with very low frequency (~$5x10^{-5}$). These factors, in addition to previous reports of ARCA cases linked to other *GBA2* mutations suggest that our mutation is disease-causing and not a polymorphism.

Conclusion Our study adds to the existing evidence of mutations underlying ataxia disorders. It also helps parents conceive healthy children via preimplantation genetic diagnosis, facilitates genetic counseling, and informs knowledge of the disease to enable future development of treatments.

College of Pharmacy Research Day is generously supported by:

Coffee is sponsored by:

pharmacy.ksu.edu.sa/en/coprd