College of Pharmacy Research Day Program

8:00 – 9:00	**Registration**
9:00 – 9:15	**Opening ceremony**
9:15 – 9:45	**Keynote Presentation by Dr. Mazen Hassanain**
9:45 – 10:15	**Faculty Presentation by Dr. Ted Morton**
10:15 – 10:45	**Graduate Student Presentation**
10:45 – 11:30	**Poster Viewing**
11:30 – 12:00	**Award Ceremony and Closing Remarks**

Dean's Message

Dr. Yousif A. Asiri

The renaissance taking place in the overall health sector in the Kingdom does not coincide with the pharmaceutical services available at the present time, where pharmaceutical services are still incapable of coping with this renaissance. This is due to the suffering of the pharmaceutical service sector from the severe shortage in the number of pharmacists and the level of service provided to patients, where studies affirmed that the job market in Saudi Arabia needs more than seventeen thousand pharmacist to work in different health sectors until 1445 H (2026), and that the job market is also suffering from a shortage of qualified personnel specialized in the area of Pharmaceutical Sciences.

Given the importance of upgrading the level of pharmaceutical sciences and the research skills, the College of Pharmacy has initiated an Annual Research Day to encourage faculty members, graduate students and undergraduate students to actively participate in the research process. This integration is pioneer to the academic culture in Saudi Arabia, and it is expected to move the research environment to an advanced level.

Finally, I would like to thank the organizing committee, faculty and administration members, as well as participating students for the great effort they had to put in order to make this idea a reality. Last but not least, I would like to extend special thanks to Dr. Hisham Aljadhey, Vice-Dean for Academic Affairs, for initiating this event.

Organizing Committee

Dr. Aws Alshamsan
Assistant Professor of Nanobiotechnology
Department of Pharmaceutics

Dr. Hesham Korashy
Assistant professor of Molecular Toxicology
Department of Pharmacology and Toxicology

Dr. Maha Al-Motairi
Vice-Dean

Dr. Ihsan Abodahab
Professor of Medicinal Chemistry
Department of Pharmaceutical Cehmistry

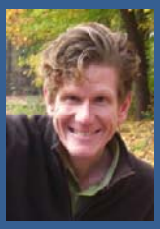
Students
Mr. Ali Alwabil
Mr. Ahmad Alghamdi
Mr. Abdullah Alshmaimri

Pharmacy Student Union
Mr. Hazza Al-Maqati

Speackers

Dr. Mazen Hassanain

Dr. Mazen Hassanain graduated from King Saud University's college of medicine in Riyadh, Saudi Arabia, in 1999 with a 2nd degree honor. He then joined the academic staff of the Department of General Surgery at King Saud University. Dr. Hassanain then went on to compete 5 years of training in General Surgery at McGill University. He is now a Fellow of the Royal College of Physicians and Surgeons of Canada (FRCSC), as well as American Board of Surgery certified. He holds certificates in both Hepato-Pancreato-Biliary Surgery and Surgical Oncology from completing his training at McGill University. In the last 3 years, he has presented 20 orals/posters at 15 national and international meetings, which has resulted in 12 peer-reviewed publications. Dr. Hassanain's ability to balance a very busy clinical practice with his research activities has allowed him to simultaneously pursue a Ph.D. in the Division of Experimental Surgery. As a result he has completed a randomized controlled clinical trial entitled "High Dose Insulin Therapy in Patients Undergoing Major Hepatectomy ." His research interests include hepatocyte regeneration and liver function in both the surgical and the transplant areas, and in the anti-inflammatory effect of the high dose insulin therapy, when given to patients with heightened stress response. Dr. Hassanain is currently an assistant professor in the Department of Surgery, College of Medicine, King Saud University, and the scientific director of the Liver Disease Research Centre.



Dr. Ted Morton

Dr. Ted Morton is an Associate Professor of Clinical Pharmacy at King Saud University College of Pharmacy and a Clinical Pharmacy Specialist in Infectious Diseases at King Khalid University Hospital in Riyadh. He graduated with his Doctor of Pharmacy degree from the University of Florida in 1993 went on to complete a Pharmacy Practice (PGY1) residency at The Regional Medical Center at Memphis TN. He then practiced for 15 years as a clinician-educator with the University of Tennessee Health Science Center in Memphis, TN and promoted to Associate Professor in the Colleges of Medicine and Clinical Pharmacy. He is Board Certified in Pharmacotherapy (with added qualifications in infectious diseases).

Mr. Waleed Saker

Mr. Walid Farouk Sakr is a research pharmacist and master student at College of Pharmacy, King Saud University. He had a bachelor of Pharmacy from college of pharmacy at Al-Azhar University, Egypt 2000 (Excellent with Honor). He had a diploma in quality management system (CQA), American university, Cairo, 2004. He has working experience in pharmaceutical industry for about 10 years at the quality control field. Has 2 published article at SPJ, and 4 articles are now submitted to international journals

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POSTERS ABSTRACTS

A- PHARMACEUTICAL SCIENCES RESEARCH (PSR)

PSR.1. DISSOLUTION ENHANCEMENT OF MELOXICAM UTILIZING RE-CRYSTALLIZATION TECHNIQUE IN PRESENCE AND ABSENCE OF POLYVINYL PYRROLIDONE

Khalid Alyahya, Khalid Alhazzani, Muteb Alharbi, and Abdullah H. Al-Omrani
Department of Pharmaceutics, College of Pharmacy, King Saud University

PURPOSE: The conventional micronization techniques (e.g. milling method) employed to enhance dissolution rate of drugs are limited by physical and/or chemical instabilities which are resulted from a high energy input used to disrupt the crystal lattice. Meloxicam (MLX), a highly potent non-steroidal anti-inflammatory drug (NSAID), is particularly insoluble in water and has very poor wettability. Poor aqueous solubility is among factors that cause low bioavailability of some drugs. Therefore, the objective of this project is to apply in situ micronization technique that reduces particle size of MLX to micron-size in presence and absence of PVP polymer. Such reduction in particle size may result in enhancement of MLX dissolution rate and hence bioavailability. The objective of this study is to investigate the effect of preparation technique in presence and absence of polyvinyl pyrrolidone (PVP) on MLX dissolution rate.
METHODS: Re-crystallization of MLX through pH change method was used to get micron-size particles. MLX (100 mg) was dissolved in 40 mL of 0.05N NaOH aqueous solution in presence and absence of 100 mg of PVP. Under different speed rates (normal magnetic steering, and homogenization; 10,000 RPM and 20,000 RPM) the pH of the formed solution was reduced by 0.1N HCL to pH 6.2± 0.2 and micronized crystal of MLX is yielded. Prepared samples were characterized with respect to their thermal behaviour, crystalline structure, morphology of microcrystals, and drug dissolution.
RESULTS: The thermal analysis data indicated an absence of characteristic MLX transition peak. The morphology of the processed MLX showed a leaner reduction in particle size along with increasing speed of homogenization. This reduction in particle size was associated with enhancement in dissolution rate of MLX. The presence of PVP has changed the thermal analysis profile of MLX in which significant shifting in Tm and reduction in enthalpy were observed. These changes in thermal parameters were correlated with the enhancement in dissolution rate of MLX compared to control (unprocessed MLX). The X-ray diffraction pattern revealed the presence of crystalline structure of MLX even after adding PVP to the formulation.
CONCLUSION: Re-crystallization by pH change method was effective (but not complete) to enhance the dissolution rate of MLX compared to control. Presence of PVP imparted a signification effect (but not complete) on the dissolution rate of MLX compared to control. Further investigation and adaptation on the system are needed to improve the dissolution rate of MLX in acidic medium.

PSR.2. ENHANCEMENT OF MELOXICAM DISSOLUTION USING BINARY AND TERNARY SOLID DISPERSION SYSTEMS

Abdullah Alshememry, Jabran Harthi, Saeed Alqahtani, and Abdullah H. Al-Omrani
Department of Pharmaceutics, College of Pharmacy, King Saud University

PURPOSE: Meloxicam (MLX) is a highly potent non-steroidal anti-inflammatory drug (NSAID) and prescribed for patients suffering from joint diseases. Unlike NSAIDs, MLX has good gastrointestinal tolerability. MLX is particularly insoluble in water and has very poor wettability, which affect its dissolution rate in acidic medium and may result in delaying in its onset of action. Hydrophilic polymers are frequently used to enhance dissolution rate of poorly water soluble drugs. Accordingly, enhancement of the dissolution rate of meloxicam, using binary and ternary solid dispersion systems, is the main objective of this project. The objective of the work was to investigate the effect of preparation technique and binary and ternary solid dispersions of meloxicam with polyethylene glycol (PEG) and/ or polyvinyl alcohol (PVP) on drug dissolution.
METHODS: PEG and PVP were used as dissolution and solubility enhancer polymers. Binary and ternary solid dispersions (in different ratios of polymers) were prepared by spray drying technique. Prepared samples were characterized with respect to their thermal behaviour, crystalline structure and drug dissolution.
RESULTS: The thermal analysis data revealed a reduction in enthalpy of the spray dried MLX (in the absence of polymers) without significant change in transition temperature (Tm). This reduction in enthalpy was accompanied with enhancement in dissolution rate of MLX by 4 fold (area under the dissolution rate curve)

more than that of unprocessed MLX. The presence of polymers (binary or ternary) has changed the thermal analysis profile of MLX in which a significant shifting in Tm and reduction in enthalpy were observed. These changes in thermal parameters were correlated with enhancement in dissolution rate of MLX compared to control (unprocessed MLX). However, the spray dried MLX without polymers showed equal or better dissolution rate that that of binary systems. For ternary system, dissolution rate was faster and more than that of MLX spray dried without polymers. The X-ray diffraction pattern revealed the presence of crystalline structure of MLX even after solid dispersion formation.
CONCLUSION: Ternary solid dispersion system of MLX with PEG and PVP was significantly enhanced the dissolution rate of MLX compared to control. However, this system was not able to release all amount of MLX. Further investigation by using other polymers is needed to improve the dissolution rate of MLX in acidic medium.

PSR.3. EVALUATION OF DIRCETLY COMPRESSED TABLETS PREPARED FROM DIFFERENT GRADES OF AVICEL

Omar I. Fantoukh, Fawaz F. Al-Asmari, Bandar A. Asiri, Yousif S. Al-Amri, Alaa J. Fakeh, Abdelleh F. Algunami, and Ibrahim M. El-Bagory
Department of Pharmaceutics, College of Pharmacy, King Saud University

PURPOSE: Compaction into tablets represents one of the most important operations in the pharmaceutical industry because physical and mechanical properties of the tablets, such as density or strength, are determined during this process. These properties affect tablet integrity and drug availability The mechanism of compaction not only depends on the powder properties but also affected by particle size, shape and moisture content, as well as, on the nature of used excipients. Avicel often is regarded as one of the best used excipients for direct compression. Avicel is available in many grades that differ from each other by their particle size, particle shape, and moisture content. The purpose of the current work was based on the physical characterization of directly compressed tablets prepared from different grades of Avicel , namely PH 101, 102, 103, 105 and 200, as direct compression excipients.
METHODS: Samples of different grades of Avicel, PH 101, 102, 103, 105 and 200 were investigated for their flow properties by determination of angle of repose and compressibility index. Avicel samples were directly compressed into tablets and then evaluated for their hardness, friability and disintegration time.
RESULTS: It was obvious from the obtained results that as the powder particle size increased the flowability is improved and leads to good tablet characters. That was clearly evidenced in the case of Avecil PH 200 with low water content less than 2%, particles size was 180 µm, showed good flowability (Hausner Ratio 1.16, angle of repose 34.13) and compressibility index (13.96) which resulted in good tablets with hardness of 9.44 KP, friability % 0.006. These results for Avicel PH 200 were matched with why that Avicel PH 200 is commonly used as a direct compression excipient that maintain high level of compressibility with minimum weight variation and drug content uniformity. In contrast, results from Avicel PH 105 with higher water content (less than 3%), particles size was 20 µm, showed poor flowability (Hausner Ratio 1.55, angle of repose 51.55) and compressibility index (35.81) which resulted in tablets with poor physical characte (hardness of 4.16 KP, friability % 0.34). Hence, Avicel PH 105 used in direct compression of coarse or hard-to-compress materials. Same findings and correlations were with other studied grades of Avicel (101, 102 and 103).
CONCLUSION: It was concluded that lower water content and large particle size will lead to good powder flowability as well as to good tablets of good physical characters.

PSR.4. EFFECT OF *NIGELLA SATIVA* MELANIN ON IMPLANTATION OF BLASTOCYSTS IN RATS

Saif Ezzat and Kamal ElTahir
Department of Pharmacology &Toxicology, College of Pharmacy, King Saud University

PURPOSE: Since pregnant human females are liable to use whole crushed black seed (*Nigella sativa*) during early & late pregnancy for different reasons, it was thought of interest to examine the recently discovered *Nigella sativa* melanin on implantation of the blastocysts in rats' uteri.
METHODS: Wistar Female rats' animals were placed with proven male rats over night in perforated cages. The morning in which a vaginal plug was observed was denoted *day 1* of pregnancy. The pregnant rats were divided into 2 groups (Control & Test).Test rats were treated on late *day 4* of pregnancy with a single dose of melanin at a dose of 200mg/kg intraperitoneally. Rats (Control & Test) were killed on day (10-12) of pregnancy

using excessive chloroform. The abdomen was opened; the two uterine horns were located and examined for presence of fetuses. The corpora leutea on each horn were observed and their number was recorded. The number of fetuses in each horn was recorded too. The % effectiveness of implantation and pregnancy was determined by [(Number of fetuses/Number of corpora leutea) X 100].

RESULTS: Treatment of rats on day 4 of pregnancy with melanin at a single dose of 200mg/kg & examination of the uterus on day 10 of pregnancy revealed the ability of melanin to reduce the implantation of the blastocysts by 71.7 %. There were no resorptions in melanin-treated rats. The % effectiveness of pregnancy in control rats was 95.8% & in melanin-treated rats was 24.1%. This difference was significant ($P<0.05$), ($N=5$).

CONCLUSION: The results of this study clearly demonstrated the successful inhibitory effect of *Nigella sativa* melanin on implantation in rats. Thus, use of the whole crushed black seed in early pregnancy (first trimester) should be avoided. On the other hand, the results revealed the potential of *Nigella sativa* melanin as a Contraceptive.

PSR.5. EFFECT OF METHAMPHETAMINE ON THE LOCOMOTOR ACTIVITY OF MORPHINE-DEPENDENT MICE

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PURPOSE: Chronic morphine treatment has been reported to cause the development of central supersensitive dopamine receptors in mice. Serious drug-drug interactions have been experienced among the opioid-dependent population e.g. severe respiratory depression upon concurrent use of morphine and neuroleptics. The present study is aimed to investigate the effect of methamphetamine which is known to affect dopamine neurotransmission on the locomotor activity of morphine-dependent mice.

METHODS: Morphine (40 mg/kg, intraperitoneally) was administered twice daily for a period of 3 days, after which a single injection of naloxone (30 mg/kg, i.p.) precipitated an opioid withdrawal jumping syndrome in mice. Methamphetamine (2.5 mg/kg. i.p.) was used to test changes in locomotor activity of groups of morphine dependent mice and compared with groups of non-dependent mice.

RESULTS: In animals not administered methamphetamine, the spontaneous locomotor activity of morphinized animals was significantly lower than that of non-morphinized animals. It is also evident from the results that the motor activity induced by methamphetamine (2.5 mg/kg i.p.) was significantly lower in morphine dependent mice than those of their non-dependent counterparts.

CONCLUSIONS: the inhibitory effect of methamphetamine observed in morphine-dependent animals indicates a depressant effect of chronic morphine use on central dopaminergic activity and possible dopaminergic modulation.

PSR.6. TYROSINE KINASE INHIBITORS DIFFERNTIALLY DECREASE HEPATOCELLULAR CARCINOMA GROWTH *IN VITRO* THROUGH OXIDATIVE STRESS- AND p53-DEPENDENT PATHWAYS

Ali M. Alaseem, Turki A. Al-Hagbani, Nawaf N. Alamri, Fahad O. Alatwi, and Hesham M. Korashy
Department of Pharmacology &Toxicology, College of Pharmacy, King Saud University

PURPOSE: Hepatocellular carcinoma (HCC) is the fifth most common cancer-related causes of death worldwide. Due to very poor 5-year-survival, new therapeutic approaches are mandatory. Among the newly identified agents, Tyrosine Kinase Inhibitors (TKIs) which posses both anti-angiogenic and anti-proliferative effects demonstrate potent suppression effect on the growth of various tumors. Yet, their effect on HCC remains unexplored. Therefore, we assessed the potential inhibitory effects of three TKIs, sunitinib (SUN), dasatinib (DAS), and gefitinib (GEF), on the growth of HCC *in vitro*.

METHODS: Human hepatocellular carcinoma HepG2 cell lines were treated for 24 h with SUN, DAS, and GEF (1 – 100 μM). Thereafter, the resulting effect on the proliferation of HepG2 cell was measured using the 3,4-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. The ability of these agents to increase the generation of reactive oxygen species (ROS) was determined fluorometrically using 2,7-dichlorofluorescein diacetate as probe. Furthermore, the expression of tumor suppressor gene p53 mRNA in response to these agents was determined using Real-Time Polymerase Chain Reaction.

RESULTS: The MTT assay showed the all tested TKIs significantly suppressed the growth and proliferation of

HepG2 cells. Mechanistically, our results revealed that only DAS, but not the other TKI, significantly increased ROS production in a concentration-dependent manner. In addition, robust increase in p53 mRNA expression (7-fold) was only detected with GEF (10 µM).
CONCLUSION: SUN, DAS, and GEF differentially suppressed the growth and proliferation of HCC cells, at least in part, through oxidative stress- and p53-dependent mechanisms.

PSR.7. Comparison of the Analgesic Potency of Four Drugs (A, B, C & D)

Mohammed Abu Grain and Kamal ElTahir
Department of Pharmacology &Toxicology, College of Pharmacy, King Saud University

PURPOSE: To compare the potency of four analgesic drugs using hot-plate method.
METHODS: The analgesic effect of the four compounds was assessed using hot-plate analgesia meter. The temperature of the hotplate was maintained at 58° C. Swiss albino mice (24–26g) were divided into four groups each group was then divided into three subgroups according to the doses of the selected drug. Each group was assigned to one drug. Each mouse was placed on hot-plate and noted for the reaction time (in second) at which the animal lifts its forelimb and licks on them or jumps. Animal were administered different doses of each drug in µmoles (5 – 200 µmoles/ kg). The reaction time was noted every 15 minutes for up to 2 hours. The % increases in the reaction time/µmole of drug per kg body weight was determined at the time of maximum effect. Then the potency order & duration of action were established.
RESULTS: The % increases in the reaction time/µmole of drug per kg body weight were (24.6, 47.4, 96.9 and 611.6 %) for A, B, C & D respectively.
CONCLUSION: This study revealed that the potency order of the four drugs was: D>>C>B>>A. The duration 1->2hrs. Drug D had duration >2hrs, drugs C & B had duration >1.5hrs, whereas the least effective drug (A) had duration of one hr.

PSR.8. PHYTOCHEMICAL AND PHARMACOLOGICAL STUDY OF SAUDI MEDICINAL PLANTS HAVING ANTIDIABETIC ACTIVITY

Abdulmohsen A. Al-Qahtani and Nassir Sedeqi
Department of Pharmacognosy, Collage of Pharmacy, King Saud University

PURPOSE: In recent years the increasing percentage of patients for diabetes mellitus in Saudi Arabia is really alarming. Our responsibility is to search local herbal medicine or plants that can be used as a replacement of synthetic drugs used as antidiabetic.
METHODS: There are several plants used like *Opuntia Ficus indica*(Teen shawkee), *Momordica charantia* (Handal),*Vaccinium myrtillus* (Anabia jabalia) and *Aloe ferox* (Sabbar) growing in different parts of the Saudi Arbia posses antidiabetic activity. These plants are growing in cold cities like (Teen shawkee) in Taif, Abha etc & others like(Sabbar) & (Handal)found in desert regions and (Anabia jabalia) growing in different parts of the kingdom . We do the extraction procedure then take the plant extract to do the studies .
RESULTS: (Teen shawkee) was found to decrease Blood Glucose Level (BGL) from 222 mg/dl to 183 mg/dl in180 min , (Handal) found to decrease fasting blood glucose (FBG) level from 160 mg/dl to 131 mg/dl in 2 hrs , (Sabbar) has an uncontrolled study that the plant decrease BGL 273mg/dl to 151 mg/dl . Other study done on rats and it is found that (Anabia jabalia) decrease BGL by 26 %.
CONCLUSION: This suggest that the other plants growing in Saudi Arabia belonging to same families may be screened for antidiabetic activity and a polyherbal formulation with appropriate proportion of individual herb may be designed which will be more effective and safe as well. The phytochemical study of these plants may give an idea for the synthesis of some potent antidiabetic moieties. The conclusion of this research project is to find out some new antidiabetic plants growing in Saudi Arabia and isolate some novel leads which can act as pharmacophore.

PSR.9. THE EFFECT OF PIPERITONE OF *CYMBOPOGON PROXIMUS* ON IMPLANTATION OF BLASTOCYSTS IN RATS

Sultan Hubess and Kamal El-Tahir
Department of Pharmacology &Toxicology, College of Pharmacy, King Saud University

PURPOSE: The purpose of this study is to examine the influence of Piperitone of the plant *Cymbopogon proximus* (Botanical family Poaceae) on blastocysts implantation in the rats' uteri.

METHODS: Wistar Female rats were placed with proven males rats over night in perforated cages. The morning in which a vaginal plug was observed was denoted day (1) of pregnancy. Animals were divided into two groups (Control & Test). A single dose of Piperitone was injected intraperitoneally on late day (4) of pregnancy at a dose of (1.6ml/kg) for test group only. Rats were killed on day (10_12) of pregnancy using excessive chloroform. The abdomen was opened and the two uterine horns were located and examined for presence of fetuses. The number of fetuses & corpora lutea of each horn were observed and their number was recorded. The percentage effectiveness of implantation and pregnancy was determined by dividing the number of fetuses by the number of corpora lutea multiplied by 100%.
RESULTS: Examination of the uteri on day (10) of pregnancy revealed the absence of fetuses in both uterine horns. The mean number of corpora lutea per animal was found to be 8.67±1.5 (Test) Vs 8±1 (Control). No sites of resorption were observed in the treated animals. In control animals, the mean number of fetuses per rat was 7.6±0.5. The percentage effectiveness of pregnancy in the treated rats was Zero Vs 95.8% in control.
CONCLUSION: The results of this study revealed the ability of Piperitone to inhibit implantation of the balstocyst in both uterine horns completely. Thus, Piperitone seemed to be a potential contraceptive that can be used either locally or systemically.

PSR.10. *IN VITRO* INVESTIGATION OF TRANSDERMAL CAFFEINE FORMULATIONS

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PURPOSE: caffeine is a mild stimulant to the central nervous system when taken orally and used topically as one of many ingredients in various cosmetic preparations for reducing under-eye puffiness and dark circles. Topically caffeine has slimming effect. Also, the cream preparation may be used for reducing erythema and itching in dermatitis. Therefore, this study was aimed to formulate and investigate caffeine microemulsion (ME) as well as gel formulations for transdermal delivery.
METHODS: Oleic acid based ME containing caffeine was formulated for transdermal drug delivery. Caffeine ME composed of 35.54% oleic acid, 23.7% tween 60, 35.54% sorbitol and 5.21% water was chosed according to the preconstructed pseudo-ternary diagram for the area of existance. Sodium carboxymethyl cellulose and methylhydroxyethyl cellulose based gels were also prepared. The release of caffeine from ME and gel formulations were evaluated using artificial standard cellophane membrane.
RESULTS: The highest release rate was observed for sodium carboxymethyl cellulose followed by methyl hydroxyethyl cellulose then ME. The percentage release after five hours were 92.74 and 81% for sodium carboxymethyl cellulose followed by methyl hydroxyethyl cellulose respectively. However it was 44.28% for caffeine release from ME. Applying Peppas equation showed that all the three formula followed a non fikian release kinetics.
CONCLUSION: Transdermal caffeine could be achieved using oleic acid based ME and gel bases. The prepared formulae of microemulsion exhibited good stability and release characteristics makes it feasible and promising for transdermal application of caffeine.

B- PHARMACY PRACTICE RESEARCH (PPR)

PPR.1. PRACTICING PHARMACISTS KNOWLEDGE AFTER GRADUATION: IS PHARMACY CAREER ENDANGERED?

Mashan Al-Metairy, Raed Nahhas, Mansoor Al-Farrag, and Hussain Al-Omar
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PURPOSE: Our study aims to assess the relation between the theoretical information included in the curriculums of colleges of pharmacy and the actual practicing information which a pharmacist needs. A second aim of the study is to know the different methods that pharmacists relay on to stay updated and revise the basic pharmaceutical information, assessing the variations result from different approaches.
METHODS: A 34 questions survey was distributed among pharmacists in different pharmacy fields, including: hospitals, community, FDA, Industries. The survey consists of 3 main parts; the first was about demographic data, the second included basic scientific questions and the last part was about continuous education.
RESULTS: From a representative sample (n=70). Overall it was shown that hospital pharmacists did better in the scientific part than community pharmacists. 32 %

of pharmacists in different settings admitted that they got certified for attending lectures which they did not attend. 74% of pharmacists included conveyed that it is not difficult to do such.
CONCLUSION: More strict regulations should be applied to assure that pharmacists are adhering to the continuous educational hours required to renew their licenses. Pharmacists should be encouraged to apply for different scientific societies' memberships

PPR.2. STUDY ON THE SAUDI PHARMACIST CONTINUING EDUCATION

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Department of Clinical Pharmacy, College of Pharmacy, King Saud University

PURPOSE: education refers to any type of post-secondary education, used to either obtain additional certifications, or as credits required to maintain a license. Almost anybody can take continuing education credits for personal or professional enrichment; fitness trainers, nurses, and safety instructors are examples of professionals who fall into the second category. Continuing education is aimed exclusively to adults who already possess a college or university degree. The main objective of this study was to offer insight on the issue of continuing education in kingdom of Saudi Arabia and to determine the type and format of continuing education pharmacist in this country prefer to attend and consider most effective. Measure how Saudi pharmacist can get a benefit from continuing education , measure their interest in to improve their skills and self-updating, are their jobs provide a proper environment to attend lectures and workshops, how to evaluate their skills and are they need continuing education.
METHODS: A multi-theme survey was developed to find the reasons pharmacist choose to attend different continuing education programs ,the survey assessed continuing education needs and preference of pharmacist .survey items included the types of formats and topics pharmacist prefer to attend and think are most useful to enhance their knowledge and skills .
RESULTS: The data is not fully collected and analyzed yet.
CONCLUSION: The data is not fully collected and analyzed yet.

PPR.3. THE ROLE OF PHARMACY STUDENTS IN HEALTH EDUCATION

Ahmad Al-Ghamdi, Ali Al-Wabel, and Talal Al-zahrani, and Wael H. Mansy
Department of Clinical Pharmacy, College of Pharmacy, King Saud University

PURPOSE: Health education is a vital and integral part of health promotion. Health professionals including pharmacists are responsible for health education. Being the pillar of phamacy profession, pharmacy student should play a key role in the process of health education. This study was designed to to elaborate the extent and degree of pharmacy student participation as well as the importance of their role in promoting health for their community.
METHODS: A total of 257 King Saud University pharmacy students from both campuses involved in this study from different college levels are asked to fulfill an electronically submitted questionnaire especially designed to obtain the main objectives of the study.
RESULTS: It was found that 94% of students believe that pharmacy student should play an integral part of health education but unfortunately they didn't have enough material and moral support to do so (71.5%). The results showed that 55% of students see that college's curricula are deficient enough to accomplish the students' role in health education especially when concerned with their pharmacy training program (60.5%). 82% of the participants agree that engagement of the pharmacy students in the process of heath education early in their college activities could improve their communication skills with community population.
CONCLUSION: It can be concluded that pharmacy students are capable and enthusiastic enough to play a remarkable role in the process of heath education and it is suggested to introduce in college of pharmacy curricula what improve and increase the participation of the students in health education.

PPR.4. MOBILE PHONE TEXT MESSAGING FOR PHARMACEUTICAL CARE IN SAUDI ARABIA - A PILOT STUDY

Ahmad N. Al-Enezi, Bandar F. Al-Qhtani, Khaled T. Al-Enezi, Naif M. Al-Harbi, Nasser S. Al-Tulaian, and Abdulatif A. Al-Dhawailie
Department of Clinical Pharmacy, College of Pharmacy, King Saud University

PURPOSE: Technology in health care services was applied long time. Particularly in pharmacy where computerized compounding of pharmaceutical

intravenous admixtures, dispensing, and inventory control was easily and successfully implemented. Mobile phone text messaging technique now is widely used for different purposes including services to needy patient within the health care system such as appointment reminder. The present study will measured the patient acceptance rate of using their personnel mobile phone to receive pharmaceutical care here in the kingdom.
METHODS: A questionnaire was structured to gather information about benefiting patients, acceptance rate of such service, expected pharmaceutical information needed by patients.
RESULTS: The patients in the kingdom are aware of using text messaging technique in their daily activities. Patients showing a great interest to use this technique for receiving pharmaceutical care. The only concern is the misuse of their personnel mobile phone number.
CONCLUSION: A pilot study will be conducted soon using a group of patients receiving treatment in one of the teaching hospital in Riyadh area KSA.

PPR.5. A PRELIMINARY STUDY OF DRUG-RELATED PROBLEMS AT KING KHALID UNIVERSITY HOSPITAL (KKUH)

Abulaziz K. Al-khaldy, Badr S. Al-Qarni, Nawaf F. Al-Otaibi, Radwan A. Hafiz, and Mohamed N. Al-Arifi
Department of Clinical Pharmacy, College of Pharmacy, King Saud University

PURPOSE: Drug related problems (DRPS) have been studied internationally, but local data are limited. Therefore we undertook preliminary retrospective study for a number of patients' prescription s at outpatient pharmacy (KKUH) in Saudi Arabia to determine the incidence of such problem.
METHODS: Seventy four outpatient prescriptions at KKUH outpatient pharmacy were studied retrospectively for DRPs during a two weeks period(date).the prescriptions studied were ≥ 3 items. The problems were identified using BNF 60, drugdex, drug facts and comparisons, and beer's criteria.
RESULTS: The current study shows that out of 74 patients, 4.4% had drug choice related problem, 24.4% had dosing drug related problem, 16.6% had interaction drug related problem and 64.4% had other drug related problems like bad handwriting, incomplete addressograph and poly pharmacy.
CONCLUSION: Drug related problems are a serious and costly issue facing health care professionals and health care system as it had been approved by this preliminary study, so more work of scientist and health authorities need to be done to overcome this problem.

PPR.6. SAUDI ARABIAN COMMUNITY PHARMACY COMPLIANCE WITH PRESCRIPTION DRUG LAWS AND PROVISION OF PATIENT COUNSELING

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PURPOSE: In Saudi Arabia, Pharmacists are required by law to only dispense legend medication under physician's prescription and likewise have a professional responsibility to provide patient counseling, but actual practices are unknown.
METHODS: We conducted a single blind randomized assessment of dispensing and counseling in community pharmacies in Riyadh, Saudi Arabia. A convenience sample of 50 pharmacies was randomly chosen from the 295 pharmacies in Riyadh listed in the online telephone directory of Saudi Telecom (STC). On December 22nd & 23rd 2010, five surveyors presented to these 50 pharmacies. The surveyors requested (without a prescription) for a 7-day supply of Amoxicillin at a dose of 250 - 500 mg. They also noted if patient counseling was offered. If counseling was not offered the surveyors asked the pharmacist if there was any additional information they needed. The major pre-defined outcomes assessed were (1) frequency of a prescription being required and (2) frequency and content of patient education.
RESULTS: Of 50 pharmacies survived, none (0%) required a prescription prior to dispensing amoxicillin. These results were consistent regardless of type of pharmacy (chain or other) or waiting time. Patient counseling was spontaneously offered by three of 50 (6%) of pharmacies. When asked by the surveyor for more counseling information, an additional 37 pharmacies (total of 40 = 80%) offered counseling. Of those 40 offering counseling, the pharmacist specifically covered side effects (5), contraindications (12), indication (10) or all three (2) in 29 cases, with the other 11 did not provide drug specific information.
CONCLUSION: Despite a prescription drug law and pharmacists obligation to counsel, these are not currently followed in community practice in Riyadh, Saudi Arabia.

PPR.7. THE BURDEN OF ISCHEMIC HEART DISEASES AT A MAJOR CARDIAC CENTER IN RIYADH, SAUDI ARABIA

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POURPOSE: Ischemic Heart Disease (IHD) is the leading cause of death worldwide, including in Saudi Arabia. Cost of illness (COI) studies aiming to explore the burden of IHD are missing in Saudi Arabia. Therefore, the objective is to estimate the direct medical costs associated with IHD at Prince Sultan Cardiac Center (PSCC).
METHODS: A prospective COI study was conducted between April & June 2009 from the PSCC perspective. All patients diagnosed or suspected having IHD at admission were included in the study. They were followed up till discharge or performing CABG or changing diagnosis. Clinical data were extracted from the patient database and combined with the unit cost of services to calculate direct medical costs.

RESULTS: 205 patients were recruited and diagnosed with stable angina (SA) (47.8%), unstable angina (USA) (24.4%), STEMI (19.5%) and NSTEMI (8.3%). Most of the patients were male, Saudi, aged between 40-75 years. 87% of the patients had two or more co-morbidities. The average cost is 40,164 SAR/patient (10,710 U$). Medication contributed the lowest in the costs (3.2%). Costs associated to SA, USA, NSTEMI and STEMI were respectively 33,991; 35,107; 46,585 and 58,877 SAR/patient. The lowest hospital length of stay was 6.5 days with SA. The average length of stay increased with the number of co-morbidities from 5.67 (no co-morbidity) to 11.25 (6 co-morbidities).
CONCLUSION: The study shows that IHD is of high economic burden in the Kingdom. Resource consumption associated to SA was the lowest. Co-morbidities increased the hospital length of stay.

PPR.8. HERBAL MEDICINE IN RIYADH LOCAL MARKET

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PURPOSE: to make a survey on herbal medicine in local market and determine the part which is used medically as a medicine, it's medical usage and look into the market features.
METHODS: Making field trips for many markets and herbal sellers in the local markets in Riyadh through asking questions regarding each drug to collect the best answers from people who are working in these markets.
RESULTS: we have noticed that there is a great demands from people from different levels to visit these stores and after we have continue our observations we have gathered scientific information for 107 medicines which represent the total number of what we can have through our field trips. It was categorized as following: 13% Oil, 25% seeds, 24% papers, 17% flower, 10% roots. As for their categorization for the medical usage it was as the following: 10% tonics, 15% analgesics, 11% chronic disease, 8% medicines which work on the nervous system, 14% anti-inflammatory, 13% skin and hair problems, 9%urinary system problems, 4% respiratory problems
CONCLUSION: There are many herbal products on this market, most of these products are imported herbals. The difficulty to get medical information from these markets owners as they consider it as a professional secret. The local market should be organized in matter of the owners and the products as well. The importance of obtaining a scientific degree on pharmacy field to work in this business. There must be more awareness and warning to the dangerous of some of these medicines.

PPR.9. ATTITUDES OF PHARMACY STUDENTS TOWARD THE COLLEGE OF PHARMACY WEBSITE

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PURPOSE: This study aims to evaluate the quality of the website of College of Pharmacy (COP), King Saud University (KSU), Riyadh, Saudi Arabia, and determine students′ satisfaction with electronic services and information provided by faculty websites.
METHODS: The study was conducted from March to October 2009. Three hundred fifty Pharmacy students were included in this survey. They were asked to answer a self-administered questionnaire.
RESULTS: The total number of respondents was 111 COP students, representing a 31.71% response rate. More than 40% of the surveyed students believe that the overall

content, look, and the clarity were good. 40-50% of the respondents "agree" that there are no grammatical or spelling errors and navigation through the website was relatively easy. 48.6% of participants believe that the general layout of the website was poor when compared with other international pharmacy schools websites which used by COP as a benchmark for it's performance. The majority of respondents showed negative attitudes toward updated contents and ease of access to required information.

CONCLOSION: Although Pharmacy students expressed general positive attitudes toward the COP website, the study reveals the existence of some weaknesses that need to be addressed.

PPR.10. PHYSICIANS' ATTITUDES TOWARD COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) IN SAUDI ARABIA

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PURPOSE: This study sought to determine general attitudes, approaches, professional practice and patterns of use of complementary and alternative medicine (CAM) among physicians in Saudi Arabia. The determinants of CAM use and availability of CAM-related information to health care professionals were also investigated.

METHODS: A 61-item questionnaire was validated and distributed to 300 physicians in major hospitals and clinics from both the governmental and private sectors in Riyadh area. A total of 194 physicians administered the questionnaire (Response rate of 65%). Data were compiled, coded and statistically analyzed using PASW software v.18.

RESULTS: Preliminary multivariate analysis indicated that more than 80% of the surveyed physicians had practiced CAM conventional therapies including acupuncture, homeopathy, Alexander technique, naturopathy and nutrition, aromatherapy, osteotherapy, chiropractic, reflexology, herbal medicine, shiatsu, iridiology, chelation therapy, ayurveda and high colonic/enema. Nearly two-thirds of the physicians had prescribed or referred for at least one CAM therapy. Most of the CAM users were expatriate physicians above 45 years of age. The use and attitude were favorable among physicians hailed from Southeast Asia. Upon the completion of data analysis, the emerging results will be fully reported.

CONCLUSIONS: The preliminary findings of the study suggests that physicians are supportive of the use of selected CAM therapies, personally or by their patients. Although most of them consider CAM therapies. To be legitimate medical practice, the results revealed that specific continuing education and training programs are needed to improve their knowledge of CAM therapies to incorporate them into their professional practice.

C- PHARMACY LITERATURE REVIEW (PLR)

PLR.1. A NOVAL TRENDS IN TREATMENT OF RHEUMATOID ARTHRITIS

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A recent advance in the management of rheumatoid arthritis is the use of biological agents which block certain key molecules involved in the pathogenesis of the illness. They include tumour necrosis factor (TNF)-blocking agents such as infliximab, etanercept and adalimumab, the anti-CD 20 agent rituximab and CTLA-4 Ig abatacept. Other agents which are in development include anti-IL6 tocilizumab, anti-CD22 and anti-lymphostat B. In this review, the efficacy and side effects of these agents, their impact on current clinical practice and future trends are discussed. Moreover, novel therapeutics strategies such as T-regulatory cell reactivation is also discussed. The methods used were searching the internet and the library. The study shows the potential of biological agent such as TNF-blocking agent _ anti-CD2 agent_ CTLA-4 Ig abatacept and T-reg activation in treatment of rheumatoid arthraitis with consider of possibilty of modifies immune response

The best current practice is to optimise the use of DMARDs including the new agent.This would involve frequent titration of therapy and the use of compination DMARDs if needed to ensure good control of inflammatory arthritis will have therapeutic options which will bring their illness into prolonged-if not-permanent remission

PLR.2. MOLECULAR TECHNIQUES USED TO DETECT TOXIC MICROBIAL CONTAMINATION IN NON-PHARMACEUTICAL HERBAL PRODUCTS

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Non-pharmaceutical herbal products, available in the market as raw material or in mixtures, are commonly used by people to overcome diseases or as a food supplement. Despite the ongoing debate about the efficacy of these products, there is a major concern about their safety. Non-pharmaceutical herbal products, due to the way they handled and stocked, are subject to contamination by many materials such as heavy metals, environmental pollutants, or toxic microorganisms. The aim of this project is to find out the common molecular techniques that are used to assess microbial contamination in non-pharmaceutical herbal products. Online search in Pub Med website and reviewing the related articles will be used. Many molecular techniques were used to test microbial contamination in non-pharmaceutical herbal products such as electrophoresis, Southern blot analysis, enzyme-linked immunosorbent assay (ELISA), DNA direct sequencing, and polymerase chain reaction (PCR). Most of the research studies used PCR to test the presence of microorganisms in the herbal products. PCR was frequently used because the technique is fast, not costly, specific, and can accommodate high-throughput screening.

PLR.3. ROLE OF MEDICINAL PLANTS IN NATUROPATHY

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Naturopathy is one of the most popular forms of alternative therapy; the term being generally applied to therapies, "derived from a phenomenon of nature and used to stimulate the body to heal itself. These include herbal medicines, various dietary and nutrition programes, Homeopathy, Hydrotherapy, Osteopathy and Chiropractice, as well as Acupuncture, and various other types of oriental medicine. In order to avoid the severe adverse effects caused by modern medicines it is essential to explore some alternatives in the form of herbal drugs. Out of 206 original articles reviewed, 36 were relevant these 36 articles contained 38 relevant studies, 21 laboratory and 17 clinical trials. The majority of articles were excluded because they were not based on actual research studies, were not in English. The physicians in the rural area were interviewed for their practice on herbal medicines. Researches show that 67.6% of people around the world receive a kind of naturopathy in their lives. The reasons of its popularity may be economic, safe and easy avaialability. Plants played a major role in the popularity of naturopathy. Some medicinal plants are used to cure the diseases which were otherwise difficult to combat. Recently the medicinal plants are used for the treatment of several deadly disease like Cancer (*Taxus brevefolia*), Leucoderma (Chaulmoogra Oil), Liver diseases (*Andrographis paniculata*) and HIV etc. Naturopathic medicines are becoming an increasingly mainstream health care option across the world because still there are some diseases for which there is no substitute in modern system of medicines. Further investigations of significant practice and policy issues are critical to understanding both the current and potential role of naturopathic medicine and its use in rural health care.

PLR.4. MEDICINAL PLANTS USED IN THE TREATMENT OF LIVER DISEASES

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Liver disease is one of the major causes of morbidity and mortality in public, affecting humans of all ages. According to WHO estimates, globally 170 million people are chronically infected with hepatitis C alone and every year 3–4 millions are newly added into the list. Also, there are more than 2 billion infected by hepatitis B virus (HBV) and over 5 million are getting infected with acute HBV annually. Presently, there are nearly 5.5 million chronic liver disease patients in USA alone with more than 5,000 liver transplants performed in adults and more than 500 performed in children every year. Thus, the impact of liver disorders on the overall population around the globe is considerable. Treatment options for common liver diseases such as cirrhosis, fatty liver, and chronic hepatitis are problematic. The effectiveness of treatments such as interferon, colchicine, penicillamine, and corticosteroids are inconsistent at best and the incidence of side-effects profound. Physicians and patients are in need of effective therapeutic agents with a

low incidence of side-effects. Plants potentially constitute such a group. Aim of the Research was to point out the confirmed efficacy of several plants in the treatment of liver disease and the mechanisms by which these plants afford their therapeutic effects. Several hundred plants have been examined for use in a wide variety of liver disorders. Just a handful has been fairly well researched. The latter category of plants include: *Silybum marianum* (milk thistle), *Picrorhiza kurroa* (kutkin), *Curcuma longa* (turmeric), *Camellia sinensis* (green tea), *Chelidonium majus* (greater celandine), *Glycyrrhiza glabra* (licorice), and *Allium sativa* (garlic). Literature survey was carried out using many published reports on hepatoprotective medicinal plants to focus on the biological activity, mode of action, active constituents, and future prospects of some of these plants.

PLR.5. ACETAMINOPHEN, ALLYL ALCOHOL AND CARBON TETRACHLORIDE HEPATOTOXICITY: ROLE OF OXIDATIVE STRESS

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Because of its unique metabolism and relationship to the gastrointestinal tract, the liver is an important target of the toxicity of drugs, and xenobiotics. Hepatotoxicity remains a major reason for drug withdrawal from pharmaceutical development and clinical use. The most frequent mechanism of hepatocellular injury involves production of injurious metabolites. For example acetaminophen is metabolized by liver cytochromeP450 system to reactive metabolite, N-acetyl-p-benzoquinone imine, that causes depletion of glutathione, leading to increase in reactive oxygen and nitrogen species. Oxidative and nitrosative stress play an important role in acetaminophen-induced hepatotoxicity.
Carbon tetrachloride is metabolized by liver cytochrome P450 system to CCL_3^*, a free radical that induces lipid peroxidation leading to increase in cell membrane injury and disruption of calcium homeostasis. Allyl alcohol is metabolized by the liver enzyme alcohol dehydrogenase to reactive metabolite, acrolein, that causes depletion of glutathione leading to oxidative stress and acute liver damage. Understanding the mechanism of drugs and xenobiotics - induced hepatotoxicity will provide better means to prevent or reverse the injury.

PLR.6. PROPOSED PHARMACY CODE OF ETHICS AND A GUIDE FOR PHARMACISTS IN SAUDI ARABIA

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The word ethics is associated with a wide range of topics that affect our daily lives, including: our religion, profession, social relationship, education, and many others. In this research we intended to: 1) propose a preliminary code of ethics for pharmacists in Saudi Arabia, where such code doesn't exist, and 2) prepare a guide on ethical issues for pharmacists in practice. The need for the pharmacy code and the guide is to idealize the relation between pharmacists and their patients and society according to our Islamic and cultural values, and to humanitarian and professional principles. In this project a literature search was used to help propose and translate into the Arabic language a pharmacy code of ethics and a guide on ethics for pharmacists in Saudi Arabia. A preliminary pharmacy code of ethics and the guide that incorporate our Islamic and cultural values was presented. This project can be considered the initial and the road map for more research and discussion regarding this important topic. It also can be used as a basic guideline to help pharmacists make rapid and ethical decisions based on adequate information when facing many practice decisions that must be made quickly.

PLR.7. EFFECT OF RESVERATROL ON HEPATIC ANTIOXIDANT DEFENSES IN DIABETES MELLITUS

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Aberrant energy metabolism is one characteristic of diabetes mellitus (DM). Two types of DM have been identified, type1 DM and type2 DM. By several studies, growing evidence indicates that oxidative stress is increased in diabetic condition due to overproduction of reactive oxygen radicals and decreased efficiency of antioxidant defenses. Oxidative stress as well as non-enzymatic glycosylation is now considered a major factor contributing to extent of chronic diabetes complications.
The oxidative stress leads to tissue damage in DM, due to: increased formation of ROS , free radicals , and

reduces the level of antioxidants especially superoxide dismutase (SOD), catalase(CAT), reduced glutathione (GSH) and ascorbic acid (vitamin C). Resveratrol (3,5,4'- trihydroxystilbene)(RSV) , a naturally occurring phytoalexin found in juice and red wines. It has a variety of pharmacological effects. It has been shown to possess antitumoral activity, cardioprotective effect, anti-inflammatory and anti- platelet properties. RVS exerts a potent antioxidant activity in several experimental biological systems. RSV has been shown to reduce the synthesis of lipid in rat liver. In several studies RSV has antihyperglycemic effect in DM leads to improve blood sugar level. Resveratrol may improve hepatic antioxidant activity defenses in DM by its antioxidant effect and antihyperglycemic effect which may affect the hepatic antioxidant.

PLR.8. ZAFIRLUKAST: LEUKOTRIENE D_4 AND E_4 RECEPTOR ANTAGONIST

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Leukotrienes (LTs) are a family of oxygenated metabolities of arachidonic acid, synthesized from arachidonic acid by a variety of cells including mast cells, eosinophils, basophils and macrophages. The family includes leukotriene C_4 (LTC_4), leukotriene D_4 (LTD_4) and leukotriene E_4 (LTE_4), which are potent biological mediators in the pathophysiology of inflammatory diseases and trigger contractile and inflammatory processes. The cysteiny-containingleukotrienes bind to specific receptors and mediate a wide variety of response. In the airway system, LTC_4 is one of the relevant mediators involved during bronchial asthma and is responsible for many of the observed cardinal symptoms of the disease. It increases mucus secretion, edema formation, and being a potent spasmogenic. The cysteinleukotriene antagonist are now in clinical use for pharmacological treatment of this disease. Zafirlukast is a selective and competitive receptor antagonist of leukotriene D_4 and E_4 (LTD_4 and LTE_4) it is rapidly absorbed following oral administration. Peak plasma concentrations are generally achieved 3 hours after oral administration. More than 99% of Zafirlukast is bounded to plasma proteins, predominantly albumin. Zafirlukast is extensively metabolized. The most common metabolic products are hydroxylated metabolites which are excreted in the feces The apparent oral clearance of zafirlukast is approximately 20 L/h, the mean terminal half-life of zafirlukast is approximately 10 hours and the mean plasma half-life of zafirlukast ranged from approximately 8 to 16 hours.

PLR.9. CARNITINE INSUFFICIENCY DURING PLATINUUM BASED CHEMOTHERAPY-INDUCED MULTIORGAN FAILURE

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Carnitine is a natural quaternary ammonium compound which is essential for the translocation of long-chain fatty acids from cytoplasmic compartment into mitochondria where beta-oxidation enzymes are located for energy production. Humans obtain carnitine from two sources; endogenous synthesis representing 25 % of total body needs and the remaining 75 % are coming from dietary sources mainly red meat and dairy products. It is well documented that cachectic cancer patients are especially at risk for carnitine deficiency due to decreased oral intake, inhibition of endogenous synthesis and increased renal losses. Moreover, dramatic changes in serum and urine carnitine levels have been reported in cancer patients with various forms of malignant diseases. In the last three decades, platinum-based chemotherapy has been successfully employed in the treatment of different types of human tumours. Unfortunately, the optimal clinical usefulness of platinum compound in the treatment of cancer is usually limited secondary to the development of life-threatening multiple organ toxicity including nephropathy and peripheral neuropathy. Platinum-based chemotherapy may cause these toxic effects by mechanisms not involved in their anticancer activity that can severely affect the life of patients and represent a direct cause of death. Earlier studies have demonstrated that carnitine deficiency constitute a risk factor and should be viewed as a mechanism during development of cisplatin-induced nephropathy. Moreover, it has been reported that treatment with platinum compounds is associated with a tenfold increase in urinary carnitine excretion, most likely due to inhibition of carnitine reabsorption by the proximal tubule of the nephron. cachectic cancer patients with decreased dietary carnitine uptake may develop carnitine deficiency when treated repeatedly with platinum-based chemotherapy. More recently, several experimental and clinical studies have demonstrated that platinum-based chemotherapy interfere with the absorption, synthesis, and excretion of carnitine in non-tumour tissues,

resulting in a secondary carnitine deficiency which is reversed by carnitine treatment without affecting anticancer efficacy. In conclusion, carnitine is a leading candidate and should be given along with cisplatin, carboplatin and oxaliplatin to block their multiple organ toxicity and to permit larger doses of these anticancer drugs to be administered, thereby killing more cancer cells and increasing the chances of patient survival.

PLR.10. EFFECT OF RESVERATROL ON THYROID FUNCTION

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Flavonoids and flavonoid-like compounds percolate to the top due to their presence in diet constituents and reported beneficial effects on diverse biological processes and disease conditions. It has previously been reported that the consumption of flavonoids and some phenolic acids by experimental animals induced enlargement and histological changes in the thyroid gland. Resveratrol is a natural polyphenolic compound with powerful antioxidant properties. It appears to exert extensive beneficial effects on numerous human organs and systems. It has chemopreventive properties, cardioprotective, and anti-inflammatory effects. Several studies were undertaken to study the effect resveratrol on thyroid function. One of these studies showed resveratrol exerts goitrogenic effect on normal rats which may be due to it is structural resemblance to thyroid peroxidase (TPO) substrate or due to it is powerful antioxidant effect through affecting the physiological level of hydrogen peroxide (H_2O_2) (TPO cofactor). Trans-resveratrol show significantly increased thyroid weight and relative thyroid weight and significantly increased serum TSH level and show decreased both serum tetra-iodothyronine (T4) and tri-iodothyronine (T3) levels. Trans-resveratrol significantly inhibited microsomal TPO activity and significantly stimulated thyroid glutathione peroxidase (GPx) activity and significantly inhibited thyroid SOD activity. Administration of trans-resveratrol had a curative effect in hyperthyroid rats since it significantly decreased the elevated level of serum T4 and T3 of hyperthyroid rats. Trans-resveratrol has goitrogenic effect in normal rats. Goitrogenic effect of the lowest dose of trans-resveratrol (200 µg/kg/day) orally may be due to competitive inhibition of TPO activity due to structural resemblance of TPO substrate (tyrosine residues) in thyroglobulin or due to decrease H_2O_2 (TPO cofactor) level in thyroglobulin due to inhibition of thyroid superoxide dismutase (SOD) activity and stimulation of GPx activity. So this can give hints to potential goitrogenic effect of resveratrol, also, the goitrogenic dose of trans-resveratrol had curative effect in hyperthyroid rats in comparable manner with the effect of propylthiouracil (PTU) as classic antithyroid drug.

PLR.11. ZILEUTON: INHIBITOR OF 5-LIPOXYGENASE ENZYME

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Leukotrienes (LTs) are arachidonic acid metabolities, synthesized by 5-lipoxygenase enzyme. During cell activation, LTs biosynthesis is initiated by translocation of a specific high molecular weight cytosolic phospho-lipaseA_2 ($cPLA_2$) from cytoplasm to selectively hydrolyze nuclear envelop phospho-lipids releasing free arachidonic acid. The liberated arachidonic acid binds to arachidonate transfer protein, 5-lipoxygenase-activating protein(FLAP) which makes the fatty acid available to 5-lipoxygenase enzyme. In a calcium-and ATP-dependent reaction the fatty acid is transformed to the unstable epoxide, leukotrieneA_4 (LTA_4). LTA_4 may be utilize by LTA_4 hydrolase to produce leukocyte activator LTB_4 or by membrane bound LTC_4 synthase which catalyze the conjugation of LTA_4 with tripeptide, glutathione, forming LTC_4. Once formed, LTC_4 is exported from the cells via active transport to the extra-cellular space. The subsequent conversion of LTC_4 to LTD_4 via removal of γ-glutamyl moiety from glutathione is catalyzed by γ-glutamyl transpeptidase. The cysteinyleukotrienes bind to specific receptors and mediate a wide variety of responses. In the airway system, LTC_4 is one of the relevant mediators involved during bronchial asthma and is responsible for many of the observed cardinal symptoms of the disease. It increases mucus secretion, edema formation, and being a potent spasmogenic.
LTC_4 and LTD_4 (spasmogenic mediators) have an important role in asthma, while LTB_4 play a major role in inflammation. From this issue different medications are synthesized with an intention to antagonize LTs receptors (Zafirlukast and Montelukast drugs) or to inhibit the enzyme responsible for their synthesis (Zileuton drug).
Zileuton is orally active inhibitor of 5-lipoxygenase that inhibits the formation of LTA4 from arachidonic acid, thereby preventing CysLTs synthesis and LTB_4 Zileuton is rapidly absorbed with a mean time to peak serum

concentration of 1.7 hours and an average half-life elimination of 2.5 hours. Plasma concentrations are proportional to dose. The apparent volume of distribution of zileuton is approximately 1.2 L/kg. Zileuton is 93% bound to plasma proteins, primarily to albumin, with minor binding to alpha-1-acid glycoprotein.

PLR.12. CARNITINE INSUFFICIENCY DURING OXAZAPHOSPHORINES BASED CHEMOTHERAPY-INDUCED MULTIPLE ORGAN FAILURE

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Cyclophosphamide (CP) and ifosfamide (IFO) are oxazaphosphorine nitrogen mustard alkylating agents which are commonly used in most cancer chemotherapy and immunosuppressive protocols. Unfortunately, the optimal clinical usefulness of CP and IFO is severely limited by a high incidence of multiple organ toxicity including urotoxicity, fanconi syndrome, neuropathy, and cardiotoxicity.
The metabolic pathway of both CP and IFO leads to formation of chloroacetyl-CoA, with subsequent depletion of the CoA-SH levels. Carnitine is known to detoxify excess amounts of CoA-bound moieties with formation of acylcarnitines, which are excreted in urine resulting in secondary carnitine deficiency. Another major toxic metabolite of oxazaphosphorines is thiodiglycolic which inhibits the oxidation of carnitine-dependent substrates. Earlier study reported that urinary excretion of carnitine is dramatically increased in patients with advanced soft tissue sarcoma during a continuous infusion of IFO. The average loss of carnitine during a chemotherapy cycle amounted to 15 % of total carnitine stores resulting in symptomatic carnitine deficiency after several chemotherapy cycles. Recently, several studies have demonstrated that that carnitine deficiency is a risk factor and should be viewed as a mechanism during development of CP and IFO-induced nephropathy and cardiomyopathy and that carnitine supplementation, using propionyl-l-carnitine, prevents the development of CP and IFO-induced multiple organ toxicity.
In conclusion, cancer patients undergoing either CP or IFO therapy must be supplemented with carnitine to block their multiple organ toxicity and improve both the quality of life and the chances of patients survival.

PLR.13. THUJONE: A COMPREHENSIVE REVIEW

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The thujone compound was isolated from Artemisia Alba and judica. The structural class is monoterpene ketone that exists in two stereoisomeric forms: (+)-3-thujone or α-thujone and (−)-3-thujone or β-thujone. Based on the similarity between the molecular shape of thujone and delta – 9 tetra hydro cannabinol, it was hypothized that thujone may act on the cannabinoid receptors in the brain. Today this is known to be false because studies have shown that thujone does not activate these receptors. Thujone is a GABA-A receptor antagonist, by inhibiting GABA receptor activation, neurons may fire more easily which can cause muscle spasms and convulsions. Thujone is also a 5-HT3 antagonist.
There are no reliable studies of the long-term toxicity. The major metabolite is 7-hydroxy-α-thujone. When thujone is injected, it causes convulsions, blindness, hallucinations, and mental deterioration. In our proposal we suggest the following: 1) Extraction of thujone and conducting some experiments on the central effect e.g, learning, anxiety, and analgesia. 2) The possibility of using beta thujone (less toxic than alpha isomer) as an antidote for general anesthetic toxicity as analeptic and comparing it to other analeptics e.g, doxapram (commonly used in hospitals) , is a hypothesis worth investigating .

PLR.14.AZELASTINE:HISTAMINE ANTAGONIST

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Leukotrienes (LTs) are a family of oxygenated metabolities of arachidonic acid, synthesized from arachidonic acid by a variety of cells including mast cells, eosinophils, basophils and macrophages. The family includes leukotriene C_4 (LTC_4), leukotriene D_4 (LTD_4) and leukotriene E_4 (LTE_4), which are potent biological mediators in the pathophysiology of inflammatory diseases and trigger contractile and inflammatory processes. Azelastine Competitively blocks the effects of histamine at peripheral H1 receptor sites .The systemic bioavailability of azelastine hydrochloride is approximately 40%. Maximum plasma

concentrations (Cmax) are achieved in 2-3 hours. Based on intravenous and oral administration, the elimination half-life, steady-state volume of distribution, and plasma clearance are 22 hours, 14.5 L/kg, and 0.5 L/h/kg, respectively. Approximately 75% of an oral dose of radiolabeled azelastine hydrochloride was excreted in the feces with less than 10% as unchanged azelastine. Azelastine is oxidatively metabolized to the principal active metabolite, desmethylazelastine, by the cytochrome P450 enzyme system. The specific P450 isoforms responsible for the biotransformation of azelastine have not been identified The major active metabolite.

Comparing the efficacy of azelastine and the leukotriene receptor antagonist montelukast in the treatment of perennial allergic rhinitis showed that in terms of the Rhinitis Severity Score, azelastine has the greatest overall benefit in alleviating the symptoms of allergic rhinitis. Azelastine's effect was greater than montelukast for reduction of rhinorrhea. However, systemic montelukast, as expected, provided better relief for symptoms distant from the nasal cavity such as ocular itching and throat/palate itching.

PLR.15. IMPORTANCE OF TURMERIC IN THE TREATMENT OF OSTEOARTHRITIS.

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Identify the turmeric and knowledge of the most important compounds that have medical effects and gain Knowledge of medical uses of turmeric, especially in the osteoarthritis.
We searched the Internet, Prince Salman Library, Dr. Andrew Weil Question and Answer Library, Center for Integrative Medicine, University of Maryland Medical center, National Center for Complementary and Alternative Medicine, and search in Better Health Research News Desk. Based on 2 studies and more than that, and using special turmeric formulation called Meriva ® .The researchers discovered that the extract group were able to function better physically, and were 58 percent less likely to have joint pain and stiffness. Furthermore, the results showed that 63 percent of those given the plant extract were less likely to treat symptoms with anti-inflammatory medications and painkillers.
In conclusion studies agreed on the Importance of turmeric in the treatment osteoarthritis and minimize the symptoms and avoided before it occurs. Therefore recommended that researchers Turmeric attention and participation in everyday life.

PLR.16. CARNITINE INSUFFICIENCY DURING DOXORUBICIN-INDUCED CARDIOMYOPATHY

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Doxorubicin (DOX) is among the first anthracycline antibiotics to be in clinical use in cancer chemotherapy. It has a broad spectrum antitumour activity against a variety of hematological and solid tumours. Unfortunately, the chronic administration of DOX is associated with the development of dose-dependent, cumulative and irreversible cardiomyopathy, which restricts its usefulness in cancer chemotherapy. Cardiomyopathy is the major limiting complication of DOX and affects 30–40% of the patients who receive a cumulative dose more than 500 mg mg/m2. Hence, even in responding tumours, it is necessary to discontinue DOX administration once a cumulative dose of 500 mg/m^2 is reached to prevent the onset of irreversible cardiac damage. Several experimental and clinical studies have reported that DOX-induces its cardiomyopathy by inhibition of beta-oxidation of long chain fatty acids secondary to myocardial carnitine deficiency with the consequent depletion of cardiac ATP and that carnitine supplementation, using L-carnitine or propionyl-l-carnitine protects the myocardium against this toxicity without interfering with its antitumour activity. Recently, administration of carnitine to cancer patients undergoing DOX therapy offered complete protection against DOX-induced cardiomyopathy. In conclusion, cancer patients undergoing DOX therapy must be supplemented with carnitine to block DOX-induced cardiomyopathy without interfering with its antitumour activity.

PLR.17. STUDY TO EVALUATE THE ANTIDIABETIC ACTIVITY OF FENUGREEK

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To evaluate effectiveness of Fenugreek in the treatment of diabetes, we searched the Internet, American botanical council, American Diabetes Association Journals, and The Journal of the American Board of Family Medicine

We investigated the effects of each subfraction on hyperglycemia and the levels of pancreatic hormones when chronically administered to alloxan-diabetic dogs. Each subfraction was studied separately and was given to the dogs per os (mixed with the two daily meals), in addition to the insulin treatment (which was kept the same throughout the experiment) for a period of 21 days. The addition of subfraction "a" to insulin treatment resulted in a clear decrease of hyperglycemia and glycosuria accompanied by a reduction of the high plasma glucagon and somatostatin levels in diabetic dogs. In conclusion, fenugreek is effectiveness on animals, but we need more studies to ascertain their effectiveness in humans

PLR.18. RECENT ADVANCES IN QUINAZOLINE ANTICONVULSANTS

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Epilepsy is a common chronic neurological disorder that is characterized by recurrent unprovoked seizures. These seizures are transient signs and/or symptoms due to abnormal, excessive or synchronous neuronal activity in the brain. Epilepsy is usually controlled, but not cured, with medication, although surgery may be considered in difficult cases. Epileptic seizures are divided into 2 major classes: partial-onset seizures and generalized-onset seizures. Partial-onset seizures begin in a focal area of the cerebral cortex, whereas generalized-onset seizures have an onset recorded simultaneously in both cerebral hemispheres. Some seizures are difficult to fit into a single class, and they are considered unclassified seizures. A seizure results when a sudden imbalance occurs between the excitatory and inhibitory forces within the network of cortical neurons in favor of a sudden-onset net excitation. Potassium bromide (1857) is the earliest effective treatment for epilepsy. Barbiturates, benzodiazepines, carbamates and hydantoins represent the major chemical classes of anticonvulsant drugs used in epilepsy treatment. Anti-epileptics, in general, inhibit the neuronal discharge or its spread in more than one pathway. This review presents some of the recent efforts in the area of anticonvulsant drug synthesis. Efforts should be continued, as the demand for new anticonvulsant agents increasing. The control of every kind of epileptic seizures, with the currently available antiepileptic drugs, is not possible. Also the quest for an ideal antiepileptic drug, devoid of side effects such as hypnosis and neurotoxicity, should stimulate researchers worldwide.

PLR.19. BLOOD SUGAR LEVEL MODIFIED BY CINNAMON

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To evaluate effectiveness of cinnamon in the treatment of diabetes. Internet, American botanical council, American Diabetes Association Journals, The Journal of the American Board of Family Medicine, and Cinnamon and Cassia book were used. The focus was on more than four studies conducted on humans diagnosed with diabetes type 2 and Cinnamon showed some effect, Cinnamon lowered HbA1C 0.83% (95% CI, 0.46–1.20) compared with usual care alone lowering HbA1C 0.37% (95% CI, 0.15–0.59). In conclusion the effects of cinnamon differ by population, Although there is an effect of cinnamon on diabetes patients but we need more studies.

PLR.20. STUDY OF SOME SAUDI HERBAL REMEDIES USED TRADITIONALLY FOR DIABETES

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To search of some antidiabetic herbs used in Saudi Arabia , and provide scientific evidence for folk use of these drugs as antidiabetic herbs . Also, provide identification methods of these herbs by morphological description and TLC analysis. Consuming various sources of knowledge such as libraries, text books, chemical abstracts, online sites and use pharmacognosy lab to do TLC analysis. From my search I found that musky bugle, fenugreek and bitter melon have antidiabetic activity. Phytoecdysteroids supplements of musky bugle seem to be useful for correcting the hyperglycemia and preventing diabetic complications in liver, pancreas and kidneys. Oral supplement of fenugreek have been shown to ameliorate most metabolic symptoms associated with type 1 and type 2 diabetes in both human and relevant animal models. The saponin fraction and the lipid fraction of bitter melon reduced protein tyrosine phosphatase 1B (PTP 1B) activity in skeletal muscle cytosol by 25 % which lead to increase in insulin sensitivity. These herbal drugs are effective and

safe for use as adjuvant therapy for diabetes type 2. TLC is effective tool in identify of musky bugle, fenugreek and bitter melon. Chloroform / methanol (98 : 2) can be used for separation of active constituents of musky bugle.

PLR.21. PHYTOCHEMICAL AND BIOLOGICAL INVESTIGATIONS OF *ERUCA SATIVA*

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In recent years, rocket plant (Eruca sativa) has gained greater importance as a vegetable and spice, especially among Europeans. E. sativa is a member of the family Brassicaceae, which is considered to be an important chemopreventive plant family. It is an edible annual plant, commonly known as rocket or arugula. It is a species of Eruca, native to the Mediterranean region, from Morocco and Portugal east to Lebanon and Turkey. It is commonly used as an astringent, diuretic, digestive, emollient, tonic, laxative, rubefacient and stimulant. It has been suggested that Eruca sativa seeds exert a beneficial antidiabetic effect in cases of chemically induced diabetes mellitus in rats by reducing oxidative stress. The major glucosinolate in Eruca sativa leaves was identified using a combination of LC/MS, LC/MS/MS and NMR. Upon myrosinase hydrolysis it produces an isothiocyanate (4-mercaptobutyl isothiocyanate) that contributes to the characteristic odour of E. sativa leaves. The other parts of the plant like roots and stems will also be subjected to phytochemical and biological investigations which may show the potential for different therapeutic activities and individual compounds isolated from roots and bark may also be identified by using UV, IR, NMR & MASS spectrophotometry and tested for the antidiabetic, laxative and chemopreventive activity.

PLR.22. TRAMADOL: AN OPIOID ANALGESIC STRUCTURALLY RELATED TO CODEINE AND MORPHINE.

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The objective of the present study is to develop analytical profile of tramadol. The methods used are screening the literature to gain insights into the available data which are required to achieve our purpose. Subsequently, the collected data were compared to each other and organized in a systematic manner to develop our target.
Chemical, pharmacological, and analytical data of tramadol were collected from literature and formulated in an acceptable manner to get analytical profile of tramadol. Thus, synthesis, physical properties, pharmacokinetics, pharmacodynamics, and some of the characterization parameters of tramadol were used in development of the required analytical profile. In conclusion, the available literature data are not enough to develop full analytical profile of tramadol. Consequently, experimental data are still needed to complete the required profile, which would be a continuation of this work.

PLR.23. PHARMACOGNOSTICAL SEARCH OF MYRRH

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The purpose of the study was to train the students in the principles of conducting scientific research projects. The students will be familiarized with the methods of design and execute an original research projects. For examples to gain experience of literature survey, to widen their knowledge, to be trained for writing thesis, to be trained for preparing slides and to be trained for delivering presentations. Consuming various sources of knowledge such as libraries (Prince Salman), text books, chemical abstracts, biological abstracts and some online sites.
From our search we found that Myrrh contains 7-17% of volatile oil. 25-40% of resin, 57-61% of gum. The volatile oil contains terpenes, sesquiterpenes, ester, cuminic, aldehyde and euogenol. The sesquiterpenes fraction contains furanosesquiterpenes including furanogermacranes, furanoguaianes and furanoeudesmanes. Furaneudesma-1,3-diene and curzarenc have morphine-like properties and act on the central nervous system opioid receptors: furanodiene-6-one and methoxy furanoguaia-9-ene-8-one show antibacterial and antifungal activity against standard strains of pathogenic species. We conclude that the Myrrh and its products have a lot of benefits, uses and constituents. So, it must be investigated more by specialized researchers.

PLR.24. PHYTOCHEMICAL AND PHARMACOLOGICAL STUDY OF SAUDI MEDICINAL PLANTS HAVING ANTIDIABETIC ACTIVITY

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In recent years the increasing percentage of patients for diabetes mellitus in Saudi Arabia is really alarming. Our responsibility is to search local herbal medicine or plants that can be used as a replacement of synthetic drugs used as antidiabetic. There are several plants like *Opuntia Ficus indica*(Teen shawkee), *Momordica charantia* (Handal),*Vaccinium myrtillus* (Anabia jabalia) and *Aloe ferox* (Sabbar) growing in different parts of the Saudi Arbia posses antidiabetic activity. These plants are growing in cold cities like (Teen shawkee) in Taif, Abha etc & others like(Sabbar) & (Handal)found in desert regions and (Anabia jabalia) growing in different parts of the kingdom .(Teen shawkee) was found to decrease Blood Glucose Level (BGL) from 222 mg/dl to 183 mg/dl in180 min , (Handal) found to decrease fasting blood glucose (FBG) level from 160 mg/dl to 131 mg/dl in 2 hrs , (Sabbar) has an uncontrolled study that the plant decrease BGL 273mg/dl to 151 mg/dl . Other study done on rats and it is found that (Anabia jabalia) decrease BGL by 26 %.This suggest that the other plants growing in Saudi Arabia belonging to same families may be screened for antidiabetic activity and a polyherbal formulation with appropriate proportion of individual herb may be designed which will be more effective and safe as well. The phytochemical study of these plants may give an idea for the synthesis of some potent antidiabetic moieties. The conclusion of this research project is to find out some new antidiabetic plants growing in Saudi Arabia and isolate some novel leads which can act as pharmacophore.

PLR.25.EVOLUTION OF NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS)

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NSAIDs constitute an important class of drugs with therapeutic applications. Treatment of inflammatory conditions such as rheumatoid arthritis (RA) and osteoarthritis (OA) starting from the classic drug aspirin to the recent rise and fall of selective COX-2 inhibitors has provided an enthralling evolution. Efforts to discover newer drugs to treat inflammation continues to be an important drug design priority. This review traces the origins of NSAIDs, their mechanism of action at the molecular level such as cyclooxygenase (COX) inhibition, development of selective COX-2 inhibitors, their adverse cardiovascular effects, and some recent developments targeted to the design of effective anti-inflammatory agents with reduced side effects. The objective of this survey is to discuss the COX pathway, enzyme functions, molecular basis of COX-2 inhibition, chemical classification of selective COX-2 inhibitors and their COX-1/COX-2 selectivities. The underlying basis for adverse cardiovascular effects and progress made in the development of novel anti-inflammatory agents having reduced GI and cardiovascular adverse effects will be the focus of this review.

PLR.26. ANALYTICAL PROFILE OF CIPROFLOXACIN

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Ciprofloxacin, 1-cyclopropyl-6-fluoro-4-dihydro-1,4-oxo-7-piperazine-1-ylquinoline-3-carboxylic acid, is an antibacterial agent with a broad spectrum of activity against a variety of gram positive and gram negative bacteria. Therefore the development or improvement of analytical methods for monitoring their levels in bulk, formulations and biological fluids is of increasing interest. Several methods have been developed using, spectroscopic (spectrophotometry, Fluorimetric, atomic absorption), electro-analytical (potentiometry, voltammetry, and polarography) and chromatographic methods (high performance liquid chromatography (HPLC), capillary electrophoresis (CE), and thin-layer) for the detection of ciprofloxacin in bulk, dosage form and in biological fluid. Different parameters affecting these methods e.g. reagent concentration, reaction time, wavelength, mobile phase composition, flow rate, retention time etc... will be discussed. The separation of ciprofloxacin in presence of different fluoroquinolones using chromatographic methods will be also discussed. Validation of the previous methods, i.e. limit of quantification, limit of detection, recovery, reproducibility, stability, precision; accuracy, ruggedness,

and robustness were also discussed. Although spectrophotometry and potentiometry represent an attractive common techniques adequate for solving many analytical problems, particularly when using the capabilities of the modern instruments available nowadays. These methods are used often in the determination of drug in bulk and pharmaceutical formulations. Chromatographic methods are considering the most important technique for determination of drugs in biological fluids and in pharmacokinetic study.

PLR. 27.EFFECTS OF RESVERATROL ON KEY ENZYMES ACTIVITIES OF CARBOHYDRATES METABOLISM IN DIABETUS MELLITUS

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Resveratrol (3,5,4'- trihydroxystilbene)(RSV) , a naturally occurring phytoalexin found in grapes juice and red wines. It has a variety of pharmacological effects. It has been shown to possess antitumoral activity, cardioprotective effect, anti-inflammatory and anti-platelet properties.RVS exerts a potent antioxidant activity in several experimental biological systems. RSV has been shown to reduce the synthesis of lipid in rat liver. In several studies RSV has antihyperglycemic effect in DM leads to improve blood sugar level. Resveratrol has demonstrated a wide variety of biological activities which make it a good candidate for the treatment of diabetes mellitus. The effect of resveratrol on activities of key enzymes of carbohydrate metabolism in streptozotocin-nicotinamide-induced diabetic rats was observed when a daily oral treatment of resveratrol (5 mg/kg body weight) to diabetic rats for 30 days demonstrated a significant ($p<0.05$) decline in blood glucose and glycosylated hemoglobin levels and a significant ($p<0.05$) increase in plasma insulin level. The altered activities of the key enzymes of carbohydrate metabolism such as hexokinase, pyruvate kinase, lactate dehydrogenase, glucose-6-phosphatase, fructose-1,6-bisphosphatase, glucose-6-phosphate dehydrogenase, glycogen synthase and glycogen phosphorylase in liver and kidney tissues of diabetic rats were significantly ($p<0.05$) reverted to near normal levels by the administration of resveratrol. Further, resveratrol administration to diabetic rats improved hepatic glycogen content suggesting the antihyperglycemic potential of resveratrol in diabetic rats. Thus, the modulatory effects of resveratrol on attenuating these enzymes activities afford a promise for widespread use for treatment of diabetes in the future

PLR. 28. PROPRANOLOL DRUG PROFILE

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Propranolol is a non-selective beta-blocker. It is reported to have membrane stabilizing properties, but does not possess intrinsic sympatho-mimetic activity. In this search; an information (nomenclature, formulae, elemental analysis, appearance, …etc.) about propranolol was described. Propranolol is used as hydrochloride in prophylaxis, management and control of cardiovascular, endocrinal other neurological diseases. Propranolol synthesized by different ways that started with 1-naphthol. Some physical characteristics (ionization constant, solubility, optical activity etc.) was discussed with the respect of methods (XRPD spectrum, DSC thermogram and different spectroscopic analysis methods) to identify the propranolol purity, chemical structure and other characteristic properties. Following that, the methods of analysis of propranolol in both British & United States Pharmacopoeias. Then, some reported methods of analysis about (titrimetric, spectrometric and colorimetric methods) was included to provide relations between propranolol and some other drugs or techniques. Electrochemical (e.g. voltammetric, polarographic), x-ray powder diffraction, chromatographic (e.g. TLC, GC, GC-MS, HPLC,HPLC-MS and Capillary electrophoresis) methods focusing about physic-chemical properties of propranolol has been described. Finally, discussion about some studies that include (biological, stability, pharmacokinetics, metabolism, excretion and pharmacology) was attributed to the physico-chemical properties of propranolol or patient cases in different situations.

PLR.29. Comparative Study Between HPLC & UPLC

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The aim of this study is mainly to explore the importance of the advanced chromatographic technique, UPLC, in comparison to conventional HPLC for many of analytical purposes including profiling of herbal products. The use

of internet, currently published books and scientific journals were highly useful to accomplish this project
Reviewing the current available literature concerning the titled project revealed the more accuracy, high productivity, time safe and better separation of highly complicated mixture, including natural products, by UPLC rather than the conventional HPLC. The emergence of a highly sophisticated UPLC machine integrated with MS and NMR will be enable many scientific institute to reinvestigate and profiling numerous herbal products and many of the commercially -available drugs. The recent discovery of UPLC machine as well MS-UPLC-NMR afforded a good, sensitive and reliable analytical and separation technique rather than the conventional HPLC method. The main drawbacks of UPLC are focused on the high cost of this machine and well-trained personal. The future of UPLC will be focused on the use of integrated MS-UPLC-NMR as a highly and sophisticated technique for profiling of the commercially-available herbal products. The emergence of these profiles will be useful for the use of herbal products on scientific evidence bases.

PLR.30.TNF-α INHIBITORS FROM NATURAL SOURCES

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The uncontrolled level of TNF-α is known to develop various diseases including septic shock, cachexia, and inflammatory and/or autoimmune diseases. Research starting during the last two decades has resulted in the identification of tens of TNF-α inhibitors from natural sources. This review will summarize the sources, chemistry, target sites, and the therapeutic potential of natural anti-TNF-α compounds. Potential target sites (inhibition of TNF production, TNF function, and TNF receptor antagonism) have been employed to identify the anti-TNF compounds. Most of these compounds were assessed *in vitro* by using culture of either mono-cytes/macrophage. A large number of natural anti-TNF-α compounds were thus systematically reviewed, from the available published documents up to date. Many natural products and herbal supplements which inhibit the production or function of TNF-α *in vitro* were discovered. These inhibitors represent the chemical constituents of many traditional herbs and foods such as napthaquinones, alkaloids, flavonoids, terpenoids, curcuminoids, etc. Several target sites have been identified in the biochemical pathways for TNF-α production including transcription factor, NFIB which regulates TNF production. A number of natural products widely known for their antiinflammatory activities has been shown to modulate TNF-α release and function through suppression of NFIB activation. Kinase enzymes and the cAMP are also useful targets for natural products which showed inhibitory activity to TNF-α production. Moreover, few compounds inhibited TNF-α production/function at the post-translational level.

D- Al-MALAZ CAMPUS ABSTRACTS

Abstract Title	Authors
Labelling guideline	Nora Sabar Alanood Al-Turky Haila Al-Mogheira Haifa Al-Bonian Hisham Al-Jadey
Aspirin & Clopidogril and Statins among patients undergoing CABG surgery at KFSH & RC in Riyadh: *retrospective safety study*	Ghazwa Kareem Rawan Al-Onaizy Noaf Al-fadel Saina Al-Akeel
Continuing medical education and pharmacist	Jawza Al-Otaibi Yousef Al-Omi Hadil Al-ghofaidy
Evaluation of superdisintigrants in directly compressible Albuterol tablets	Noaf Al-Ghahtani Manal Bosroor Adel Saqer Hanae Al-Sagheer
Review of current methods to teach medication history	Samar Al-Moaiseb Heba Al-Rahman Khlood Shagroon Anaam Khaiat Abeer Al-Baqawy Jawza Al-Sabhan
Kinase inhibitors as new target in cancer therapy	Ibtasam Al-Jeirani Fadila Alio Ayat Al-Abbas Jihan Heijazi
A novel approach for oral delivery of a poorly soluble active pharmaceutical ingredient	Fateima Al-Harz Sarah Al-Wasiebi Eiman Al-Abdorab Anabi Hoor Al-Sheriawy Hana Al-Sagheer
Statins and sepsis: the effect of 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors on sepsis induced multiple organ dysfunction and mortality	Ashwak Al-Ghethami Amjad Bin Labda Rana Al-Ghamdi Naiea Abdulbaki
Drug delivery	Kholodd Aljoodi Maram Alsani Ibtisam Alharbi Mahasin Radwan
Comparative Study of invitro availability l of paracetamol from different dosage forms and manufacturers	Sakeena Owaisheer Nasrah Abbas Doaa Mshekhs Huda Aleid Omaima Algohary
Formulation and characterization of an enteric release dosage form of anti-	Amsha Alsaqyani Haia Alonazi