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نحو أبحاث صيدلانية متعددة التخصصات وصديقة للبيئة

ADVANCING ECOFRIENDLY MULTIDISCIPLINARY RESEARCH IN PHARMACY

ABSTRACT BOOK

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Fourteenth International Pharmaceutical Sciences Conference

"Advancing Ecofriendly Multidisciplinary Research in Pharmacy"

Assiut, Egypt

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Faculty of Pharmacy, Assiut University, Egypt

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Prof. Mohamed Mahmoud Abdel-Latif

(Vice Dean for Community Service and Environmental Development)

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Prof. Takeshi Tsubata

Visiting Professor of Immunology, Nihon University, Japan

After completing PhD in Medicine in Kyoto University School of Medicine, Takeshi Tsubata was trained as an Alexander von Humboldt fellow at University of Cologne and Max Planck Institute for Immunobiology (Freiburg) in Germany, and then worked under Prof. Tasuku Honjo at Department of Medical Chemistry, Kyoto University School of Medicine. He was a full professor at Tokyo Medical and Dental University (TMDU) from 1996 to 2022, and was the Dean, School of Biomedical Sciences, TMDU from 2003 to 2010. In 2022, he moved to Nihon University School of Dentistry. He has been working on mechanisms for the regulation of immunity vs. immunological tolerance of B lymphocytes.

Dr. Yousef Abdullah Bin Jardan

Associate Professor of Pharmaceutics, College of Pharmacy, King Saud University, KSA.

Dr. Yousef Abdullah M Bin Jardan is an esteemed Associate Professor in the Department of Pharmaceutics at the College of Pharmacy, King Saud University (KSU), Riyadh, Saudi Arabia. He earned his Doctor of Philosophy (Ph.D.) in Pharmaceutical Sciences from the University of Alberta, Edmonton, Alberta, Canada, in 2017, following a Bachelor of Pharmaceutical Sciences from KSU in 2009.

Dr. Bin Jardan's academic expertise spans teaching various undergraduate courses for PharmD students. His contributions to the field extend to significant administrative roles, having served as the Graduate Studies Coordinator, Director of the Experimental Animal Care Centre, and Assistant Vice-Dean for Graduate Studies and Research and Development and Quality within the College of Pharmacy. Additionally, he has been actively involved in several committees, including the Pharmaceutics Department Council, where he has served as Secretary and Chairperson of the department's website committee.

Dr. Bin Jardan's research focuses on the development of analytical methods for drugs and metabolites, pharmacokinetic and pharmacodynamic studies, and drug-disease interactions. His research has been published in prestigious journals, including Current Drug Metabolism and BioMed Research International. Notable studies include investigations into the effects of Nigella sativa and Fenugreek on drug pharmacokinetics, and the role of Sinapic Acid in mitigating cardiotoxicity.

His contributions to the field have been recognized with multiple awards, including the Distinction Award for Academic Excellence from the Saudi Arabian Cultural Bureau and several Graduate Student Awards from the University of Alberta. Dr. Bin Jardan has also participated in significant training and workshops, including Good Laboratory Practice (GLP) and new faculty orientation programs.

Dr. Bin Jardan continues to advance the field of pharmaceutics through his research, teaching, and administrative roles, reflecting his commitment to excellence in pharmaceutical sciences and education.

Prof. Alaa M. Hayallah

Prof. of Pharmaceutical Organic Chemistry and Dean of admission & registration, Sphinx University, Assiut
Pharmacists Syndicate Chairman, Assiut, Egypt

Prof. Hayallah received a B.Sc. in Pharmaceutical Sciences from Assiut University, Asyut, Egypt in 1990, a M. Sc. In the Pharmaceutical Organic Chemistry from Assiut University in 1996, and a Ph.D. in the Pharmaceutical Organic Chemistry from Pharmaceutical Institute, Bonn University, Bonn, Germany in 2003. In 1992 he started his academic life as a demonstrator at Pharmaceutical Organic Chemistry Department in Assiut University, and then he served as a Teaching Assistant and later as a Lecturer. He served as a Lecturer of “Pharmaceutical Organic Chemistry, Medicinal Chemistry and Molecular Biology” for the undergraduate and postgraduate students, LIMES Program Unit Chemical Biology & Medicinal Chemistry, Bonn Uni. Germany (2005). Prof. Hayallah has a unique expertise in Medicinal Chemistry and Drug Design as a Lecturer of "Instrumental tools for drug analysis and molecular biology” at Faculty of Pharmacy, Israa University, Jordan. Previous to his Deanship at Deraya University, Prof. Hayallah took the lead as the Head of Pharmaceutical Organic Chemistry at Asyut University. He is also Chairman of Assiut Pharmacists Syndicate and Vice president of operation smile committee in Egypt, in addition, he is a certified HR trainer. He supervised evaluated many of M. Sc & Ph. D thesis and published a lot of papers in the top journals of Organic and Medicinal chemistry, in addition to one paper in Nature Cell Biology. Also. he is acting a reviewer in many international journals and inspector for many scientific research projects. In 2015, Prof. Hayallah received a prestigious Assiut University Award, as the best-ever scientific research in field of Pharmacy and Pharmaceutical Manufacturing.

Prof. Hamdy M. Abdel-Rahman

Professor of Professor of Medicinal Chemistry and Dean of Faculty of Pharmacy, Badr University in Assiut, Assiut, Egypt

Hamdy M. Abdel-Rahman received the Ph.D. degree in medicinal chemistry in 1999 in a joint supervision between Faculty of Pharmacy Assiut University, Egypt and Kyoto Pharmaceutical University, Japan. After Two postdoctoral positions, from 2002-2004, at *Kyoto Pharmaceutical* University, Japan and from 2006-2009 at institute of cancer therapeutics, Bradford University, UK; he returned to Assiut University, Egypt where he promoted to full professor in 2012. From 2014 he joined the Faculty of Pharmacy, Nahda University in Beni Suef (NUB), where he became the dean from 2018-2022. Finally, from 2022 till now he is the dean of the Faculty of Pharmacy, Badr University in Assiut (BUA).

Prof. Mahmoud Fahmy Ali Elsabahy

Professor of Pharmaceutics and Vice President for Graduate Studies and Research, Badr University in Cairo, Egypt

Dr Mahmoud Elsabahy is a professor of pharmaceutical technology and nanomedicine, with more than 15 years of experience in the development of cutting-edge technologies for gene therapy, and for the delivery of biotechnology-related products. He is the vice president for graduate studies and research in Badr University in Cairo. He is a fellow of the Leaders in Innovation Fellowship Program (Royal Academy Engineering in London) which provided added skills in business and entrepreneurship, a pivotal bridge between academia and industry. He has completed MSc and PhD degrees from the faculty of pharmacy, University of Montreal “pharmaceutical nanotechnology” (Montreal, Canada). Dr Elsabahy has been the assistant director of a research facility at Texas A&M University (Texas, USA, 2011-2020), and currently he is a visiting scholar at Texas A&M University. He has been ranked in 2020, 2021, 2022 and 2023 among the top 2% of scientists in the world and among the top 1% of scientists in the world in “Pharmacy and Pharmacology”, as named by Stanford University World's Top 2% Scientists. He contributed to 130 publications, all in international top-profile peer-reviewed journals, and he is the principal investigator on several grants. He is the main inventor on several granted US and European patents. In May 2016, he received the State Award, and in August 2017, he received the Excellence Medal ‘First Class’ from the Egyptian President. In 2021, he won the ‘Gold Medal’ from the International Exhibition of Inventions of Geneva and was awarded the Obada Prize. Recently, in 2022, he won the State Award for Excellence in Advanced Technological Sciences.

Prof. Maha Fadel Mohamed Ali

(Professor of Pharmaceutics, Pharmaceutical Nano-Technology and Laser Applications in Pharmaceutical Sciences, National Institute of Laser Enhanced Sciences, Cairo University, Egypt)

Dr. Maha Fadel is a Professor of Pharmaceutics, Pharmaceutical Nano-Technology and Laser Applications in Pharmaceutical Sciences. Now she is the Vice Dean for Postgraduate Studies and Research at National Institute of Laser Enhanced Sciences (NILES), Cairo University. She was the head of Medical Applications of laser Dept., NILES. She has 55 publications on laser applications in pharmaceutical Sciences and nanotechnology in photodynamic therapy. She is a reviewer in many international scientific journals. She was the president of Medical Ethical Committee at NILES and member of Medical Ethical committee of the Medical Sector in Ministry of Defense in Egypt. She is a member in Pharmaceutics and Industrial Pharmacy promotion committee for Professors and associate professors at Supreme Council of Universities in Egypt. She had her PhD, MSc in pharmaceutics and Industrial pharmacy and Bachelor degree in pharmaceutical sciences from faculty of Pharmacy Cairo University.

Prof. Mostafa Ahmed Hussein

Professor and Head of Pharmaceutical Organic Chemistry department, Faculty of Pharmacy, Assiut University, Egypt.

Prof. Mostafa obtained his bacherlor's degree in Pharmaceutical Sciences from Assiut University, then proceedd to obtain his master's degree from the same university. He obtained his PhD in Pharmaceutical Sciences from Assiut and Kyoto University (channel system). He currently serves as the head of the Pharmaceutical Organic Chemistry department in Faculty of Pharmacy, Assiut University. He previously took the positions of director of qulity unit in the Faculty of Pharmacy in Assiut University, director of project managament unity in Assiut University, and vice dean for development and quality in College of Clinical Pharmacy, Al baha Univeristy in Saudi Arabia

Prof. Gehan Hussein Heeba

Professor and Head of Pharmacology and Toxicology Department, Faculty of Pharmacy, Minia University

Prof. Gehan Hussein Heeba is currently a professor and Head of Pharmacology and Toxicology Department, Faculty of Pharmacy, Minia University, Egypt. Prof. Heeba supervised 31 Masters and Ph.D. theses, having 53 publications, and attended 25 conferences and workshops, Scopus h index 23 (Scopus author ID: 23060107600). Prof. Heeba is an academic scientific reviewer in more than 30 international journals. She is a member of editorial board of Frontiers in Gastroenterology Journal, and Egyptian Journal of Basic and Clinical Pharmacology. Prof. Heeba is a member of The National Committee of Drugs & Medicines by Academy of Scientific Research and Technology (ASRT), Ministry of Higher Education, Cairo, Egypt since 2022 till now. She was selected among the top 2% of the World's most influential scientists in the Stanford University Rankings for 2020, 2021and 2022

Prof. Sherif Fouad Hammad

Professor of Medicinal Chemistry, Egypt-Japan University pf Science and Technology, Alexandria, Egypt

Sherif F. Hammad is one of the expert Egyptian medicinal chemists especially in the field of API industrial production. Dr. Hammad graduated from the Faculty of pharmacy, Alexandria University in 1997 with an excellent with honor grade after receiving the best ideal student award (first ranked over the university). He started his academic career in Helwan University where he earned a master's degree in Pharmaceutical chemistry followed by a Medicinal Chemistry PhD degree from Auburn University in Alabama State in the US and a postdoctoral fellowship in University of Maryland Baltimore County. His work in the US focused on the multistep total synthesis of DNA minor groove alkylators, carbocyclic nucleosides and other modified nucleotides targeting cancer, tuberculosis, and Hepatitis C virus. Upon returning to Egypt, he started his professional career both academically as an assistant professor of Medicinal Chemistry in Helwan University and other Universities as adjunct professor as well as industrially as a Research and development (R&D) consultant in Pharco group for pharmaceutical industries. He shared in the startup and establishment of the most modern API production facility in the Middle East (Pharco B for Chemicals) at the role of R&D and technical director with a significant contribution in the treatment of more than 2 million Egyptian patients from HCV in the last five years. He joined EDA (Egyptian Drug Authority) from its beginning as API and Quality consultant and He is the major R&D

Prof. Gamal Mohamed Mahmoud El Maghraby

Professor and Head of Pharmaceutical Technology Department, Tanta University, Egypt

Dr. El Maghraby is a Professor and Head of Pharmaceutical Technology, Faculty of Pharmacy, Tanta University, Egypt. He received his Ph.D. in pharmaceutical Technology from the University of Bradford, UK in 2000. After brief stints as a postdoctoral fellow at Monash University, Australia (2001), he worked as a lecturer at Tanta University for 4 years before moving to University of Auckland, New Zealand for 1 year. He worked also at King Saud university in Saudi Arabia for 5 years before coming back to Tanta University. He published more than 150 international publications in addition to 12 book chapters. He was listed in the top 2% scientists worldwide by Stanford University for 4 consecutive years. His research interests include optimization of drug absorption using nanotechnology and crystalline structure modification.

Prof. Usama Ramadan Abdelmohsen

Professor and Head of Pharmacognosy Department,
Deraya University, Egypt

Usama Ramadan Abdelmohsen received his B.Sc. in Pharmaceutical Sciences from Minia University, Egypt in 2002. He received his Ph.D. with an Egyptian fellowship award from the University of Würzburg, Germany, with his thesis entitled 'Antimicrobial activities from plant cell cultures and marine sponge-associated actinomycetes' under the guidance of Professor Ute Hentschel. He was group leader at the University of Würzburg for 8 years in the natural Products section. His academic interests are the isolation and structure elucidation of bioactive secondary metabolites from marine sources using spectroscopic, genomic, and metabolomic tools to discover new chemical leads.

Prof. Ibrahim M. El-Sherbiny

Professor of Nanomaterials and Nanomedicine,
Director of the Center for Materials Science,
Zewail City of Science and Technology, Egypt

Prof. Ibrahim M. El-Sherbiny obtained his BSc in chemistry and his master's degree in polymers from Mansoura University. He moved to Massey University, New Zealand and obtain his PhD in smart drug delivery in 2007. In 2009, he was awarded a Fulbright Fellowship from the University of Michigan. In 2012, he received Prestigious STATE Incentive Award in Science given by the National Academy of Scientific Research, Egypt. In 2013, he was awarded the Venice Goda Award for Scientific Creativity for Young Researchers in the field of Materials Science and its applications also by National Academy of Scientific Research, Egypt. El-Sherbiny was a post-doctoral fellow in three different universities; Michigan University, University of New Mexico and Texas University, United States between 2008 and 2010. Prof. Ibrahim is currently an Egyptian Professor of Nanomaterials and Nanomedicine at the Zewail City of Science and Technology. He is the Director of Nanoscience Program and the Center for Materials Science of the institution. He is a member Biomedical Engineering Society and a Fellow of Royal Society of Chemistry.

Prof. Fotouh Rashed Mansour

Professor of Analytical Chemistry, Faculty of Pharmacy, Tanta University, Tanta, Egypt.

Fotouh Mansour is a Professor at Tanta University's Faculty of Pharmacy. He is also the director of the University's Scientific Research Development Unit. In 2013, he finished his PhD in chemistry at Miami University. Two year later, he joined the University of Tasmania in Australia as a research associate. With over 110 international publications, he has developed an H-index of 24. Prof. Fotouh was further acknowledged as one of the World's Top 2% Scientists in analytical chemistry for 2021 and 2022 by Stanford University's Ranking of the World Scientists. Prof. Fotouh's research interest includes green analytical chemistry, sample preparation, microextraction, deep eutectic solvents, carbon dots and metal organic frameworks in pharmaceutical analysis.

Prof. Korany Abdella Khallil

Professor of Applied Organic and Medicinal Chemistry at the National Research Center, Egypt)

Dr. Korany A. Ali is a Professor of Applied Organic and medicinal Chemistry at NRC. He has multiple interests that are closely related to linking scientific research with industry, especially the pharmaceutical chemicals industry, as he is currently the Director of R&D Center of Chemical and Pharmaceutical Industries (R&D-CPI)- National Research Centre- 6 October branch. Dr. Korany is the General Coordinator of the National Knowledge Alliance: Pharmaceutical Industries Dr. Korany is one of the founders of the TICO Office at the National Research Center. He holds a Diploma in Technology Management from Nile University 2014. Currently, Dr. Korany is the Executive Director of the NRC Technology Incubators. Dr. Korany has international collaborations, as he participated in many international research projects and He has worked as a Visitor Researcher at Lodz University-Poland, and TU-Dresden, Germany. Dr. Korany has published more than 75 international publications in the field of medicinal, chemistry, Heterorganic Synthesis organic and biomaterials applications and nanotechnology.

Prof. Mohamed Omar Ahmad Abdelgawad

Associate Professor of Mechanican Engineering, American University of Sharjah, UAE and Mechanical Engineering Department, Assiut University

Dr. Mohamed Abdelgawad received his B.Sc. in mechanical engineering from Assiut University in 1998 and his PhD from University of Toronto, Canada, in 2009. He worked at Assiut University as an assistant/associate professor of mechanical engineering between 2010-2018. During this period, he established the first Microfluidics Lab in Egypt and built collaborations with colleagues in the faculties of Medicine, Pharmacy, and Veterinary Medicine which led to him receiving the State Award for Early Career Researchers from the Egyptian government in 2016

Dr. Abdelgawad's research interests include mechanical characterization of biological cells, studying sperm swimming behavior, nanoparticle synthesis using Microfluidics, and studying physics of fluid flow on the micro scale. In 2018, Dr. Abdelgawad joined the mechanical engineering department at the American University of Sharjah, UAE while still keeping his affiliation with Assiut University.

Prof. Sara Abdel Hamid Abdel Gaber Mohamed

Nanomedicine Department, Institute of Nanoscience and Nanotechnology, Kafrelsheikh University

Assoc. Prof. Dr. Sara A. Abdel Gaber is an associate professor at the nanomedicine department institute of nanoscience and nanotechnology, Kafresheikh University, Egypt. Dr. Sara is a graduate of the pharmacy and Biotechnology faculty of the German University in Cairo. She pursed her master and PhD in the field of phototherapy and that was in a bilateral program with German Universities such as Jena University, Ulm and Munich Universities. Dr. Sara is a DAAD awardee several times, she was awarded the UNESCO green chemistry for Life Sciences grant, the Daniel Turnberg Fellowship to University college of London and AfOX fellowship to Oxford University. She was recently awarded the Science by Women fellowship which is a program for women, science and innovation in Africa. Dr. Sara is participating in multiple nationally and internationally multimillion Egyptian pounds funded projects studying the interaction of nanotechnology, phototherapy within a green chemistry aspect. She is a member of the Egyptian Young Academy of Sciences and the ethical committee for animal use in laboratories and research. Since 2022, She is a member in the Arab-German Young Academy of Sciences and Humanities (AGYA) with an active role in the working group of health and society.

Prof. Yaseen Elshaier

Professor of Pharmaceutical Chemistry and Vice Dean for Research and Postgraduate Studies, University of Sadat City, Egypt

Yaseen A. M. M. Elshaier is a professor in pharmaceutical chemistry and vice dean for research and postgraduate studies, faculty of pharmacy, university of Sadat City, Menufia, Egypt. He got his bachelor degree (2000) from faculty of Pharmacy, Al-Azhar University, Egypt, and master degree (2007) from faculty of pharmacy, Cairo University, Egypt. On 2011, he got his PhD from Kanazawa University, Japan in the field of metal coupling chemistry toward total synthesis of natural products. On 2015, he travelled to USA for a postdoc scholarship at South Dakota State University, SD, USA. His work, there, focused on different molecular modelling techniques and computer aided drug design approaches. Additionally, he engaged in projects for design and synthesis of Cucurbitaceae analogues as anti-cancer agents. Dr Elshaier has Scopus H index 24 with 1430 citation and two international patents. In the frame of pharmaceutical chemistry perspective, currently he is interesting in novel green chemistry methods, drug repurposing approaches and molecular modelling. Furthermore, he is working in utilizing artificial intelligence applications in drug development and drug discovery.

Prof. Abdel-Rahman Hedar

Professor of Artificial Intelligence and Advisor of Assiut University President for IT & AI, Assiut, Egypt

Prof. Abdel-Rahman Hedar holds a Doctor of Informatics (Computer Science) degree from Kyoto University, Japan, in 2004. He also received his B.Sc. and M.Sc. (Mathematics) from Assiut University, Egypt, in 1993 and 1997, respectively. He is currently a professor of artificial intelligence and vice-dean of graduate studies and research at the Faculty of Computers and Information at Assiut University. He also holds several advisory and supervisory positions, as he is an advisor to the President of Assiut University for Information Technology and Artificial Intelligence, the executive director of the Research Projects Management Office, and the general supervisor of the entrepreneurship club at Assiut University. Prof. Abdel-Rahman Hedar has published several scientific papers in the field of intelligent system design and optimization with different application areas, especially in data processing and mining. Moreover, he got many research grants in the area of computing science and applied mathematics, and he is co-inventor of two patents related to intelligent systems in crowd management. He also supervised several doctoral and master's theses in the fields of artificial intelligence at many universities in Japan and Egypt. From July 2005 to July 2007, he was a JSPS research fellow at Kyoto University, Japan. From 2012 to 2020, he worked as a faculty member and consultant at Umm Al-Qura University, Saudi Arabia. He was a visiting researcher at different international universities, including Kyoto University, Japan, and Federation University, Australia. His research includes meta-heuristics, global optimization, machine learning, data mining, bioinformatics, graph theory, network management, cloud computing, and parallel programming. He has published more than 80 papers in international journals and conferences with more than 2400 citations, and his h-index is 24.

Dr. Abdelsalam Mohamed Abdelaziz Hussein

Clinical Pharmacy inspector, Qena governorate and senior at medical coordinator, Shifaa Alorman Oncology Hospital, Luxor, Egypt

Dr. Abdelsalam received his BSc in Pharmaceutical Science in 2016 with excellent grades and went on to went on to obtain diploma in clinical pharmacy in 2018 and became a board-certified pharmacotherapy specialist in 2019. He started working in Shifaa Alorman Oncology Hospital in 2016 as a clinical pharmacist, then took several positions in the hospital where he is now a senior medical coordinator and a clinical pharmacy inspector in Qena governorate. He published several respectable research papers in SPOR, ASCO and MASSC and is a fellow of The Health Technology Assessment, Wifor Institute in Germany.

GENERAL LECTURES

Therapeutic vaccines that substitute for therapeutic antibodies

Takeshi Tsubata
Department of Pathology, Nihon University School of Dentistry

In the past two decades, numbers of therapeutic antibodies that have revolutionary efficacy for various diseases have been developed. However, the costs of the therapeutic antibodies are a huge burden on household and national finances. Nonetheless, these therapeutic antibodies have not been replaced by small chemicals. This is because small chemicals can bind only to the specific sites of the target molecules. In contrast it is possible to generate therapeutic antibodies to almost any epitope of any target molecule. Antibodies to the target molecules can be generated by vaccines. Thus, numbers of studies and trials have been done to develop therapeutic vaccines that substitute for therapeutic antibodies by inducing antibody production to the target molecules. However, it is so far not successful to induce sufficient antibody titers for therapeutic efficacy comparable to therapeutic antibodies. We have generated a highly immunogenic carrier combining toxoid and polysaccharide, and developed therapeutic vaccines that contain small peptides derived from the immune checkpoint molecules PD-L1 or CTLA-4. Injection of these vaccines to mice induces good antibody titers to the target molecules and anti-tumor effect comparable to the injection of antibodies to these molecules. Because the costs of therapeutic vaccines are expected to be much lower than those of therapeutic vaccines, our results suggest that therapeutic vaccines using a highly immunogenic carrier may reduce the financial burden of medical expenses without affecting the quality of medical care.

Effect of Hyperlipidemia on Drug Disposition of Glibenclamide

Yousef A Bin Jardan
Department of Pharmaceutics, College of Pharmacy, King Saud University, KSA.

Hyperlipidemia (HL) is a disease characterized by elevated levels of lipids in the bloodstream, has significant implications for drug disposition, affecting pharmacokinetics and pharmacodynamics. Increased lipid levels can alter the absorption, distribution, metabolism, and excretion (ADME) of various medications. This condition can lead to changes in plasma protein binding, resulting in higher free drug concentrations and altered therapeutic effects or toxicity. Additionally, hyperlipidemia may influence hepatic metabolism by affecting cytochrome P450 enzyme activity, potentially leading to drug interactions and variability in drug efficacy. Understanding these effects is crucial for medication pharmacodynamics in patients with hyperlipidemia, alteration of dose adjustments, therapeutic monitoring, and individualized treatment strategies to ensure efficacy while minimizing adverse effects. Previous studies indicate that HL can alter the toxicodynamic and pharmacokinetic properties of lipoprotein-bound drugs, potentially resulting in increased plasma binding, reduced unbound plasma fractions, and decreased drug clearance (CL). These changes may lead to elevated systemic drug concentrations and a heightened risk of adverse drug reactions. Additionally, HL is associated with decreased expression and activity of cytochrome P450 (CYP) isoforms crucial for drug metabolism, particularly CYP3A4. Glibenclamide (Gb), a second-generation sulfonylurea commonly used to manage type 2 diabetes mellitus. It is primarily metabolized by CYP3A4. Therefore, understanding the effect of HL on the disposition has an impact on therapeutic efficacy and safety of Glibenclamide (Gb).

Novel heterocyclic hybrid molecules as potential apoptotic antitumor agents

Alaa Arafat K. M. Hayallah

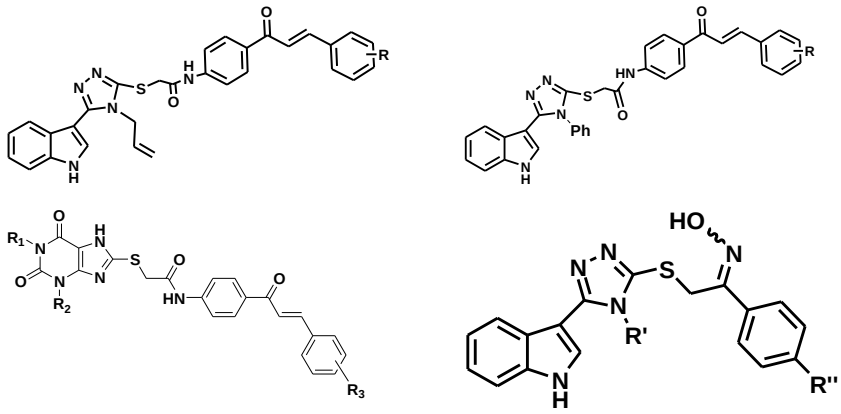
Prof. of Pharmaceutical Organic Chemistry, Faculty of Pharmacy, Assiut University.

Faculty of Pharmacy Dean, Sphinx University

Cancer is one of the primary causes of death universal. Most patients who have been diagnosed with cancer suffer from poor quality of life due to adverse proceedings associated with cancer. One of the most effective methods of suppressing tumor growth and tumor eradication is chemotherapy. However, many patients undergoing chemotherapy have associated side effects such as thrombocytopenia, anemia, nausea and vomiting.

Nowadays, the challenge for medicinal chemists is finding new anticancer agents with improved efficacy and high degree of safety toward normal host cells. Methylxanthine derivatives such as caffeine (1) and theophylline were found to induce apoptosis, and promote cytotoxicity induced by doxorubicin. Theophylline was found to induce programmed cell death in various human cancer cell line and in a malignantly transformed granulosa cell line when synergizing with gemcitabine or cisplatin. Recent studies demonstrated that molecular hybridization of chalcone units with biologically active pharmacophore produced new hybrids with synergistic biological activity. Indoles have important biological activities including anticancer, antioxidant, anti-inflammatory, anti TB, antiadipogenic, antibacterial, antiviral. These favorable biological activities of the indole scaffold have attracted researchers towards developing novel indole-based therapeutics.

Encouraged by all these facts, our work aimed at gathering two bioactive entities NO releasing oxime or acetylated chalcone and xanthine or indole derivative in only one compact hybrid structure for the purpose of synergism and/or decreasing the expected adverse effects. Synthesis of novel hybrid compounds based on xanthine or indole and chalcone pharmacophores.



Synthesis of benzimidazole derivatives and their biological activities.

Hamdy M. Abdel-Rahman [1,2]

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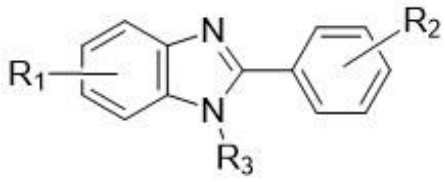
[2]*Pharmaceutical Chemistry Department, Faculty of Pharmacy, Badr University in Assiut (BUA), Egypt*

The benzimidazole ring (as privileged scaffold) has attracted the attention of medicinal chemists due to its widespread medicinal and pharmacological properties. Herein, we summarized our recent reports for the synthesis of benzimidazoles in the discovery of new pharmacological agents targeting different diseases. Particularly, this report will focus on the use of short and eco-friendly synthetic schemes. Furthermore, the biological results of synthesized compounds will also be discussed.



Engineering nanoconstructs for targeted treatment of *Fusobacterium nucleatum* associated-colorectal cancer

Prof. Mahmoud Fahmy Ali Elsabahy

Professor of Pharmaceutics and Vice President for Graduate Studies and Research, Badr University in Cairo, Egypt

Colorectal cancer (CRC) ranks second in the global incidence of all cancers, accounting for one of the highest mortalities. CRC is generally characterized by a high prevalence of *Fusobacterium nucleatum* (*F. nucleatum*), a Gram-negative anaerobe pathogen derived from the oral cavity. Although chemotherapy is an effective strategy for CRC treatment, chemotherapy resistance caused by tumor-resided *F. nucleatum* could result in treatment failure. Recent studies have highlighted the significant role of *F. nucleatum* in the progression, chemo-resistance, metastasis, and poor prognosis of CRC. Moreover, *F. nucleatum* can specifically colonize CRC tissues through adhesion on its surface *via* adhesin FadA and Fap2, forming biofilms that are highly resistant to commonly used antibiotics. *F. nucleatum* and its biofilm prevent the accumulation of tumor-infiltrating lymphocytes and lead to an immune-suppressive tumor microenvironment. Eradication of *F. nucleatum* and its biofilms may effectively remodel the immune microenvironment and potentiate CRC immunotherapy. The rational design of *F. nucleatum*-targeted nanoassemblies can improve the anti-tumoral immune microenvironment and enhance immunotherapy of *F. nucleatum*-associated CRC. This can be achieved *via* constructing nanoparticles incorporating a positively charged polymer with *F. nucleatum* inhibition capacity, peptides targeting Fada and Fap2, and polyethylene glycol to improve circulation time and enhance the biocompatibility of the antibacterial nanoassemblies. This novel anti-tumor nanosystem provides a promising strategy for achieving a clinically relevant solution for bacteria-associated drug-resistant cancers.

Nano-Technology in Photodynamic Therapy

Maha Fadel

Prof. of Pharmaceutics, Pharmaceutical Nano-Technology and Laser Applications in Pharmaceutical Sciences
Department of Medical Applications of Laser, National Institute of Laser Enhanced Sciences, Cairo University

Photodynamic therapy (PDT) is a promising treatment modality for treatment of oncological, dermatological, and ophthalmic diseases. Photodynamic therapy (PDT) involves the use of photochemical reactions mediated through the interaction of photosensitizing agents (PSs), light, and oxygen for the treatment of malignant or benign diseases. One of the main factors that limits the use of many PSs in PDT topically is their poor penetration through the skin layers and eye. Increasing transdermal penetration efficiency was the aim of many researchers using different techniques and carrier systems. Nanotechnology has achieved the status as one of the critical research endeavors of the early 21st century, as scientists harness the unique properties of atomic and molecular assemblages built at the nanometer scale. There are a number of classes of nanoparticles used, or proposed for use, in different applications such as vesicular nanosysstems, solid lipid nanoparticles (SLN), nanostructured lipid carriers (NLCs) and other novel materials, such as fullerene, have also appeared in a small number of products.

Green Chemistry and its Implementation for Sustainability "Egypt Vision 2030"

Mostafa Ahmed Hussein

Professor and Head of Pharmaceutical Organic Chemistry department, Faculty of Pharmacy, Assiut University, Egypt.

Green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances to the environment. Green chemistry applies across the life cycle of a chemical product, including its design, manufacture, use, and ultimate disposal. Its concept developed in the business and regulatory communities as a natural evolution of pollution prevention initiatives. In our efforts to improve crop protection, commercial products and medicines, we also caused unintended harm to our planet and humans. By the mid-20th century, some of the long-term negative effects of these advancements could not be ignored. Pollution choked many of the world's waterways and acid rain deteriorated forest health. There were measurable holes in the earth's ozone. Some chemicals in common use were suspected of causing or directly linked to human cancer and other adverse human and environmental health outcomes. Many governments began to regulate the generation and disposal of industrial wastes and emissions. The United States formed the Environmental Protection Agency (EPA) in 1970, which was charged with protecting human and environmental health through setting and enforcing environmental regulations. Green chemistry takes the EPA's mandate a step further and creates a new reality for chemistry and engineering by asking chemists and engineers to design chemicals, chemical processes and commercial products in a way that, at the very least, avoids the creation of toxics and waste. Among the different principles of Green Chemistry, this work will be concentrated on the use of catalytic reagents (as selective as possible) as superior to stoichiometric ones.

Incretin-based therapy and cancer: Are they enemies or allies?

Gehan Hussein Heeba

Professor and Head of Pharmacology and Toxicology Department, Faculty of Pharmacy, Minia University

Incretin-based therapy has been increasingly used in the past decade for the management of type 2 diabetes mellitus. A link between incretin pathway and cancer has been proposed. Still a debate in the scientific committee is rising whether incretin-based therapy has beneficial or harmful effects on patients with malignant diseases or at risk of malignancy. This presentation will discuss the published preclinical and clinical research discussing incretin-based therapy and cancer. Regarding pancreatic cancer, there are case reports of pancreatic cancer after receiving incretin-based drug therapy but the lag time for tumorigenesis is questionable. To date, meta-analyses agreed that no increased incidence of pancreatic cancer was observed among users of incretin-based therapy. Whether incretin-based therapy increases the risk of thyroid cancer is controversial therefore it is advisable to avoid prescribing glucagon-like peptide-1 receptor agonists (GLP-1RAs) for patients with high risk for thyroid cancer. Despite the numerous studies published about incretins and cancer, it is still a rich area for further research.

Localization and Internationalization of the API industry in Egypt, Challenges and Ambitions

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The continuous supply of active and inactive pharmaceutical raw materials that fulfill the quality essentials (purity, safety, and efficacy), is a crucial corner for the sustainability of pharma industry. The past highest global prevalence of HCV (Hepatitis C virus) in Egypt and the unaffordable initial cost of the HCV medication, stimulated the revival of the local API (Active Pharmaceutical Ingredient) industry that was originally established in the mid-sixties of the last century by El-Nasr Company.

Optimum exploitation of local resources and encouraging target-directed academic scientific research along with collaborative technology transfer would be vital in promoting the API industry.

The successfully achieved local syntheses and production of sofosbuvir and Ravidasvir by Pharco from one side and of Remdesvir and Molnupiravir by EVA from another side, represent a remarkable milestone in a must-have and crucial industry in Egypt.

The arena of API industry is unbelievably opened for creative and skillful pharmacists and chemists that Egypt is impressively rich in for promoting industrial localization and improving the health care system.

Some success stories and strategic approaches for advancing the local API industry and enhancing academic-industrial collaboration as knowledge and technology alliances with notable socio-economic impacts would be highlighted in this talk.

Co-crystallization in drug product development

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Development of a new drug product is a multistage process which requires time and money. Researchers are developing increasing numbers of new chemical entities with promising pharmacological activity. Unfortunately, many compounds fail to continue through the pipelines to reach the market. This is usually attributed to inability to develop them into bioavailable dosage form. Modification of crystalline structure is a promising tool to improve drug characteristics boosting the bioavailability. Modification of crystalline structure results from salt formation, eutectic transition, amorphization or co-crystallization. Co-crystallization involves development of hybrid crystals of drug with inactive co-former or with another drug. FDA considers co-crystals of existing drugs as analogous of polymorph or as fixed dose combination. Co-crystallization was shown to enhance the dissolution rate of a wide range of drugs with authors employing co-formers ranging from simple organic acid to traditional excipients such as silica, sucralose and xylitol. The important features of these co-formers are the existence of hydrogen bonding sites and the hydrophilic nature. Co-crystallization may even take place between drugs in fixed dose combination if the drugs have the necessary hydrogen bonding sites. This may be beneficial if one of the drugs is hydrophilic but can provide a possible deleterious effect in case of hydrophobic drugs. Olmesartan medoxomil and hydrochlorothiazide provide example for deleterious co-crystallization which must be avoided. **In conclusion**, co-crystallization should be considered in drug product development and the formulators must employ the knowledge in this area to optimize drug dissolution and to protect drugs from deleterious interaction.

From Oceans to Medicine: Marine Natural Products as Anti-Infective Agents

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Marine ecosystems comprise taxonomically and biologically diverse classes of macroorganisms and microorganisms with exclusive physiological and structural features. LC-HRESIMS-assisted dereplication along with bioactivity-guided isolation of the Red Sea Sponge *Callyspongia siphonella* led to targeting two antibacterial brominated oxindole alkaloids. N‑acetylglucosamine was used to maximize the chemical diversity of sponge‑derived actinomycete *Actinokineospora spheciospongiae* sp. nov. yielding two antitrypanosomal new fridamycins H and I, along with three known compounds actinosporins C, D, and G. Chemical analysis based on bioassay-guided fractionation resulted in the isolation of the cyclic lipopeptides, cyclodysidins A-D, from *Streptomyces* sp. RV15 associated with the marine sponge *Dysidea tupha*. From the same strain, one naphthoquinone derivative SF2446A2 was isolated and showed new antichlamydial and antischistosomal activities. A new azepino-diindole alkaloid; rhodozepinone, along with five known compounds were identified from the broth culture of *Rhodococcus* sp. UA13, which had been previously recovered from the Red Sea sponge *Callyspongia* aff. *Implexa.* Rhodozepinone exhibited significant antibacterial and antitrypanosomal activities against *Staphylococcus aureus* NCTC 8325 (IC_{50}= 8.9 µg/ml) and *Trypanosoma brucei brucei* TC221 [IC_{50}= 16.3 (48 hr) and 11.8 (72 hr) µg/ml], respectively. One new phenoxazin analogue, strepoxazine A, along with two known antibiotic phenazines phencomycin and tubermycin B were isolated from the solid culture of *Streptomyces* sp. SBT345 which had previously been recovered from the Mediterranean sponge *Agelas oroides*. Strepoxazine A showed cytotoxicity against leukaemia cells HL-60 cells. From the same culture, a new chlorinated quinolone, ageloline A, was also identified. Ageloline A exhibited antioxidant potential using cell-free and cell-based assays and was further able to reduce oxidative stress and genomic damage induced by the oxidative stress inducer 4-nitroquinoline-1-oxide (NQO). It also inhibited the formation and growth of *Chlamydia trachomatis* inclusion in a dose-dependent manner with an IC_{50} value of 9.54 ± 0.36 µM. Using metabolomics to dereplicate the marine sponge-associated *Actinokineospora* sp. EG49 cultivated from the Red Sea sponge *Spheciospongia vagabunda*, 20 compounds were identified, many of which are unknown. Bioassay-guided isolation of the same strain led to the isolation of new anti-trypanosomal and antioxidant angucyclines named actinosporins A-D. Interestingly, co-cultivation of the two sponge-derived actinomycetes, *Actinokineospora* sp. EG49 and *Nocardiopsis* sp. RV163, induced biosynthesis of three natural products that were not detected in the single culture of either microorganism. These were *N*-(2-hydroxyphenyl)-acetamide, 1,6-dihydroxyphenazine and 5a,6,11a,12-tetrahydro-5a,11a-dimethyl-1,4-benzoxazino[3,2-b][1,4]benzoxazine. The phenazine derivative was active against *Bacillus* sp. P25, *Trypanosoma brucei* and interestingly, against *Actinokineospora* sp. EG49. These results totally reflected the potential of sponge-derived actinomycetes as a rich source of new chemical scaffolds with promising potential for drug discovery.

Nanomedicine: Potential for Early Cancer Diagnosis and Treatment, Along with Other Biomedical Uses

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Smart nanomaterials represent a very favorable class of materials that are able to dramatically change their properties in response to specific environmental stimuli such as pH, temperature, magnetic field, light, electricity, certain chemicals, etc. Recently, the ability to manage the size in the nanoscale, shape, porosity and surface morphology of materials has created new opportunities to evade various challenges in various applications. Besides, the concurrent fast and considerable stimuli-response of these nano-structured smart nanomaterials may magnify the scope of their applications and suggest improved performance in their uses especially in the biomedical fields. The talk will give an overview of the recent advances of smart nanomaterials, and will describe the *in-vitro* and *in-vivo* evaluation of several new series of our newly-developed smart nano and nano-in-micro systems for treatment and early diagnosis of different types of cancer.

Emerging Trends in Green Analytical Chemistry: Challenges and Opportunities

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Green analytical chemistry (GAC) has evolved as an emerging field, driven by the need to reduce environmental impacts while maintaining high standards in chemical analysis. In the last decade, recent trends in GAC have included miniaturization, solvent-free techniques, and the use of renewable materials. These advances aim to minimize resource consumption, reduce waste, and decrease the carbon footprint of laboratory practices. However, these advanced strategies come at a cost. For example, employing greener solvents in extraction works but at the expense of extraction efficiency. The situation is not entirely different when using green mobile phase modifiers in liquid chromatography. Moreover, the limited availability of green alternatives for certain reagents makes this approach particularly challenging. On the other hand, the balance between method sensitivity and sustainability is a critical hurdle to the widespread adoption of eco-friendly technologies. These challenges present opportunities for technological innovation, interdisciplinary collaboration, and the development of more comprehensive assessment tools for green practices. As the demand for sustainable solutions grows, green analytical chemistry has the potential to lead a transformative shift in laboratory methodologies, aligning scientific progress with environmental responsibility.

The Role of R&D Centers in Promoting the Manufacture of Active Pharmaceutical Ingredients: achievements of R&D-CPI as the first example in Egypt

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National Research Centre

Global crises such as the coronavirus pandemic, geopolitical issues, and currency exchange rates have affected supply chains, including active pharmaceutical ingredients (APIs) supply chains. This crisis has led many countries to adopt new policies relying on national industries to meet the needs of strategic goods, including APIs, instead of importing. Hence, the importance and necessity of securing the local pharmaceutical industry in Egypt emerges by setting clear policies with specific time frames and clear performance indicators to secure the availability of APIs through local manufacturing of these raw materials instead of relying on importing them from abroad. Whereas Egypt imports almost all APIs from the global market, while many of these materials can be manufactured and prepared using technological methods locally, at the same time, most of these methods are not protected by patents or any commercial protection, therefore, through the R&D-CPI, we have achieved many targets in this field. In cooperation with all research and industrial bodies, we seek to put the APIs industry in Egypt on the right track to secure Egypt’s needs for pharmaceutical raw materials in the coming periods.

Microfluidics as a low-cost platform for preparation of nanoparticles for drug delivery applications

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Microfluidics, which involves the manipulation of minute amounts of liquids inside microchannels, is becoming more popular in nanomedicine applications such as preparation and characterization Nanoparticles (NPs). Microfluidics is well known to offer many advantages over traditional bench-top techniques in preparation of NPs including better control over particle size, greater uniformity, and high throughput. Despite its advantages, microfluidics is still considered an expensive technology due to the high costs associated with chip fabrication equipment and pumps needed to generate the required flows inside microchannels. In this talk, I will present an overview of using microfluidics for preparation of nanoparticles and will discuss the effect of channel geometry and flow parameters on the size and uniformity of the prepared NPs. I will also introduce a low-cost pumping platform capable of preparing liposomes and polymeric NPs with sizes ranging from 50 nm to 250 nm using a commercially available micromixer chip. The entire platform costs only $250 with the chip and can be built in a couple of hours. We believe this platform will render microfluidic preparation of NPs accessible to any laboratory with minimal capabilities.

Nanomedicine Mediated by Electrospun Nanofibers for Regenerative Medicine

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Nanomedicine is emerging globally since it overcomes many of the limitations encountered by standard therapies. Many nanoparticles were granted approvals for clinical applications and others are in late clinical trial stages. Electrospun nanofibers are of a particular interest in applications requesting wide surface area and those in need of scaffolds. They can be greatly tailored to mimic the natural ones, provide controlled drug release and boost the adhesion of cells. Furthermore, the mechanical properties of the electrospun nanofibers can be strengthened by the incorporation of polyblends of both natural and synthetic polymers in addition to nanoparticles. Regenerative medicine aims to regenerate functional tissues avoiding scar formation. In the realm of wound healing, regenerative medicine of chronic wounds such as diabetic ones and burns are lifesaving. We developed many forms of single layered and multiple layered nanofibers both random and aligned. We managed to load them with various drugs and nanoparticles and tested their efficiency in chronic wounds and burn healing. This experience provided us with a deep understanding of the needed requirements and potential challenges that will be discussed in this talk.

Generative Artificial intelligence in drug synthesis and design: The revolution of generative chemistry

Yaseen Elshaier

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The popularity of artificial intelligence (AI) across drug discovery continues to grow, yielding impressive results. Deep learning generative models presents an encouraging solution in drug discovery as an automated de novo drug design tool for construction of novel bioactive compounds. This work explores a range of method development initiatives of how AI is influencing the chemistry and highlights the concept of generative chemistry. Herein a different aspect, which considered as the infrastructure for generative chemistry. The impact of generative chemistry and future challenges are also represented.

Artificial Intelligence and Entrepreneurship in Pharmaceutical Sciences

Abdel-Rahman Hedar

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The integration of Artificial Intelligence (AI) into pharmaceutical sciences is transforming the landscape of entrepreneurship within the field. This talk explores the synergies between AI and entrepreneurship in pharmaceutical sciences, highlighting how AI-driven innovations are accelerating drug discovery, personalized medicine, and process optimization. By leveraging AI tools such as machine learning, predictive analytics, and automation, pharmaceutical startups and entrepreneurs are gaining a competitive edge, reducing costs, and improving efficiency in drug development pipelines. The talk will discuss case studies, emerging trends, and challenges, offering insights into the future of AI-enabled entrepreneurship in the pharmaceutical sector.

Early-Onset Colorectal Cancer in Egypt: Pathological Characters, Patterns of Care, and Survival Compared to Average-Age Onset Colorectal Cancer: A Retrospective Multicenter Study

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Purpose: Early-onset colorectal cancer (EOCRC) is a rising health problem. The incidence of EOCRC has increased over the past 2 decades all over the world. Reports from Egypt since the 1990s have reported a higher incidence among young populations with no identifiable risk factors. The aim of this study was to assess EOCRC in Egypt regarding incidence, characteristics, treatment pattern, and survival compared with average age onset and elderly patients. **Materials and methods:** This was a retrospective, record-based, cohort study combining data from four different cancer centers in Egypt. We grouped patients according to age into three categories: the EOCRC group for patients age ≤45 years and the average age onset and elderly cancer group (for patients age ≥65 years). **Results**: The study included 1,310 patients with histopathologically proven colorectal cancer, representing four different geographical areas in Egypt. Patients with EOCRC represented 42.4% of the study population. Female patients were 50.6% among the EOCRC group and 52.5% among the average age group. Rectal tumors were significantly higher in EOCRC (54.7% *v* 40.6%; $P < .001$). There was no significant difference between both groups regarding the tumor stage at presentation, obstruction, or presence of metastases at presentation. Patients with EOCRC had a significantly higher rate of peritoneum/adnexa metastases than the average age ones (12.3% in EOCRC *v* 6.9% in the average age group; $P < .001$). No statistically significant differences between EOCRC and average age groups in both disease-free survival and overall survival were reported. **Conclusion:** A comprehensive framework for the study of EOCRC is required in Egypt as well as a genomic analysis to identify possible underlying genetic alterations responsible for the high incidence of EOCRC.

Innovative Drug Delivery Solutions: Exploring 3D Printing and Microneedles in Modern Healthcare

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The evolving landscape of healthcare demands innovative approaches to drug delivery, particularly as personalized medicine and advanced manufacturing technologies have become increasingly prominent. This presentation explores cutting-edge solutions in drug delivery, focusing on the transformative role of three-dimensional (3D) printing and microneedle (MNs) technology. 3D printing opens up possibilities for dosage forms tailored to individual patient needs. Meanwhile, MNs offer a minimally invasive method for drug administration, addressing challenges such as patient compliance and the need for precise, localized delivery. This talk will highlight recent developments in these fields, including insights from ongoing research and practical applications in modern healthcare. Key considerations in formulation, manufacturing, and future potential of these technologies will also be discussed.

Students ORAL PRESENTATIONS

Integrating Biosensors with Drug Delivery System: A Pathway to Personalized Medicine

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The current landscape of drug therapy is marked by several limitations, including reduced effectiveness and the necessity for frequent laboratory visits. These challenges often lead to suboptimal treatment outcomes for patients. To address these issues, we propose a forward-thinking solution: the integration of biosensors directly into drug delivery systems. This innovative approach could serve as a cornerstone for personalized medicine, effectively combining the therapeutic benefits of pharmaceuticals with the diagnostic capabilities provided by biosensors.

Biosensors are designed to continuously monitor physiological parameters and drug concentrations in real time, offering a wealth of information that can be used to fine-tune drug delivery and dosing strategies. By leveraging this real-time data, healthcare providers can optimize treatment efficacy, reduce side effects, and significantly improve patient outcomes. Moreover, the use of biosensors paves the way for the development of adaptive drug delivery systems that can automatically adjust the release of medication based on individual patient needs and responses.

Fundamentally, the integration of biosensors with drug delivery systems opens a new direction in personalized medicine and further enhances patient care. In essence, this new modality can bring a revolution in the healthcare field by overcoming several weaknesses of current drug therapies toward more effective and tailored patient therapies.

COF and its Applications in Chemotherapy, Environmental pollution, and Relationship between them

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Water pollution poses significant risks to public health, particularly through its potential to contribute to cancer incidence. Contaminants such as heavy metals, pesticides, and industrial effluents can disrupt endocrine functions and cause cellular mutations, leading to increased cancer risks. Addressing this issue necessitates innovative approaches for both remediation and prevention. Covalent organic frameworks (COFs) present a promising solution, offering unique advantages in environmental cleanup and pharmaceutical applications. COFs are porous materials with high surface areas, tunable structures, and functionalizable properties that enable effective adsorption of pollutants from water. Furthermore, COFs can be engineered to deliver anti-cancer drugs in a targeted manner, enhancing therapeutic efficacy while minimizing side effects. This dual functionality makes COFs a compelling candidate for integrated water treatment and drug delivery systems. By leveraging the dual capabilities of COFs, it is possible to simultaneously mitigate the impact of waterborne pollutants on cancer risk and improve the precision of cancer therapies. This presentation will explore recent advancements in COF technology, highlighting their potential to address the dual challenges of environmental pollution and cancer treatment. Through a review of current research and case studies, we aim to demonstrate how COFs can play a transformative role in safeguarding public health and advancing pharmaceutical science.

Metal Organic Frameworks (MOFs) in drug delivery applications

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Metal-organic frameworks (MOFs) are a diverse group of crystalline materials characterized by their extremely high porosity, reaching up to 90% free volume, and vast internal surface areas exceeding 6,000 m2/g. These attributes, combined with the extensive variability of their organic and inorganic components, make MOFs highly promising for a range of applications at biomedical field as potential drug releases like ibuprofen as model drug, biomimetic mineralization as protective coating for biomacromolecules, intracellular delivery of CRISPR/ Cas9 genome editing machinery. The current presentation shines the spotlight on the green synthesis and uses of MOFs in drug delivery applications. In the beginning, a brief overview of the MOFs and its advantages and efficient fabrication techniques for MOF green methods, along with its characterization methods, have been presented. Recently MOFs have gained incredible consideration in the drug delivery carrier possessing customization potential and meeting the needs of spatio-temporal drug delivery. Researchers have devised several environment-friendly approaches for MOF construction and surface modification. Owing to stimuli-responsive potential, MOFs have demonstrated their prominent therapeutic efficacy via several routes of administration. The numerous benefits of MOFs would certainly open up a new vista for its novel drug delivery applications.

POSTER PRESENTATIONS OF RESEARCH ARTICLES

Pharmaceutics

Niosomes as a Promising Nanoparticulate Prolonged Release Drug Delivery System of Dexmedetomidine

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Background: Dexmedetomidine (DEX) is a selective α2-adrenergic agonist that approved by the FDA for intravenous analgesia in the intensive care units. However, its I.V application is challenged because of systemic side effects such as hypotension and bradycardia. This study aimed to develop nanovesicular carrier (niosomes) as sustained release drug delivery system of DEX for rectal application. Different types of nonionic surfactants were investigated to develop the optimized formulation. **Methods**: DEX-loaded niosomes were fabricated by thin film hydration method using different nonionic surfactants. The developed niosomes were evaluated for vesicle size, zeta potential, encapsulation efficiency and in-vitro drug release. **Results**: The selected formulation of DEX-loaded niosomes contained cholesterol (250 µM), Span60 (125 µM) , and Tween 40 (125 µM) exhibited the optimized outcomes for particle size of 255 ± 7.5 nm, zeta potential of - 25 ± 1.6 mV, narrow distribution of 0.32±0.1.and higher encapsulation efficiency of 65±3.5 %. Scanning electron microscopy presented nonaggregate spherical shape nanovesicles. All the formulated niosomes showed initial drug release followed by prolonged drug release profiles for 48 h compared to rapid release of free DEX. The selected DEX-niosomes presented higher cumulative drug release of 75% up to 48 h and showed anomalous non-Fickian diffusion mechanism. **Conclusion**: The encapsulation of DEX for the first time into nanoniosomes would be considered as a promising method to provide sustained release drug delivery system for rectal administration. This nanosystem might be used to improve biological activity of dexmedetomidine and overcome the potential adverse effects of I.V administration.

Design and Evaluation of Liquisolid Orodispersible Tablets Combining Eggshell Powder and Fenugreek Seed Mucilage for Enhanced Agomelatine Delivery: A Comparative Study

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Agomelatine (AG), an orally administered antidepressant with low aqueous solubility, extensive hepatic metabolism, and limited oral bioavailability. This study aimed to develop orodispersible tablets (ODTs) incorporating AG-liquisolid (LSD) to enhance AG dissolution and bioavailability. The selected LSD, based on the powder flowability, was incorporated into ODTs using natural excipients (eggshell and fenugreek seed mucilage (FSM)) and compared to synthetic superdisintegrants. LSDs were prepared using Tween 80, propylene glycol, and polyethylene glycol 400, with Avicel PH101 (carrier) and Aerosil 200 (coating) in various ratios. The selected LSD formulation was characterized via FTIR; powder x-ray diffraction pattern (PXRD); and scanning electron microscopy imaging (SEM). AG-ODTs were fabricated via direct compression and evaluated for different parameters. The formula with the fastest disintegration time and shorter wetting time was selected for further investigations. Results showed that propylene glycol was the best non-volatile solvent, and the LSD formula containing Avicel PH101 and Aerosil 200 (R= 20) exhibited the excellent flowability, leading to its selection for ODT fabrication. FTIR confirmed compatibility between AG and the excipients. PXRD and SEM signify the complete disappearance of AG crystals. All ODTs met pharmacopoeial standards, with the FSM-based formula showing significantly faster disintegration (46±1.06 sec), shorter wetting time (17±1.56 sec), and Q_{10min} of 81.13 ±3.2%. In-vivo pharmacokinetic studies revealed a relative bioavailability (RB) of 252.77% compared to the marketed tablets. The study concluded that AG-LSD ODTs with natural superdisintegrants offer a promising approach for instant delivery of AG with higher RB when compared to conventional AG tablets.

Improvement of Wettability and Dissolution of Anti-tuberculosis Drugs in Ionic Liquid Forms

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Isoniazid (INH) and rifampicin (RIF) are the two main drugs utilized for the treatment of tuberculosis. Frequently, they are utilized as a fixed drug combination. However, their use is hampered by poor solubility and physical instability. Active pharmaceutical ingredient-ionic liquids (API-ILs) are new forms of drugs where a drug molecule is reacted with an organic counter ion leading to liquid formation. In its new form, an API-IL has modulated physicochemical and pharmaceutical properties. INH are RIF were each combined with various counter ions through the solvent evaporation technique. INH and RIF API-ILs were successfully created using ascorbic acid (AsA) and citric acid (CA) as counter ions. FTIR spectroscopy, XRPD, and polarized optical microscopy were used to study formed ILs. XRPD and microscopy verified their lack of crystallinity, with FTIR analysis showing the role of hydrogen bonding in IL formation. The addition of CA improved the storage stability of the INH + RIF combination. Furthermore, RIF-CA IL notably enhanced the rate and extent of RIF poor dissolution, which was unachievable with the RIF/CA physical blend. Therefore, the formation of API-IL not only improved the dissolution of RIF but also aided in the creation of stable, compatible combinations of INH-RIF.

Polymeric Nanocapsular Hydrogel for Enhancing Topical Delivery of Miconazole Nitrate: Formulation, Optimization, and In Vitro / In Vivo Evaluation

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Recently, nanocapsules have been strongly suggested as vehicle for incorporation of hydrophobic drugs for to provide sufficient and controlled drug penetration into the skin. The objective of the present study is to investigate the potential of polymeric and lipid nanocapsules as carrier systems for miconazole nitrate, for controlled and localized drug delivery into the skin for treatment of fungal infection. Effect of Miconazole nitrate polymeric nanocapsules were prepared by emulsification diffusion technique using polycaprolactone as a polymer, tween 80 and span 60 as two comparative surfactants. Characterization of developed nanocapsules included measuring the mean particle size, zeta potential, poly dispersity index (PDI), entrapment efficiency and the morphology was examined using Transmission electron Microscope (TEM). The results showed that F (4) is the best promising preparation as it shows the best results. The PDI is (0.850), Average particle size is (260.3d.nm), entrapment efficiency is (93%) and zeta potential is (-29).

From Solid to Liquid: Innovative Solubility Enhancement of Piperine via DESs formation

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Unfavorable physicochemical properties of active pharmaceutical ingredients (APIs), particularly poor aqueous solubility, often limit their therapeutic potential. Conventional strategies to improve API solubility, such as chemical modification, salt formation and prodrug formation are not always successful and have inherent limitations. Consequently, there is increasing interest in converting APIs into ionic liquids (ILs) and deep eutectic solvents (DESs), which offer enhanced solubility and stability without the drawbacks of solid forms. This study investigates the use of ILs/DESs approaches to improve the solubility of piperine (PI), a naturally derived, poorly water-soluble anti-inflammatory compound. PI was combined with fourteen structurally diverse acidic counterparts, leading to the successful development of ten liquid PI-counterpart systems. Thermal analysis confirmed the formation of IL/DESs, while computational and spectroscopic studies highlighted the crucial role of hydrogen bonding in these interactions. The study found that the availability of hydrogen bonding groups in the counterparts was key to the successful formation of DESs, and that these systems could enhance PI's solubility by 36% to 294%. Additionally, normalized polar surface area (PSA) and logP values were identified as effective predictors of solubility enhancement. These findings demonstrate that IL/DES systems can be strategically designed to improve the delivery and therapeutic potential of poorly soluble APIs, emphasizing the importance of counterpart structure in optimizing these APIs liquid forms.

Pharmacognosy and Natural Products Chemistry

Promising Cures Emerging from The Sea

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Oceans coat more than 70% of the surface of our globe, and the sea is where life first began on Earth. Experts believe that the biological variety in some marine environments, such as coral reefs and the deep-sea bottom, is even higher than in tropical rainforests. Early in the 1960s, the demand for medications that might fight emerging diseases or virulent strains of microbes led researchers to search for novel, unconventional sources of naturally occurring bioactive substances. Interest in bioactive compounds and later chemical ecology introduced new driving forces in the 1970s that allowed an extraordinary expansion of what must now be regarded as "mature field". Many marine invertebrates, such as sponges, have soft bodies and lack physical defences like protective shells or spines. This necessitates chemical defence mechanisms synthesizing toxic and/or deterrent compounds to dissuade predators and protect themselves. These compounds are considered to be potentially active secondary metabolites isolated from marine sources. The marine sponge *Haliclona fascigera*, a member of the Haliclona genus, Chalinidae family, contains potentially useful marine natural products, including a variety of bioactive secondary metabolites. It demonstrated positive results in a variety of in-vitro biological experiments. It has antioxidant and antibacterial properties, and it may be useful as a source for newly developed antibiotics. The reported biological activities highly recommend *Haliclona fascigera* as a rich source of chemicals with promising biological potentials. Hence, extensive chemical exploration of this organism will definitely result in innovative compounds that could be used as a cure for some diseases.

Macro and Microscopical Study of *Calliandra surinamensis* Benth., Family: Fabaceae Cultivated in Egypt

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Quality control of herbal products relies on botanical sciences to ensure the safety, efficacy and consistency, as this field leverages various botanical techniques, including macroscopic and microscopic identification, which involves examining plant materials under a microscope to identify specific structural features, to authenticate plant materials and detect adulterants. *Calliandra surinamensis*, commonly known as the Pink Powderpuff, is a low-branching, evergreen tropical shrub belonging to the Fabaceae family. The leaves of *C. surinamensis* are bipinnate, with each pair of leaflets further divided into pairs of pinnules. These leaves exhibit nyctinastic movements, closing and drooping from dusk until dawn[1]. The plant produces globose flower heads with small green petals and a calyx, featuring up to 100 long, hair-like stamens that are white at the base and pink towards the top, giving the appearance of a pink powder puff[13]. The species contains several phytochemicals, such as myricetin, lupeol, and ferulic acid, which possess antioxidant, anti-inflammatory, cytotoxic, thrombolytic, and antimicrobial properties[1]. Microscopical identification is a critical tool in the quality control of *Calliandra surinamensis* leaves. Key microscopic features such as trichomes, stomata, epidermal cells, and vascular bundles are analyzed to distinguish *C. surinamensis* from potential adulterants. By integrating microscopical identification with other quality control measures, the safety, efficacy, and reliability of - products are significantly enhanced, supporting their use in medicinal applications.

Chemical and Biological Investigations of *Tripneustes gratilla* Collected from The Red Sea

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In the fact that the ocean, is the source of fundamentally distinct natural products. Some of these substances exhibit pharmacological properties and are useful in the development and discovery of bioactive chemical compounds, mainly for the treatment of fatal illnesses such as cancer, AIDS, arthritis, and so forth. In several nations, sea urchin gonads have long been consumed by the general public as well as used as a luxury food item. *Tripneustes gratilla* is the most important one Among the six kinds of sea urchins that are marketed commercially. Because of its gonads (roe), this type of sea urchin is valuable economically. There are a few chemical and biological data about T. gratilla Only a lethal protein, heparin-binding lectin and some toxins were isolated. There are three metabolites isolated from *T. gratilla* such as 5a, 8a, epidioxycholest-6-en-3b-ol which is considered as epidioxysterol , sulfonoglycolipids and sodium cholesterol 3-sulfate. The first epidioxysterol discovered in sea urchins *T. gratilla* was found to have cytotoxicity against three human tumor cell lines, it demonstrated only little cytotoxicity against SGC-7901, HepG2, and HeLa cells (IC50 values of 99, 65, and 94 mg/mL, respectively), but not against human normal hepatocytes. The lack of any previous work on *T. gratilla* collected from the Red sea together with current review of literature shed the light on this organism as one of the promising sea urchins that could be a valuable source of medicinally active secondary metabolites.

Plants as Nanofactories: A Rising Star in Therapeutics and Drug Delivery

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Extracellular vesicles are membrane-bound structures that facilitate cell communication by transporting bioactive molecules. Exosomes, a type of extracellular vesicles, show potential in treating cancer, inflammation, and regenerative medicine due to their ability to cross biological barriers. In plant cells, nanoparticles containing miRNA, bioactive lipids and proteins serve as extracellular messengers to mediate cell-cell communication in a manner similar to the exosomes secreted by mammalian cells. Notably, such nanoparticles are edible. Moreover, given the proper origin and cargo, plant derived edible nanoparticles could function in interspecies communication and may serve as natural therapeutics against a variety of diseases. Though research on their antioxidant properties is limited, they hold potential for scalable and safe therapeutic applications.

Phytochemical Study on Genus *Mimusops caffra* Belonging to Family Sapotaceae

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Mimusops caffra known as coastal red milkwood, species belonging to family Sapotaceae found along coastal regions of southern Africa. It is used in local medicine for treating different diseases. Biological activity studies have demonstrated that extract significant antimicrobial activity against bacterial and fungal pathogens. Its antioxidant properties are suggested to reduce risk of chronic diseases (cardiovascular and cancer diseases) depending on these reports' antimicrobial and cytotoxic activity still under investigation. Phytochemical studies have confirmed presence of numerous bioactive compounds within the plant, making it an important candidate for further pharmacological investigation and phytochemical analysis has revealed the presence of flavonoids, triterpenoids, alkaloids, saponins and phenolic compounds. That encourage me to work in this plant.

Experimental: Plant extraction is typically prepared using different chemicals for isolation and fractionation followed by Liquid-liquid partion chromatography, extensive chromatographic techniques and spectroscopic analysis that give these isolated compounds : β amyrin, α-amyrin, 3 acetoxy β-amyrin, Ursolic acid, oleanolic acid, Beta sitosterol glycoside and Flavanoids such as Myricetin -3 α L rhamnopyranoside and Methoxy Myricetin and we do GC-MS analysis on hexane fraction to separate sap and un sap compounds.

Conclusion: *Mimusops caffra* exhibits a wide range of phytochemicals with promising biological activities. These findings support its traditional uses and suggest the potential for developing new therapeutic agents. However, comprehensive toxicological evaluations and clinical trials are necessary before it can be considered for pharmaceutical applications. Further research on the mechanisms of action of its bioactive compounds will provide more medicinal potential.

Pharmaceutical Analytical Chemistry

Copper-ion Mediated Fluorescence Quenching Based-Sensor for Monitoring of Ertapenem

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Quantum dots (QDs) are well-known for their bright, size-tunable fluorescence, making them powerful tools for drug detection. However, their fluorescence can be modulated through interactions with various metal ions, allowing the development of highly sensitive probes. Copper ions (Cu^{2+}), can act as linkers between drug and QDs, leading to significant changes in QDs' optical properties, resulting in fluorescence quenching. Herein, a turn "Off" fluorescence probe based on carbon quantum dots (CQDs) was proposed and utilized for the determination of ertapenem (ERT) using Cu^{2+} ions as linkers. The probe is based on the quenching effect of ERT in the presence of Cu^{2+} ions of the strong native fluorescence of CQDs forming the turn "Off" system. When Cu^{2+} ions are introduced as linkers between ERT and CQDs, they participate in electron transfer reactions due to their variable oxidation states. Copper ions as electron acceptors; form a complex between the drug and QDs, causing electron transfer from the excited QDs to the Cu^{2+} ions. This process decreases the fluorescence by promoting non-radiative decay pathways, thus quenching the fluorescence. The process of optimizing the parameters such as pH, volume of CQDs, and incubation time, which affect the performance of the probe, was carried out to achieve maximum sensitivity. The developed platform shows a linear response towards ERT over a wide range, giving a low limit of detection (LOD) inferring an excellent sensitivity of the proposed sensor. The applicability of the proposed platform has been investigated through the detection of ERT in pharmaceutical dosage forms.

Advancing Pharmaceutical Analysis: A New Fluorometric Approach for Vonoprazan Detection Utilizing Carbon Dots

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This research introduces an innovative fluorometric method for vonoprazan quantification utilizing carbon dots (CDs). The synthesized CDs underwent comprehensive characterization employing multiple analytical techniques, including UV-visible spectroscopy, fluorometry, X-ray photoelectron spectroscopy (XPS), Fourier-transform infrared spectroscopy (FTIR), and transmission electron microscopy (TEM). The interaction mechanism between vonoprazan and the CDs was elucidated through a combination of spectroscopic and morphological analyses. The developed method exhibited excellent linearity and sensitivity across a range of vonoprazan concentrations relevant to clinical applications. This novel approach presents a highly sensitive and reliable tool for vonoprazan detection, offering significant potential in pharmaceutical analysis and clinical diagnostics. The method's performance characteristics suggest its viability as an effective analytical technique for vonoprazan quantification in various matrices, potentially advancing both drug development processes and therapeutic monitoring strategies.

Spectrodensitometric Determination of Certain Pharmaceutical Binary Mixtures Containing Linagliptin and Empagliflozin

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A fully validated, simple, cost effective, and reproducible TLC spectrodensitometric method was developed for the simultaneous determination of linagliptin and empagliflozin in bulk, synthetic mixtures, and pharmaceutical formulation (Empacoza plus tablets). The binary mixture was separated on silica gel 60 F254 TLC plates. Measurements were recorded at 234 nm. Parameter testing was performed to ensure the quality of chromatographic method. The limits of detection were found 9.54 and 55.46(ng/spot) while limits of quantitation were 28.90 and 168.05(ng/spot) for linagliptin and empagliflozin, respectively. The proposed method was also validated according to International Council for Harmonization (ICH) guidelines and was found to be to specific, accurate, precise, and robust. It was successfully applied for quantitative analysis of the binary mixture in tablet dosage form without interference from common excipients.

Carbon dots-derived from peel biowaste of *Lupinus luteus* for fluorometric determination of alendronate sodium

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Alendronate sodium, a bisphosphonate drug, is commonly used to treat bone metastasis, osteoporosis, Paget's disease of the bone, and malignancy-induced hypercalcemia. A validated spectrofluorimetric method was developed for the quantification of alendronate sodium using carbon dots (CDs) derived from the peel biowaste of *Lupinus luteus* as an eco-friendly fluorescent probe. The CDs were synthesized through a simple hydrothermal method, exhibiting strong blue fluorescence at 410 nm when excited at 340 nm. Various parameters influencing the detection of alendronate sodium, such as pH, CD volume, copper ion (Cu^{2+}) concentration, and incubation time, were thoroughly investigated and optimized. In the presence of Cu^{2+} ions, the fluorescence of the CDs decreased due to energy transfer from the CDs (donor) to the vacant orbitals of Cu^{2+} (acceptor). However, upon introducing alendronate sodium, the fluorescence was restored due to the formation of a stable coordination chelate between Cu^{2+} and alendronate sodium. Under optimal conditions, the fluorescence ratio (F/F_0) increased linearly with rising concentrations of alendronate sodium in the range of 0.9–50 µg/mL, with a detection limit of 0.5 µg/mL. The proposed method was successfully applied to real clinical samples, demonstrating acceptable recovery rates and low relative standard deviations.

Facile One-Pot Green Chemistry Approach for Unveiling Micellar-Mediated Fluorescence Amplification in Midodrine: A Comprehensive Study of Analytical Significance

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This work introduces a spectrofluorimetric method characterized by high sensitivity for the quantification of midodrine hydrochloride based on the amplification of midodrine intrinsic fluorescence (at λ excitation 291 nm and λ emission 324 nm) by the addition of sodium dodecyl sulfate surfactant above its critical micelle concentration, and Torell & Stenhagen buffer (pH 6.0). The suggested approach was effectively validated following the guidelines set by the International Council for Harmonization (ICH). The current method was highly sensitive with a linear range from 0.025 to 2.0 $\mu g.mL^{-1}$. The lower quantification and detection limits were 30 and 9.8 $ng.mL^{-1}$, in the respective order. It was efficiently employed to assess the drug concentration in its marketable tablet formulations, achieving exceptional recovery without any disruptive impact from excipients. The suggested spectrofluorimetric method can be utilized in the regular analysis and quality control of the investigated drugs in their specific dosage forms. Additionally, the technique can be employed to assess the uniformity of tablet contents by the guidelines outlined by the United States Pharmacopeia (USP). Furthermore, A comparative study was presented for the greenness and whiteness of the proposed technique and other reported spectrofluorimetric methods to ensure their qualitative and quantitative safety to both humans and the environment.

Spectrofluorometric determination of cabergoline using blue-emissive carbon dots derived from *Hylocereus undatus* peels waste

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Abstract This research work focuses on the development of a novel spectrofluorometric method to detect cabergoline using carbon dots (CDs) derived from *Hylocereus undatus* (dragon fruit) peels waste through a hydrothermal synthesis process. The as-prepared CDs were highly stable under various conditions, such as different pH levels, ionic strengths, and irradiation times. These CDs exhibited a blue fluorescence emission at 440 nm when excited at 350 nm. When cabergoline was introduced to a solution containing the CDs, the fluorescence intensity increased due to the formation of hydrogen bonds and Van der Waals interactions between the CDs and cabergoline. In this interaction, cabergoline functions as an electron donor, while the CDs act as electron acceptors. Under optimal conditions, the fluorescence intensity ratio (F/F0) exhibited a linear relationship with cabergoline concentrations ranging from 5 to 300 ng/mL, with a detection limit of 0.34 ng/mL. This method showed several advantages, including simplicity, cost-effectiveness, rapid detection, good selectivity, and a low detection limit. It was successfully applied for the detection of cabergoline in pharmaceutical formulations and human serum samples, yielding acceptable results. This research demonstrates a promising approach for the efficient detection of cabergoline in both medical and pharmaceutical settings. synthesis.

Silver stabilized sulfur-doped quantum dots based fluorometric sensor for determination of Dapagliflozin

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In recent years, the stabilization of quantum dots (QDs) with noble metals such as silver (Ag) has emerged as an effective strategy to improve the fluorescence performance and chemical stability of QDs. Silver-stabilized sulfur-doped quantum dots (Ag@S-QDs) combine the advantageous properties of both sulfur doping and silver capping. Silver nanoparticles stabilize the quantum dots' surface, reducing oxidation and aggregation while enhancing the fluorescence through plasmonic interactions.

The presented sensor has been utilized for the fluorometric determination of dapagliflozin (DPF) in pure and pharmaceutical dosage forms. The prepared QDs possessed a native blue emission at 455 nm when excited at 340 nm. Upon the addition of DPF, the native fluorescence of Ag@S-QDs increased in a phenomenon called surface plasmon resonance (SPR). In this phenomenon, the drug binds to the surface of the QDs and alters the local electromagnetic field around the QDs, causing an increase in excitation efficiency leading to enhanced fluorescence. Various parameters affecting detection efficiency have been studied and optimized including pH, solvent type, excitation wavelength, and volume of QDs. The presented method demonstrated a linear dynamic calibration range of DPF (29 μM – 310 μM) with a low limit of detection of 19.5 μM. Additionally, the described sensor was successfully applied to determine DPF in pharmaceutical dosage forms.

Electrostatic Interaction-Driven Fluorescence Quenching: A New Approach for Non-Invasive Amisulpride Detection in Saliva Samples Using Carbon Dots

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This study presents a novel fluorometric method for the determination of amisulpride using orange-emitting carbon dots (CDs). The prepared CDs were thoroughly characterized using UV-visible spectroscopy, fluorometry, X-ray photoelectron spectroscopy (XPS), Fourier-transform infrared spectroscopy (FTIR), and transmission electron microscopy (TEM). The mechanism of interaction was further investigated through TEM imaging and zeta potential measurements. The proposed method demonstrated good linearity and sensitivity over a clinically relevant range of amisulpride concentrations. Notably, the method was successfully applied to human saliva samples with minimal interference, highlighting its potential for non-invasive drug monitoring. This innovative approach offers a sensitive, reliable, and potentially non-invasive tool for amisulpride detection, with promising applications in pharmaceutical analysis and clinical diagnostics

A novel zirconium-based electrochemical sensor for ultrasensitive determination of Edoxaban

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Edoxaban is one of the recently approved oral anticoagulants that is used for treatment of pulmonary embolism and deep venous thrombosis. The present study sheds the light on the electrochemical behavior of EDX. A novel sensor (ZrNPs@poly-ALZ/PGE) was fabricated by integration of zirconium nanoparticles (ZrNPs) on Alizarin red dye (poly-ALZ) platform over pencil graphite electrode surface (PGE). The fabricated electrode was further characterized via cyclic voltammetry (CV), square wave voltammetry (SWV), scanning electron microscopy (SEM), and X-Ray diffraction (XRD) measurements. The incorporation of ZrNPs and poly-ALZ promotes the electro-oxidation of EDX in Britton Robinson buffer (pH 6.0). SWV procedure was developed, optimized, and then validated according to International Council on Harmonization (ICH) guidelines. Good linearity with low sensitivity limits was achieved. In line with this, the proposed method was successfully applied for the electro-analysis of the studied drug in bulk form as well as pharmaceutical and biological samples. The easiness of fabrication, high sensitivity, and cost-effectiveness are the main advantages of the newly modified electrode.

Sensitive determination of Deflazacort by comparative nano-voltammetric and ion selective potentiometric in pharmaceuticals and biologicals

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The FDA approved Deflazacort (DZC) as a corticosteroid which is analogous of Prednisolone but with minimum side effects and more effective uses. A comparison between nano-voltammetric (Method A) and ion selective potentiometric (Method B) electro-analysis of DZC have been approached. In method A, reduction behavior of DZC was studied using square wave voltammetry (SWV) by both nano-gold electrode (NGE) and modified nano-screen printed electrode (NSPE) with Tetrakis; triphenylphosphine palladium (TK-NSPE) using Britton Robinson buffer at pH 4.0 were applied. To enhance the sensitivity of nano-voltammetric technique all variables as pH, accumulation potential, accumulation time and scan rate were studied to attain the optimum conditions of analysis. While for method B, potentiometric determination of DZC was achieved by the use of ion selective electrodes ISEs; the anionic exchanger of ammonium renikate (AR) and phosphotungestic acid (PTA), respectively. Optimization of conditions affecting the potentiometric method has been developed as the studied electrodes and the effect of pH. The electrochemical methods were evaluated according to IUPAC recommendations. These methods were validated by ICH guidelines and capable of being used easily for sensitive determination of DZC in pure form, pharmaceutical formulation and in biological fluids; serum and urine.

Industrial Pharmacy

Formulation of haloperidol in self-nanoemulsifying drug delivery systems

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Introduction: Haloperidol (HLP) is a typical first-generation antipsychotic agent used to treat schizophrenia. The drug has a first-pass hepatic metabolism which limits its oral bioavailability to 40-75%. The aim of the study was to formulate this highly lipophilic drug (log P= 4.3) in self-nanoemulsifying drug delivery systems (SNEDDSs) comprising long chain fatty acid (LCFA). These systems was considered in attempt to enhance the intestinal lymphatic transport of the drug, hence by-passing the hepatic portal circulation. **Methods**: Solubility of HLP was assessed in different oils, surfactants and co-solvents. Oleic acid, Brij®35 and propylene glycol were used to construct the ternary phase diagram using dilution method. Furthermore, a mixture of oils (NIKKOL Sefsol-228: oleic acid) in ratio of (2:1), polysorbate 20, and Transcutol® HP were employed to develop the pseudo-ternary phase diagram for the drug. The systems in the phase diagram which gave a clear transparent nanomulsion were assessed for self-emulsification time, particle size analysis, ζ-potential and thermodynamic stability testing. The in-vitro drug release testing for the best formulation was performed in buffer pH 1.5 followed by raising the pH to 4.5 and 7.2 to test the effect of raising the physiological pH on the possibilities of luminal drug precipitation. **Results**: The obtained particle size for HLP-loaded SNEDDSs were in the range between 38.53-137.6 nm with polydispersity index (PDI) values ranged from 0.188-0.25 indicating homogeneity of produced nanoemulsion. The measured ζ-potential values were in the range between (-7.41) – (-5.20) mV. In addition, the formulated HLP-loaded SNEDDSs showed an enhanced in-vitro drug release characteristics in comparison to the intact drug and the marketed product. **Conclusion**: HLP was successfully formulated into a SNEDDSs with a reasonable size and charge. These systems could be a promising approach for the drug formulation by enhancing its intestinal lymphatic transport, hence by-passing the hepatic portal circulation with an overall improvement in the drug oral bioavailability.

Formulation and Evaluation of Mizolastine Gel: Development, Stability, and Therapeutic Efficacy

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Mizolastine (MZL) is a new benzimidazole-derivative non-sedating antihistamine with additional anti-inflammatory properties. Mizolastine was formulated into topical dosage forms to eliminate systemic side effects associated with the oral administration of the drug. The objective of this study was to prepare MZL gels (0.1%w/w) using different types and concentrations of gel bases such as HPMC, Cp 934P and Aloe Vera. Coevaporate of MZL-PVPK40 at a ratio of (1:7w/w) was incorporated into the previously prepared gels. Additionally, the effect of different penetration enhancers on the release of the drug from the prepared gels has been studied. The gels were evaluated for physical appearance, rheological behavior, drug release through standard cellophane membrane and permeability through hairless skin rat membrane. In addition, the kinetic release of MZL from the prepared gels was studied. The best selected formulae of MZL gels were further investigated for pharmacodynamic and stability studies. The obtained results revealed that MZL was successfully formulated into gels using different gel bases. The prepared MZL gels showed acceptable physicochemical properties and cosmetic criteria. The highest percent released of MZL from gel formula (G14 prepared by 3%w/v HPMC as a gel base with 30 % w/w glycerol as a penetration enhancer) was obtained followed by Aloe Vera gel (G6). Mizolastine prepared gels have an anti-inflammatory activity, which combined with its antihistaminic properties, hence it is valuable for the treatment of allergic inflammation.

Development of Simvastatin-loaded In Situ Thermosensitive Hydrogel for Periodontitis Treatment

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Simvastatin belongs to the statins which is lipid lowering group. They act by inhibiting the 3-hydroxy3-methylglutryl coenzyme A. Statins exert a variety of beneficial effects on different aspects of oral health which includes; their positive effects on bone metabolism, anti-inflammatory, and antioxidant properties, and their potential effects on epithelization and wound healing, which makes this class of drugs attractive to the field of periodontal diseases and dental health. The objective of the present study was to design and evaluate simvastatin in situ gel formulations combining a thermosensitive polymer ‘‘poloxamer 407’’ as well as mucoadhesive polymers, Chitosan, Carbopol , and SCMC, to release the drug slowly in periodontal pocket as a local drug delivery for the treatment of periodontitis. Additionally, In situ gel formulations were evaluated in the term of clarity, gelation temperature, pH, gelling capacity, drug content, rheological study, mucoadhesion study, in vitro release study, stability, and finally in vivo study in rat model. The obtained results revealed that, Formula G1 containing 1.5 % chitosan showed suitable properties and; thus, it was selected for further in vivo and stability studies. The selected formulation remain stable after storage for 6 months in 4 ℃. The in vivo evaluation showed that, Local administration of SMV in the form of intra-pocket in situ gel showed superior results to systemic administration. As on visual comparisons of histopathological samples, in situ gel-treated groups gained complete recovery from inflammation and regeneration of bones compared with marketed tablet-treated groups.

Clinical Pharmacy

Effectiveness of Prophylactic Darbepoetin Alfa with Chemotherapy-Induced Anemia in Non-Metastatic Breast Cancer Patients

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Background: Chemotherapy-induced anemia (CIA) is commonly encountered among breast cancer patients undergoing chemotherapy treatment. Chemotherapy-induced anemia is associated with a substantial economic burden and medical costs. The negative impact of anemia on quality of life and survival of breast cancer patients has been widely described. **Aim**: The present study is aimed to evaluate the effectiveness of prophylactic Darbepoetin alfa (DA) with CIA in non-metastatic breast cancer patients. Patient and Methods: The study included 110 patients diagnosed with non-metastatic breast cancer divided into two groups; 55 patients in each arm. The control group received the scheduled chemotherapy regimens while the study arm received the scheduled chemotherapy regimens with DA every three weeks at Assiut University hospital and El Shamla hospital. Grading of anemia was done according to the National Cancer Institute Anemia Scale. Laboratory investigations including CBC, ferritin, iron, liver and renal chemistry were performed. **Results**: At baseline there was no significant difference between the two groups regarding anemia grades (intervention group; 47(85.5%) had no anemia vs. Control group 39 (70.9%). After 8 cycles of chemotherapy treatment, there was a highly significant difference between the two groups. In the intervention group; 47(85.5%) patients were non anemic and 8(14.5%) showed mild grade anemia while in the control group; 10(18.2%) patients were non anemic, 23(41.8%) showed mild grade anemia and 22(40.0%) showed moderate grade anemia. **Conclusion**: Administration of Darbepoetin Alfa as a prophylactic treatment in breast cancer patients receiving chemotherapy was highly effective in reducing the incidence and grading of anemia.

Nutritional support in Athletes with Type 1 Diabetes

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Type 1 diabetes mellitus (T1DM) represents a complex clinical condition worldwide. The autoimmune destruction of pancreatic beta cells leads to partial or complete lack of insulin production, causing a lot of lifelong risks for people including acute (Diabetic ketoacidosis, coma) and chronic complications (macro and microvascular). Physical activity (PA) and exercise have widely demonstrated their efficacy in controlling diabetes mellitus. It isn't easy for people living with T1DM to manage their nutritional needs. Balancing macronutrients with micronutrients, their effects on glycemic control, and insulin treatment represents a complicated clinical challenge. There are many factors that make the effect of Physical activity on glycemic management largely unpredictable such as exercise intensity and duration, nutrient co-ingestion, individual related factors and many others. Due to this clinical complexity, the scientific literature was reviewed in depth to help diabetologists, sport medicine doctors, nutritionists, and all the health figures involved in diabetes care to improve both glycemic management and the nutritional status of T1DM people engaging in physical activity. Two electronic databases (PubMed and Scopus) were searched. The main recommendations for carbohydrate, protein and fat ingestion before, during, and immediately after physical activity are explained. Glycemic control during such activity is reviewed. Micronutrients and nutritional supplement effects are also mentioned

Biochemistry

Upregulation of Circulating GDF-15 is associated with Proinflammatory Cytokines Expression and Severity in Acute Respiratory Distress Syndrome Patients

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Acute respiratory distress syndrome (ARDS) is a critical inflammatory condition characterized by rapid respiratory failure and significant mortality, necessitating prompt diagnosis and intervention. This study investigates the role of growth/differentiation factor 15 (GDF-15) as a potential biomarker for early detection of ARDS upon hospital admission. We enrolled 56 patients diagnosed with ARDS, subclassified into moderate and severe cases, alongside 28 healthy controls. Peripheral blood samples were analyzed to measure circulating GDF-15 levels using ELISA and to assess proinflammatory cytokine expression through qPCR. Our findings revealed that GDF-15 levels were significantly elevated in ARDS patients compared to controls ($p < 0.05$), with higher concentrations observed in severe cases versus moderate cases ($p = 0.01$). Notably, non-survivors exhibited increased GDF-15 levels compared to survivors ($p = 0.02$). The diagnostic efficacy of GDF-15 was robust, with a cut-off point of >1652.11 pg/ml yielding an area under the curve (AUC) of 0.9 ($p < 0.001$), indicating excellent predictive capability for ARDS. In conclusion, our results suggest that elevated circulating GDF-15 is associated with inflammatory responses and disease severity in ARDS, highlighting its potential as a novel biomarker for early diagnosis and management in critical care settings

Microbiology and Immunology

Carbapenemase Producers Among Carbapenem-Resistant Gram-Negative Bacteria Isolated from Adult Cancer Patients

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Background: Carbapenem-resistant Gram-negative bacteria (CR-GNB) infections are prevalent in cancer patients with weakened immune systems, causing significant morbidity and mortality. The empirical use of antimicrobials has reduced mortality but led to the emergence of multidrug-resistant bacteria (MDRB). In this study, identification and susceptibility testing were carried out using standard procedures (Kirby-Bauer and broth microdilution techniques) and phenotypic and genotypic detection of carbapenemase-producing GNB isolated from adult cancer patients was performed using conventional procedures. **Methods**: One hundred and eight Gram-negative bacteria were recovered from various specimens, with the most common isolates being, Escherichia (E.) coli (45; 41.7%), followed by Klebsiella spp. (38; 35.2%), Acromobacter spp. (9;8.3%), Acinetobacter (A.) baumannii (5; 4.6%) and others including *Enterobacter aerogenes*, *Raoultella ornithinolytica*, *Serratia fonticola*, *Citrobacter brakii*, *Comamonas testosteroni*, *Proteus mirabilis* (11; 10.2%). Concerningly, 64 of 108 Gram-negative bacterial isolates (59.3%) were MDR. Furthermore, 91 out of 108 GNB isolates (84.3%) revealed a pattern of meropenem resistance using the broth microdilution method, which is a worrying rise in the rate of carbapenem resistance. Following the modified carbapenem inactivation method (mCIM), EDTA carbapenem inactivation method (eCIM), and combined disc test as phenotypic tests for the preliminary screening of carbapenemase producers (CPs), conventional PCR was performed on the 91 extracted DNA (Using 6 common carbapenemase primers). **Results**: It was found that blaNDM was the most common 60(66%), then blaOXA-48, VIM 47 (51.6%), blaIMP 32(35.2%), blaKPC 20(22.2%), and blaGES 12(13.2%). **Conclusion**: Based on these results, rapid and precise carbapenemase detection is crucial for clinical care, epidemiological investigations, and infection control.

Levels of IP-10 and IFN-γ in Chronic HBV Infected Patients

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Introduction: Hepatitis B virus (HBV) infection causes a global health problem. WHO reported that two billion individuals worldwide have been infected with HBV. Chronic HBV carriers are about 350 million individuals. About 600,000 die due to either acute or chronic infections of HBV every year. Almost 90% of children infected and 10% of young adults with HBV develop chronic infection. In Egypt, the most prevalent genotype is four**. Aim:** We aimed to investigate serum levels of IP-10 and IFN-γ in cirrhotic and non-cirrhotic in chronic HBV infected patients. **Methods:** Study enrolled 78 individuals; outpatient chronic HBV infected patients (n=53) presented to the clinic of Liver Hepatitis Centre, Assiut governorate, Ministry of Health, Egypt divided into two main categories; non-cirrhotic HBV patients (n=33) and patients cirrhotic (n=20). Besides, control group (n=25) included healthy blood donors. serum levels of IP- 10 and IFN-γ were measured by direct sandwich ELISA (KOMAbiotech, Korea). **Results**: Mean serum IP-10 levels were higher in patients than healthy controls and cirrhotic patients had higher IP-10 than non-cirrhotic patients (457 vs 236 pg/ml; $p<0.005$). Mean IFN-γ levels of cirrhotic patients had higher IFN-γ than non-cirrhotic patients (35 vs 8 pg/ml; $p<0.005$). IFN-γ levels correlated with HBV DNA level ($r=-0.692$, $p=0.0001$). **Conclusion:** IP-10 and IFN-γ may be used to predict cirrhosis in chronic HBV infected patients.

Chemistry

A Platinum (II) Complex with an Asymmetric Thiourea Ligand Showing Promising Activities Against the Postharvest Pathogen *Rhizopus stolonifer*

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A platinum (II) complex [Pt(L)2] (HL = 1-phenyl-3-(pyridin-2-yl) thiourea) was prepared. The complex was studied by X-ray crystallography which revealed its square planar geometry and packing in an orthorhombic P b c a lattice. In the complex, there are two ligand monoanions each of which is bound to the platinum atom via N(pyridine) and S(thiol) atoms. Against *Rhizopus stolonifer*, this complex offered excellent half-maximal inhibitory concentrations of 36.8 μg/ml (Potassium tetrachloroplatinate (II), the ligand 113.9 and nystatin 59.1, 113.9 and 68.4 μg/ml, respectively). The negative control values of *Rhizopus stolonifer* dry mass, sugar consumption, soluble proteins and total antioxidants are 4.42 g/l, 70.8±0.83 %, 2.43±0.03 mg/g fungal weight and 3.78±0.3 mg/g protein, respectively). Increasing the concentration of [Pt(L)2], potassium tetrachloroplatinate (II), nystatin and the ligand results in gradual reduction in the dry mass and sugar consumption and enhancement in the soluble proteins (For [Pt(L)2], potassium tetrachloroplatinate(II), nystatin and the ligand at 100, the dry masses are 0.55±0.05, 1.18 ±0.05, 1.42 ±0.07 and 2.2±0.045 g/l, the sugar consumption values are 25.4±0.37, 35.9 ±0.45, 49.7±0.04 and 52.5±0.79 % and the soluble proteins are 9.34±0.03, 7.83±0.039, 7.35±0.04 and 6.98±0.04 mg/g mg/g fungal weight). The total antioxidants for nystatin and 1-phenyl-3-(pyridin-2-yl) thiourea were weak. The Pt(II) complex at 80 μg/ml and Pt(II) precursor at 60 μg/ml gave the highest total antioxidants of 10.05±0.039 and9.95±0.25 mg/g protein, respectively, but these values decreased to 9.49±0.047 and 8.38±0.17 mg/g protein at 100 μg/ml.

Students POSTER PRESENTATIONS

Novel Approaches to Fluconazole Delivery: Leveraging Ionic Liquids and Deep Eutectic Solvents for Enhanced Therapeutic Performance

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This study addresses the challenges of fluconazole (FLC) delivery by employing advanced formulation strategies, specifically active pharmaceutical ingredient ionic liquids (API-ILs) and deep eutectic solvents (DESs). FLC is classified as a BCS class II drug due to its poor water solubility, which can impede its absorption and overall effectiveness against fungal infections. While conventional solubility enhancement methods such as solid dispersions, cyclodextrin complexes, and co-crystals have been explored, limited research exists on the formation of ILs or DESs with FLC. In this preliminary investigation, we screened FLC's ability to form ILs or DESs with various acids, including benzoic, tartaric, glycolic, gentisic, hippuric, aspartic, gallic, and lipoic acids. FLC successfully formed liquids at room temperature with both gentisic and gallic acids. FTIR spectroscopic analysis highlighted the critical role of hydrogen bonding in these interactions. Antifungal assays demonstrated that the FLC-gentisic acid liquid form showed significantly enhanced antifungal activity, with a minimum inhibitory concentration (MIC) of 12.5 mcg/mL, achieving a two-fold improvement over pure FLC (MIC of 25 mcg/mL). In contrast, the FLC-gallic acid liquid form exhibited reduced activity, with an MIC of 100 mcg/mL. These findings underscore the potential of the FLC-gentisic acid liquid form as a promising system with improved therapeutic efficacy. Ongoing research aims to further investigate the nature of the interactions within these liquid systems. Additionally, further studies will focus on examining their solubility and partition properties, ultimately guiding the development of optimized liquid systems into suitable dosage forms.

Ceftazidime Solid Lipid Nanoparticles as a Promising Approach to overcome Antimicrobial Resistance

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Antimicrobial resistance is one of the biggest threats to global health. Thus, the need for novel antibacterial strategies is critical. On the other hand, drug delivery systems might be able to enhance the qualities of existing antibiotics and counteract resistance mechanisms. Among different drug delivery systems, solid lipid nanoparticles (SLNs) represent a highly interesting option as they offer many advantages. In this work, cholesterol was used to create ceftazidime SLNs via a solvent injection technique. SLNs were examined for their size, zeta potential, loading efficiency, and release profile. To ascertain the minimum inhibitory concentration (MIC) in vitro, the agar diffusion method was employed. SLNs were successfully produced and characterized. SLNs exhibited a polydispersity index of less than 0.3 and particle size ranging from 145 to 200 nm. Cholesterol-based SLNs produced high entrapment efficiency values (>70%). Incorporation of ceftazidime into SLNs leads to controlled drug release and a superior antibacterial activity. **Conclusion**, SLNs offer highly interesting opportunities to boost antibiotic effectiveness and lower antibiotic resistance.

Targeted Metabolic Profile Analysis of Pyrrolizidine Alkaloids in *Cineraria maritima*

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Pyrrolizidine alkaloids (PAs) are naturally occurring metabolites found in medicinal plants. PAs can be found in about 3% –5% of the world's flowering plants. Several cases of poisoning from PAs contaminated food have been documented. Besides their toxicity, PAs have glycosidase inhibitory, antidiabetic, anticancer, fungicidal, and antiviral activities. There is a need for an effective identification and separation method for PAs in plant extracts. *Cineraria maritima* is a medicinal plant that is cultivated in the Mediterranean region. It is often grown for ornamental purposes in Egypt and cultivated at our university campus. *Cineraria maritima* is widely used in traditional remedies. Additionally, the juice of the whole plant is traditionally used to treat eye conditions like cataracts and conjunctivitis. However, concerns about its safety and chemical composition have been raised because of potentially toxic PAs. The aerial parts, including stems, leaves, and flowers, were collected, dried, and subjected to maceration extraction to isolate the PAs. The targeted metabolic profile of PAs was investigated using the selected ion monitoring technique mass spectrometry linked to liquid chromatography. Twenty-eight alkaloids were detected in *Cineraria maritima* extract. Jaconine, jacoline, triangularine, doronenine, integerrimine, senecionine, and retroisosenine alkaloids were detected at a higher intensity.

UV Protection and Anti-photoaging Activity of Medicinal Plants: A systematic Review.

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Introduction: Skin photo-aging is the obverse of UV-Protection. Skin extracellular matrix proteins (ECM) composed mainly from collagen that responsible for the tense and beauty appearance of the skin. Process of irradiation appears through damaging ECM cause aging and sagging of skin; decrease hydration level; and increase keratin layer thickness. UV also affect collagen production from fibroblast.
Method: Here we shed light on a summary according to research criteria from January 2020 to December 2023 we searched for the articles in PubMed and MDPI through keywords Anti-wrinkle, antiwrinkle, skin wrinkle, wrinkle, skin, Photoaging, UV-Protection, UV Protection, Anti-age, Aging, skin, Solar aging, skin photoaging, Anti-Photoaging, Anti Photoaging, Anti Photo age, Skin Rejuvenation, Plant, Collagen, and medicinal plant.
Result: Included papers n= 117+\-7. We classify bioactivities according to pathways of the collected medicinal plants MAPK/AP-1, NF-κB, and TGF-β, antioxidant pathway Nrf2/HO-1\ARE, and miR-138-5p/Sirt1 also by prevent glycation reactions, other genes like FOXO-1 and as well as cell senescence-secreted complexes like SASP. We propose a novel framework to include inhibition of mical2 by mushroom extract of (*Phellinus linteus*) and decrease microvascular endothelial pathway by salvianolic acid of (*Salvia miltiorrhiz*).

Lung cancer

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Lung cancer is the most common cause of cancer-related mortalityin the US with an average five-year survival rate of 15%. The major risk factor for lung cancer is still smoking. Small cell carcinoma and non-small cell carcinoma (such as adenocarcinoma, squamous cell carcinoma, and large cell carcinoma) are the two types of lung cancer. Decisions about therapy and prognosis are made using these categories. The type of tumor and the degree of metastases can affect the signs and symptoms. Tissue diagnosis, a thorough staging work-up that includes assessing metastases, and a functional patient evaluation are all part of the diagnostic evaluation of patients with suspected lung cancer.

Breast cancer

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Breast cancer is the most prevalent cancer diagnosed in women and the second leading cause of cancer-related deaths among women globally. The risk factors for breast cancer are well known, and lowering risk is essential to lowering the disease's occurrence. Breast cancer is frequently detected during routine screening. Breast cancer is frequently discovered as a palpable breast lump in the absence of screening. Breast cancer is treated with a mix of surgery, radiation, chemotherapy, and immunotherapy. Overall survival and patient-reported outcomes have significantly improved as a result of advancements in various therapy approaches.

Magnetic Nanoparticles: Synthesis, Biomedical Applications and Challenges

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One of the research and development disciplines with the fastest global growth is nanotechnology. Magnetic nanoparticles (MNPs) show different properties from their bulk counterparts due to their large ratio of surface to volume, increasing their reactivity. Different methods are utilized for their synthesis including, physical, chemical, and biological methods. The fusion of nanotechnology with medical applications, commonly referred to as the biomedical applications of nanotechnology, presents significant opportunities for advancement. This integration allows for diverse biological applications, including drug delivery systems, gene therapy, antibacterial treatments, and tissue engineering. The growing interest in MNPs has inspired us to design this review focusing on the composition, synthesis, and recent applications of MNPs.

A Review on Detection of Water-Soluble Vitamins in food Using High Performance Liquid Chromatography

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This review presents a comprehensive analysis of advancements in the detection and quantification of water-soluble vitamins (B1: Thiamine, B2: Riboflavin, B6: Pyridoxal, B12: Cobalamin) in food products using High-Performance Liquid Chromatography (HPLC) from 2000 to 2024. Water-soluble vitamins are essential cofactors in metabolic processes, energy production, and antioxidant defense, making their accurate measurement critical for both food and pharmaceutical industries. Due to their instability under environmental factors such as heat, light, and oxygen, precise detection methods are needed to address degradation during food processing and storage. HPLC has become the preferred analytical technique for water-soluble vitamin quantification due to its superior sensitivity, selectivity, and capacity to handle complex food matrices. This review examines key advancements over the past two decades, highlighting innovations in chromatographic separation, and detection techniques that have enhanced the accuracy, reproducibility, and robustness of HPLC methods. Improvements and development of more selective detectors have addressed matrix interference issues, resulting in more reliable results. This review underscores the ongoing need for continued optimization to meet the growing demand for accurate vitamin analysis. Overall, this review showcases the evolution of HPLC technology for water-soluble vitamin detection, positioning it as an indispensable tool in maintaining quality and safety standards in food products.

TLC For Testing Food Products Authenticity

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This analytical review examines the applications of Thin Layer Chromatography (TLC) for assessing food authenticity, with a focus on advancements from 2000 to 2024. Food authenticity is critical for ensuring that products are genuine and free from adulteration, which is essential for consumer safety and regulatory compliance. Adulteration, including the addition of harmful substances or substitution of high-quality ingredients with inferior ones, presents significant health risks and compromises product integrity. TLC is highlighted as a robust and cost-effective analytical technique for both qualitative and quantitative analysis of food adulteration. This review covers the detection of contaminants such as melamine, pesticides, and synthetic additives across different food categories including dairy products, honey, vegetables, and oils. Additionally, the review emphasizes the integration of TLC with advanced techniques like mass spectrometry and chemometrics for more precise authentication. **In conclusion**, TLC remains a vital tool in food quality control and authenticity verification. Ongoing developments in this field are essential to addressing the increasing complexity of food fraud and ensuring product safety and authenticity in global food systems.

Antibiotic Stewardship strategies to manage Urinary Tract Infections (UTI) and Catheter-Associated Urinary Tract Infections (CAUTI) Bacterial Resistance

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Urinary tract infections (UTIs) caused by multi-drug-resistant gram-negative bacteria present a growing alarm, given the currently limited treatment options available. Among these bacteria are Enterobacteria. They are frequently responsible for both community-acquired and hospital-acquired UTIs. These microorganisms can acquire genes encoding various antibiotic resistance mechanisms, such as extended-spectrum-lactamases (ESBLs), AmpC-β-lactamase, and carbapenems. The escalating rates of antibiotic resistance underscore the importance of using antibiotics judiciously, guided by principles of antimicrobial stewardship. Understanding the common pathogens responsible for UTIs and local susceptibility patterns is crucial for determining the appropriate empiric therapy.

Ocular Infection and Stewardship to Improve Clinical Outcomes and Preserve Antibiotic

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Ocular infections including conjunctivitis, keratitis, endophthalmitis, uveitis, blepharitis, orbital cellulitis, and dacryocystitis. Both gram-positive and gram-negative bacteria cause ocular infections. Common pathogens including Staphylococcus aureus, coagulase-negative Staphylococci, Streptococcus pneumoniae, and Pseudomonas aeruginosa. Antibiotic Resistance: Antimicrobial resistance (AMR) is a growing concern. MRSA strains have emerged, and other pathogens like P. aeruginosa have developed resistance to broad-spectrum antibiotics. AMR Impact: AMR affects healthcare systems and economies globally. Surveillance studies and antimicrobial stewardship programs are essential to combat resistance.
Recommendations: Rational antibiotic use, understanding local resistance patterns, and improving prescription practices are crucial for managing ocular infections effectively.

مؤتمرجامعة أسيوط الدولي الرابع عشر
للعلوم الصيدلية

أسيوط - مصر

6 و 7 نوفمبر 2024م

تنظمه كلية الصيدلة – جامعة أسيوط

تحت رعايـــــــــة

الأستاذ الدكتور: أيمن عاشور
وزير التعليم العالي والبحث العلمي

الأستاذ الدكتور / أحمد المنشاوى
رئيس جامعة اسيوط

الأستاذ الدكتور/ أحمد محمد عبد المولى
نائب رئيس الجامعة لشئون التعليم والطلاب

الأستاذ الدكتور/ أحمد محمود عبد العليم
نائب رئيس الجامعة لشئون خدمة المجتمع وتنمية البيئة

الأستاذ الدكتور/ جمال عبد الرؤوف بدر
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رئيس المؤتمر
الأستاذ الدكتور/ جيهان فتيح
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سكرتير المؤتمر

الأستاذ الدكتور/حسن رفعت
نوكيل الكلية لشئون التعليم والطلاب

الأستاذ الدكتور/ محمد محمود عبد اللطيف
وكيل الكلية لشئون خدمة المجتمع وتنمية البيئة