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Faculty of Pharmacy, Assiut University

CONTENTS

SPEAKERS

Prof. Hideyoshi Harashima

Laboratory for Molecular Design of Pharmaceutics
Laboratory of Innovative Nanomedicine
Faculty of Pharmaceutical Sciences
Hokkaido University

Hideyoshi Harashima is a Professor of Pharmaceutics and the chair of Laboratory for Molecular Design of Pharmaceutics, Faculty of Pharmaceutical Sciences, Hokkaido University. He received B.S., M. S. and Ph. D. from The University of Tokyo. After a post-doctoral training in School of Medicine at Stanford University, he became an Associate Professor at Faculty of Pharmaceutical Sciences, The University of Tokushima in 1989. He was appointed a Full Professor of Laboratory for Molecular Design of Pharmaceutics at Hokkaido University in 1999. He was also appointed a professor of a newly build Laboratory of Innovative Nanomedicine in 2009. He became a Distinguished Professor of Hokkaido University since April 2022.

He served as an Associate Editor of the Journal of Controlled Release (2009 – 2020) and Cancer Science (2009 – now) and as an Executive Editor of Advanced Drug Delivery Reviews (2012 – 2020). He was a president of Academy of Pharmaceutical Science and Technology of Japan (APSTJ: 2012 - 2014). He received The Nagai Award from Japanese Society of Drug Delivery System in 2007, Distinguished Science Award from FIP in 2010, Fellow from Controlled Release Society in 2013, APSTJ award and 19th SONG EUM Med-Pharm Award from Song Eum Academy Foundation in 2016. He also received Høst Madsen Medal from FIP in 2021. He published 444 original research articles, 72 invited reviews, 13 Book Chapters and 85 patent submissions.

Prof. Samir A. Ross

Res. Prof. at NCNPR, Professor of Pharmacognosy
School of Pharmacy
University of Mississippi, MS

Prof. Samir was graduated from Faculty of Pharmacy, Assiut University, Assiut, Egypt (1966). He obtained MSC in from Assiut University, Assiut, Egypt (1972) and PhD from Kiev Medical Institute, USSR (1976). He expertise for over four decades is in the area of isolation, identification, structure elucidation, synthesis and evaluation of biologically active metabolites from natural sources including plants, mushrooms, fungi, algae, and marine organisms. He has published over 314 publications in peer-reviewed journals and own 12 patents. He served as PI on a research grant funded by National Institute of General Medical Sciences on "Center of Research Excellence in Natural Products Neuroscience". He also served as PI /consultant for several collaborative projects with Pakistan, Kazakhstan, and India, searching for new antimicrobial agents from natural sources. He successfully completed a project funded by National Institute of Drug Abuse (NIDA) (NO1DA-07707); Samir A. Ross, Co-PI, 1994-2005.

Prof. Samir has received several honors from University of Mississippi, School of Pharmacy, Faculty Research Award (2009), School of Pharmacy, Almaty, Kazakhstan, Gold Medal (2011), School of Pharmacy, Borno University, Czeck Republic, Silver Medal (2012), Kazack National Medical University, Almaty, Kazakhstan, Bronze Medal (2014), School of Pharmacy, Almaty, Kazakhstan, Silver Medal (2015), and Assiut University, Assiut, Egypt., Golden Shield (2016).

Prof. Khaled A M Abouzid

Professor of Pharmaceutical Chemistry
Faculty of Pharmacy, Ain Shams University

Dr. Khaled Abouzid is a Professor of Pharmaceutical Chemistry, Faculty of Pharmacy, Ain Shams University, Prominent Scholar in Drug Discovery, Co-founding Director of Center of Drug Discovery and Development Research ASU He was nominated as the Acting Dean of the Faculty of Pharmacy, University of Sadat City from 8-2018 to 8-2022. He is currently a member of national pharmaceutical chemistry promotion committee

Dr. Abouzid's research is directed towards drug discovery of bioactive small molecules with special emphasis on cannabinoids, targeted anticancer, anti-inflammatory, anti-viral anti-microbial agents and enzyme inhibitors. He has published over 150 research papers, two books and filed 14 patents in medicinal chemistry. He has Scopus H index of 28. He has supervised over 100 Master and PhD students in 7 universities. Dr Abouzid has research collaborations with German, British, Swedish, Canadian and US universities. He has also organized and presided over 34 international symposia and conferences. Dr. Abouzid obtained his B.Sc. degree in Pharmaceutical Sciences from Cairo University in 1985, and his PhD. joint degree in Organic Chemistry from the Faculty of Pharmacy, Cairo University and School of Pharmacy University of Connecticut, USA. Dr. Abouzid started his career in 1995 as a lecturer of Organic Chemistry at Cairo University, Faculty of Pharmacy. In 2001, he moved to the Dept. of Pharmaceutical Chemistry, Ain Shams University, and was promoted to Associate Professor in 2003. He did postdoctoral work with Professor Jochen Lehman of the Friedrich-Schiller-Universität Jena, Germany.

Prof. Gihan Taha

Scientific of counsel

Ibrachy and Dermarkar (I&D) legal firm

Dr. Gihan Taha has joined the reputable legal firm Ibrachy and Dermarkar (I&D) as a Scientific of Counsel. She joined the Intellectual Property Department team in the beginning of 2019. Dr.Taha received her PhD degree in field of Pharmaceutical Analytical Chemistry from the Faculty of Pharmacy, Cairo University. Before joining I&D, Dr. Taha was working as assistant professor at Faculty of Pharmacy -Cairo University, then a Regulatory Affairs General Manager at a generic pharmaceutical company (Medical Union Pharmaceuticals) for more than 20 years. She achieved remarkable teaching experience in Analytical Chemistry and Regulatory Affairs at both Faculty of Pharmacy -Cairo University and Misr International University (MIU). Dr. Taha offered valuable advisory scientific opinions in cases regarding IP and pharmaceutical patent disputes.

Professor Tahani Hassan Mohamed El-Faham.

Faculty of pharmacy. Department of pharmaceutics. Assiut University, Assiut

Dr. Elfaham is an Emeritus professor in pharmaceutics department, Faculty of pharmacy, Assiut University. She is interested in research concerning new and targeted drug delivery systems. New pharmaceutical technologies are also among her interest. She walked along with evolution of clinical pharmacy concept globally, so she won a project from HEEPF in 2005-2007 to implement courses of clinical pharmacy to faculty of pharmacy, Assiut University students. Prof. Elfaham worked as founder and coordinator of the clinical pharmacy program, Assiut University (2006-2011). She inaugurated and managed a Drug Information Center in the Faculty of pharmacy, from 2005. She collaborated with Children Hospital, Assiut University to establish the intravenous admixtures preparation Lab.2007. Environmental issues are of high concern for professor Elfaham, she worked as Director of Assiut University Center for Environmental studies (1996-2000). She acted as Assiut university representative in UNESCO Echotechnie chair for Environmental Education and Sustainable Development .She contributed as a member in committee of the National Strategy for Preservation of Biodiversity1999.

Dr. Elfaham had graduated from Faculty of pharmacy, Alexandria University Egypt, (June 1974), started to work as demonstrator in pharmaceutics department, faculty of pharmacy, assiut University (Nov.1975), from (July 1981 – July 1983) ,she was a Ph.D student in Institute fur Pharmazeutische Chemie, Munster, Germany. Started as a lecturer in Pharmaceutics Dept., Faculty of Pharmacy. Assiut University (May 1984 – July 1989). Then as Head of Pharmaceutics Dept., Faculty of Pharmacy, Assiut university (August 2008), Vice Dean for Community Services and Environmental affairs, Faculty of Pharmacy, Assiut University. (Sept. 2009) and Vice Dean for Education & Students Affairs ,Faculty of Pharmacy ,Pharos University, Alexandria Sep. 2011. She was a Visiting professor at Hiroshima University, Faculty of Medicine Japan, (June –December, 2001). Prof. Elfaham shared as evaluator with the National Authority for Quality Assurance and Accreditation of Education , Egypt and as Reviewer for projects submitted to the " Science & Technology Development Fund" (STDF) .

Prof. Sameh Soror

Professor of biochemistry and molecular biology, Dean of Faculty of Pharmacy, Helwan University

Prof. Dr. Sameh Soror is the professor of Biochemistry and Molecular Biology and dean of the Faculty of Pharmacy Helwan University and founding Director of the Centre for Scientific Excellence "Helwan Structural Biology Research (HSBR)".

He was graduated from Faculty of Pharmacy, Cairo University with the grade Excellent (honor) in 1997 and he received his master degree in genetics from Kaiserslautern University, Germany in 2003 followed by a PhD degree in genetic engineering in 2007. He worked as postdoctoral researcher at Free University Brussels from 2008 to 2009 and 2011-2012 and at Flames Institute for Biotechnology (VIB) in Belgium from 2009-2011.

Sameh is the chair of biotechnology executive board of Arab German chamber of industry and commerce. He served as supervisor of the specialized councils and as the foreign secretary and supervisor of cultural and scientific relations sector at Academy of Scientific Research and Technology (ASRT). Prof. Soror is a member of the IAP international advisory committee for COVID-19 and a member of the international network of government science advice-Africa steering committee. He was a member of the International Science Council (ISC) advisory committee and the head of NAM S&T center membership committee. He was the Co-Chair of the GYA. He has been selected as a member and secretary general of the council of education and scientific research policies at ASRT. He is research consultant of king Abdulaziz University.

Sameh Soror has a profound expertise in participation and managing research grants.

He is PI of two STDF grants (grant number 5290 and 12636). He is research consultant for King Abdulaziz University. ASRT PhD research project grant (2013-2015) and Jessor initiative project grant number 1015. Prof. Soror was an investigator in IWT grant, Drug discovery for bone and joint protection - Structural biology of novel targets and their inhibitors 2009-2011. He was a member of the National Committee of Biochemistry and Molecular Biology and the National Committee of crystallography in the Egyptian Academy of Scientific Research (ASRT) and he served as board member of the Global Council of the IAP Science Education Program (SEP). He is cofounder of the Egyptian young academy of sciences (EYAS) and member of its advisory board. He is a member of the steering committee of INGSA-African chapter and a member of the committee which oversees the IAP project on "Harnessing science, engineering and medicine to address Africa's challenges", in partnership with the institute of advanced study (Princeton) and funded by Carnegie Cooperation of New York.

He was head of the membership committee of NAM S&T center and member of GRC executive committee.

Awards

He was lionized by world economic forum in 2012 during the meeting of new champions in Tianjin, China. He was awarded the **State prize** for advanced technological sciences, which supports medical sciences in 2013.

He was awarded the Helwan university prize in basic science for 2013/2014, and Helwan university excellence prize in medical sciences 2016/2017.

He was awarded Tiba academy award for innovation in medical sciences 2021.

Dr. Mohamed A. Hamzawy

Acting Vice Dean for Education & Students Affairs, Acting Head of Pharmacology and Toxicology Department, Faculty of Pharmacy, Fayoum University

Associate Professor Mohamed Hamzawy is Vice Dean Faculty of Pharmacy Education and Students Affairs, Head of Pharmacology & Toxicology Department, Fayoum University. He is a former vice dean For Community Development and acting Vice-Dean for Research & Postgraduates Studies, Faculty of Pharmacy, Fayoum University. He received a PhD in Pharmacology & Toxicology, Faculty of Pharmacy, Cairo University, Egypt. He was a Co-Chair of Egyptian Young Academy of Sciences (EYAS), Academy of Scientific Research & Technology and selected as ambassador of EYAS. He is a secretary of Egyptian Society of Pharmacology & Experimental Therapeutics (ESPET). Drug Research Council, Academy of Scientific Research & Technology. He received special Award for invention of TEMOSOME, A novel formula for treatment of lung cancer, 46th International Exhibition of Invention of Geneva and other award for innovation TEMOSOME from King Abdel Aziz University, Kingdom of Saudi Arabia. Dr. Hamzawy is Fellow of African Science Leadership Program, University of Pretoria, South Africa. He was a research fellow at Goethe University Clinic of Frankfurt a. M, Germany. Dr. Hamzawy is a visiting scholar at Abel Salazar for Biomedical Sciences Institute (ICBAS), University of Porto, Portugal.Currently. Dr. Hamzawy is member of Council of Educational Policies & Scientific Research, Ministry of Higher Education. He is selected as member of Technical Office, President Office of Academy of Scientific Research & Technology (ASRT), Egypt.

Prof. Rania Mohammed Hathout

Professor and Head of Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Ain Shams University

Prof. Rania has graduated amongst the first class (class 2000) of faculty of Pharmacy Ain Shams University where she was appointed as a TA and started her academic career, took her master in 2006 and PhD in 2010 after a channel scheme between ASU and University of Bath, UK. After, she was granted post-doctoral grants in Netherlands and the UK. Prof. Rania possesses an H-index of 32 in SCOPUS and 34 in Google scholar and is ranked amongst the highest 10 in ASU since its foundation. She has been globally recognized for her scientific excellence being selected as a finalist in the UK alumni awards (2021-2022) and being ranked among the top 2% most impacting scientists worldwide for two successive years; 2020 and 2021. She has a publication that was ranked amongst the top 1% papers in Pharmacology and Pharmacy according to Web of Science (2017-2020). Prof. Rania also has an article selected by the American Chemical Society as one of the best articles in Africa-2020 and to be featured in its special Virtual Issue "Chemistry in Africa: Open & Global". In 2022, Prof. Rania has recently been selected by women of Egypt organization funded by L'Oreal Paris foundation to be one of the top distinguished 100 women in Egypt and Hall of Fame in the Science field as she was awarded the State award in Cancer treatment, August 2021 and Prof. Dr. Sediq Afifi prize in Scientific Research, Innovation and Arts, June 2021. She was also awarded Obada International prize awarded from the Natural Sciences Publisher and funded from the African Academy of Sciences, February 2020.

Prof. Rania is also an awarder of the Egyptian State Excellence award (2021), Egyptian State Excellence Medal (Accolade) of the highest class (2017), the Egyptian State Incentive award (2014), the State award in the field of medicine and medical products (2017), the State award in the field of medical genetics (2016), the European Science foundation (France) award (2013), Lancaster University Young Researchers grant (2016), INNOVINC Foundation (USA) grant (2019), the best presentation in the Frontiers Meetings Ltd, London, UK (2019). She also received

Wiley most downloaded certificate (2017-2018) and Elsevier hottest article certificate for the most downloaded researches (2011). Prof. Rania was also awarded Misr-Elkheir foundation prize for the best research for the two years 2010 and 2012 and a grant from Misr El-Kheir foundation to attend an International Conference in Toledo Spain (2013), EIPICO Pharmaceutical prize for supervising the best graduation project (2018) and MinaPharm Pharmaceutical prize for supervising the best graduation project (2019), supervised the best graduation projects at faculty of Pharmacy, Ain Shams University (2016 & 2017), supervised the best thesis in the British University in Egypt (2019), supervised the best Ph.D. Presentation award and the best M.Sc. graphical presentation award (Prof. Abdel-Hamid El-Shamy prizes, 2021), and the best M.Sc. thesis (Prof. Ahmed Shawky Prize, 2022) Dept. of Pharmaceutics& Industrial Pharmacy, Faculty of Pharmacy, Ain Shams University. She was also granted Ain Shams University international publication awards for several years. Recently, she has won the best oral presentation award from the 14th International Society of Phytocosmetic Science Conference – held virtually and onsite in collaboration with Fayoum University, Fayoum, Egypt (10-12 May, 2022). She was also awarded ASU INNOVATES 2022 award for the best projects idea in the medical field. Additionally, Prof. Rania has developed several new advanced courses and modules and was awarded several excellences in teaching certificates from faculty of Pharmacy, Ain Shams University and was honoured from faculty of Computer and Information Sciences, Ain Shams University. She holds a Pharmaceutical Bioinformatics certificate from Uppsala University, Sweden (Scored the highest grade). Prof. Rania is an Associate Editor-in-Chief at the Artificial cells, Nanomedicine and Biotechnology (Taylor& Francis Publisher) Impact factor: 6.3 and an Editor in Scientific Reports, I.F. 4.379 and Topic editor in Pharmaceutics (I.F. 6.525) and Biomedicines (I.F. 6.05) and several other international journals. She has authored 2 books and 10 book chapters and 80 international publications in highly prestigious journals and participated as a speaker in more than 70 international and national conferences and workshops, supervised several theses in different universities and is a member of many prestigious scientific societies and a scientific consultant in several Pharmaceutical companies. She is a member of the Higher Council of Research of Ain Shams University (Dec 2020 till current) and a collaborating scientist with several prestigious international universities and science academies in the UK, Netherlands, Sweden and recently Spain and Russia.

Dr. Hosam Abdelhady

Associate Professor Pharmacology
Department of Physiology & Pharmacology
College of Osteopathic Medicine
Sam Houston State University

Dr. Abdelhady joined Sam Houston State University in January 2022 as an Associate Professor of Pharmacology at the Department of Physiology & Pharmacology in the College of Osteopathic Medicine. Abdelhady received his doctorate in Philosophy, Pharmaceutical nanotechnologies & molecular biophysics from the University of Nottingham, UK in 2004. He received his Master of pharmacy from Faculty of Pharmacy, Cairo University, Egypt & his Bachelor of Pharmacy from Faculty of Pharmacy, Tripoli University, Libya.

Abdelhady initiated his research career in the Bioavailability center at National Organization for Drug Quality Control and Research (equivalent to FDA), Cairo, Egypt, during 1994-2004, where he developed pharmacokinetics & biostatistics programs for postgraduate researchers, and he was recognized with an excellence award from the Egyptian government.

Abdelhady established and led the first Nano-imaging lab at Central Michigan University in 2004 & established and led the analytical lab at Dendritic Nanotechnologies INC, 2006, a Nano polymer company established by the distinguished Professor Donald Tomalia, a Thomson Reuters Predicts Nobel Laureates, 2011.

Abdelhady held the position of Head of the Department of Pharmaceutical Sciences at the College of Pharmacy at Taibah University, King of Saudi Arabia (KSA) in 2010. He received two awards from King Abdulaziz City for Science and

Technology (KACST), the main funding institute in KSA, with two large grants to 1-Film Unseen Scenarios of the suicidal effects of novel gene nanoparticles on individual cancer cells, using real-time nanoimaging in native environments and 2- to investigate the effect of natural small molecules on delaying and/or preventing Alzheimer's disease and tau pathology. Due to his achievements in the 4D bioimaging research, he was awarded the Golden Medal of Sciences during the 4th International Workshop on Ultra-Fast Laser Technology and Application in 2012 from Cairo University, Egypt.

Abdelhady is interested in understanding the mechanisms of the molecular interactions between the pharmacological agents and the biomolecular targets (DNA, RNA, receptor, etc.) that yields therapeutic responses by applying the 4D-single biomolecular & cellular imaging and biomolecular mapping techniques using the state-of-the-art atomic force microscopy in native molecular environment. He is also a co-inventor of Bio-Nano Power Cells and Their Uses.

Abdelhady also held a variety of teaching positions including at Lake Erie College of Osteopathic Medicine, Wayne State University, and Beyond Canvas Innovation INC. Throughout his academic carrier he taught Pharmacokinetics and Pharmacodynamics, Pharmacology, Advanced Drug Delivery Systems, Pharmaceutical Calculations, Principles of Pharmacotherapy, and Pharmacotherapeutic Problem Solving. In addition, he wrote and planned curricula for a wide range of courses, grade record and track all students' progress and work in team to develop challenging medical programs for national and international accreditations. Finally, Abdelhady was invited to train middle and high school teachers as well as middle and high school students in implementing nanotechnologies in their education.

Prof. Alaa Arafat Hayallah

Pharmaceutical organic chemistry Department, Faculty of Pharmacy, Assiut university
Pharmaceutical chemistry Department, Vice Dean for education & student affairs, Faculty of Pharmacy, Sphinx university

Prof. Hayallah received a B.Sc. in Pharmaceutical Sciences from Assiut University, Asyut, Egypt in 1990, an 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. He also is 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.

GFNERAL LECTURES

Multifunctional Envelope-type Nano Device from Controlled Intracellular Trafficking to Clinical Application for Nanomedicines

Prof. Hideyoshi Harashima
Laboratory for Molecular Design of Pharmaceutics
Laboratory of Innovative Nanomedicine
Faculty of Pharmaceutical Sciences
Hokkaido University

We are developing a multifunctional envelope-type nano device (MEND) as a novel non-viral gene delivery system based on a new packaging concept termed "Programmed Packaging".

Cytosolic delivery: MEND was modified octaarginine (R8) to enhance cellular uptake and GALA peptide was also introduced to enhance endosomal escape. The R8/GALA-MEND can deliver siRNA successfully to dendritic cells (DC) to increase immune response, however, the antitumor activity was not sufficient. Then we introduced newly designed pH-sensitive cationic lipid YSKC12 and YSKC12-MEND can induce remarkable silencing effect in human NK cells as well as DC and T-cells. ***In vivo delivery:*** In order to apply MEND via a systemic administration, we designed a pH-responsive cationic lipid to control biodistribution as well as intracellular trafficking. A newly designed YSK05 can respond to endosomal pH to induce efficient escape from endosome while maintaining neutral surface charge in blood circulation. The YSK-MEND can induce gene silencing in hepatocytes at a dose of 0.06 mg/kg. YSK-lipids were optimized based on chemical library which contains diversified chemical structures of YSK-lipids. The most efficient delivery of siRNA has been achieved by CL4H6 of ED50 at 0.0025 mgsiRNA/kg for gene silencing in hepatocytes in vivo after iv administration. Application of a new pH-sensitive cationic lipids for genome editing will be discussed. ***Mitochondrial delivery:*** We proposed a MITO-Porter, a liposome-based carrier system that introduces macromolecular cargos into mitochondria via membrane fusion manner. An antisense RNA oligonucleotide (ASO) against cytochrome c oxidase subunit II was encapsulated into MITO-Porter to knockdown mitochondrial RNA. MITO-Porter can successfully knockdown the targeted mitochondria-encoded mRNA, protein and membrane potential in HeLa cells. D-arm, a mitochondrial import signal of tRNA to the matrix was chosen as ASO. Mitochondrial gene therapy will also be discussed based on our recent data in mutated human cells.

Challenges in Natural Products Research

Prof. Samir A. Ross
Research professor at National Center for Natural Products Research, and Professor of Pharmacognosy at BMS department, School of Pharmacy, University of Mississippi. USA, Honorable Professor at Asphendiarov Kazakh National Medical University, Almaty, Kazakhstan

Natural sources could be plants, microbes (bacteria, fungi, mushrooms, truffles, endophytes), animal products, marine sources, mineral sources, synthetic/chemical derivatives, and semisynthetic derivatives. Plants are the most dominant source for natural medicine, due to their chemical and structural diversity and the biodiversity of their components. Examples of medicines that are derived from plants are morphine, codeine, papaverine, aspirin, digoxin, hyoscine. atropine, quinine and quinidine. Here are some challenges which could face researchers:

a. Collection and identification: time and date of collection, drying, identification (*Limonium gemelini*), **b. Availability of the source** (*pulveroboletus ravelii*), **c. Loss of activity**: *Astraeus pteridis*, Genus *Morchella* , **d. Bioavailability**: *Sinularia dura* (soft coral) and *Lendenfeldia dendyii* (marine sponge), **e. Absolute configuration**: *Sorocea muriculata* (Roots), *Artocarpus sepicanus* Diels (Leaves). **f. Stability**: [Artifacts, *Cannabis sativa*, THC , silica gel column, time, VLC, SPE columns 1, **g. Purity of the used solvents**, **h. Low yield of the active compounds** (start with 20-50 kg plant material), synthesis or semisynthesis **i. Mushrooms** [How to collect and dry mushrooms?, Identification, You must collaborate with Mycologist], **j. Check the possible biosynthetic pathway**, **k. Collaboration** with other international scientists and researchers. Attend international conferences. **l. Compare the calculated and found UV** for new compounds. **m. Carefully search the literature**.

Towards Discovery of Potent Anti-Angiogenic Agents with VEGFR-2 Inhibitory Activity from Different Scaffolds

Prof. Khaled A M Abouzid
Professor of Pharmaceutical Chemistry, Faculty of Pharmacy, Ain Shams University

Anticancer drug discovery represents an active field in medicinal chemistry research due to the emergence of resistant cancers to current therapies. In an attempt to discover novel drug candidates anti-angiogenic agents targeting vascular endothelial growth factor receptor-2 (VEGFR-2), novel potent small molecules representing various chemical scaffolds were discovered by our group. Phthalazine, thienoprymidine, pyrrolopyrimidine, quinazoline and pyridazine were selected as potential chemical scaffolds for construction of sorafenib and regorafenib congeners the widely used anti-angiogenic agents by applying computational drug design approach.. The potential hit structures were synthesized and evaluated for their ability to inhibit VEGFR-2 kinase *in vitro*. Many of these compounds displayed more potent inhibitory activity than sorafenib. Certain compounds demonstrated IC_{50} as low as 3.9 nanomole . Also, these compounds demonstrated anti-proliferative activity in HUVEC cell line assay These compounds represents potential drug candidates for further development and for in *vivo* preclinical study.

Insights on Patents as One of the Intellectual Property Rights

Prof. Gihan Taha
Scientific of counsel at Ibrachy and Dermarkar (I&D) legal firm

Intellectual property rights are the rights given to persons over the creations of their minds. They usually give the creator an exclusive right over the use of his/her creation for a certain period. In this presentation there is brief explanation of the various Intellectual Property Rights with focus on the concept of *patents* as one of the most sophisticated Intellectual Property Rights. The presentation includes clarification of what inventions can be patented, and which inventions cannot be patented. In addition, "Patentability" conditions and criteria are explained. This presentation will help throw light on constructing a successful patent application and what are the main parts of a patent which can be a challenging task for the researchers to get their patents accepted by patent offices. I will point to the role of patents in the development of pharmaceutical research and industry. Also, I will describe in a nutshell how to apply for a patent in Egypt and Internationally.

Academia and Industry Collaboration

Prof. Tahani Elfaham
Professor of Pharmaceutics, Assiut university, Assiut 71526

Industry and academia have been working together for decades in the pharmaceutical sector, but historically relationships did not extend far beyond the traditional exchange of funding and research. For many years there has been a trend for partnerships to address mutual short-term goals, but more recent advice places emphasis on the importance of long-term strategic collaborations to establish trusting professional ties. By exploring the current challenges facing both industry and academia, and the potential advantages to both as a result of collaboration, key criteria for successful collaboration can be established and innovation into the future can be ensured. Challenges for industry presented as industry partners are driven to generate new, ground-breaking ideas which ultimately result in a marketable product or solution. Timing is critical: if a product or technology is too ahead of its time, it cannot be successfully implemented. Refining a hypothesis with the appropriate experiments is a lengthy process which requires a lot of work – often too long for the timelines of industry partners. Many industries have shifted their focus from investing in long-term, discovery-based R&D efforts towards shorter-term strategies that identify consumer needs and trends. In contrast to recent history, academic partners are now requesting more rights to intellectual property (IP), which can pose a challenge for companies which previously owned the IP. Historical overview on development of the pharmaceutical industry from mid-19th century highlighted the contribution of the primitive humble work of ancestors, led to these current huge pharmaceutical investments. Some successful international pharmaceutical partnerships were discussed as bright examples for others to follow. Presentation of some research work and published papers from our faculty that worth attracting industry attention has been presented.

EthR Inhibitors: A New Class of Anti-Tuberculosis Drugs

Prof. Sameh Soror
Professor of biochemistry and molecular biology, Dean of Faculty of Pharmacy, Helwan University

Tuberculosis remains a major cause of mortality and morbidity, killing each year more than one million people. Although the combined use of first line antibiotics (isoniazid, rifampicin, pyrazinamide, and ethambutol) is efficient to treat most patients, the rapid emergence of multidrug resistant strains of Mycobacterium tuberculosis stresses the need for alternative
therapies. Mycobacterial transcriptional repressor EthR is a key player in the control of second-line drugs bioactivation such as ethionamide and has been shown to impair the sensitivity of the
human pathogen Mycobacterium tuberculosis to this antibiotic. As a way to identify new potent ligands of this protein, fragment-based approaches were used.
We combined surface plasmon resonance assay, X-ray crystallography, and ligand efficiency driven design for the rapid discovery and optimization of new chemotypes of EthR ligands starting from a fragment.

Future of Pharmacy Jobs and Professions: Sustainable Career Mentoring Platform 2050

Mohamed A. Hamzawy

Acting Vice Dean for Education & Students Affairs, Acting Head of Pharmacology and Toxicology Department, Faculty of Pharmacy, Fayoum University

Workforce planning is essential for sustaining a healthy profession and career; this is of utmost importance since many people have predicted the demise of the pharmacy profession due to several factors. Before the pandemic, there was an oversupply of new pharmacists, but all these trends were destroyed after the COVID outbreak. We are certainly at a crossroads. The pharmacy professionals will be integrated with technologies like artificial intelligence (AI), robotics, and virtual health that drive an exponential change. Although 2050 may still be a long way, the pharmacist will serve patients via the digital frontier and deliver advice through an application on a smartphone. Pharmacists must acquire several skills such as adaptability, mental elasticity, and creativity in addition to knowledge and technology. Future pharma professionals depend on a good understanding of informatics, biotechnology, and big data processing. The pharmacy career that exists today is set to witness a complete overhaul in the future with the set of 3D printing evolving pharmaceutical artisans. By 2050, pharmacists will be competent to be a consultant, experts in Medication Therapy Management, clinical research, biostatistics, and intellectual property in drug innovation. Many questions are currently being raised without concrete answers. All these points affirm the importance of launching a career mentoring platform for pharmacy profession forecasting in the next 30 years. The platform aims to accelerate personal and professional development and study the future of pharmacy jobs. We suggest developing a sustainable career mentoring platform in cooperation between academia and the industry as well as other stakeholders

Evolution of Pharmaceutics Informatics Tools in the Modeling and Prediction of Drug Payload in Nanocarriers

Prof. Rania Mohammed Hathout
Professor and Head of Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Ain Shams University

The word "informatics" includes a lot of tools such as: softwares, data mining, artificial intelligence, meta-analysis, machine learning, natural language processing, optimization and cloud computing. The use of any of these aforementioned tools solely or in combinations in the field of drug delivery and formulation introduces a new term which could be named "Pharmaceutics Informatics". This novel approach can revolutionize the drug formulation and delivery field leading to dramatic reduction in the resources costs and the time of development of new drug formulations. Machine learning methods are a branch of artificial intelligence that utilizes certain software algorithms in order to make computers "learn" and to make hard and critical decision functions from representative data samples. With the advent of the internet and the enormous growth of data that are obtained from huge number of sources, the recent advances in various statistical and programming tools and the continuous innovations in machine learning algorithms have resulted in a rapid increase in new applications in the different areas of pharmaceutics and drug delivery disciplines. Over the past 20 years, this new approach of data analysis has been extensively used in drug development and delivery.

Machine learning methods offer several advantages and applications over the other conventional statistical methods. First, the majority of these methods can model nonlinear relationships that are hard-to-model using the common quantitative structure-bioavailability or structure–property relationships methods. Second, they can model incomplete data or nontrending data and the users do not have to suggest any models or particular deigns before use. In other words, no restrictions are encountered while implementing machine learning algorithms where all types of data whether binary classification, multiple classes and continuous data can be analyzed and modeled. And finally, these methods can they offer. Integrating the machine learning methods into drug delivery saves costs, resources, time, and effort. In this talk, different types of the machine learning methods together with a new approach utilizing bioinformatics and proteomics that were exploited in drug delivery aspects and applications will be demonstrated and discussed. These

methods are currently considered important elements of the new approach of computer-aided drug formulation design (CADFD) and computer- aided pharmaceutical technology. The cross-disciplinary integration of drug delivery and machine learning methods as a branch of artificial intelligence may shift the paradigm of pharmaceutical research from experience-dependent investigations to data-driven studies.

Filming the Unseen: Applications of 4D Atomic Force Microscopy (4DAFM) in Pharmaceutical & Bio-nanomedical Sciences

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4DAFM is a powerful technique for imaging the morphological & nanomechanical changes in single molecular levels, in real time and in native biological environments. Simultaneously, gene delivery is significant in cancer therapy but has not been fully investigated on a single molecular or on a single cellular scale. To this end, this talk will show our unique applications of 4DAFM to visualize, in real-time, and in molecular scale; the effects of single pharmaceutical monomers on the morphological properties of individual biomolecules (DNA and siRNA) in liquid environments, how this information was applied in optimizing the genetic nanoparticles, and the effects of these nanoparticles on the morphological and nanomechanical behaviors of individual living cancer cells.

Novel xanthine derivatives as potential apoptotic antitumor agents

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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 (2) 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. Encouraged by all these facts, our work aimed at gathering two bioactive entities NO releasing oxime or acetylated chalcone and xanthine 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 and chalcone pharmacophores through S-alkylation of 1,3,8-trisubstituted and 1,8-disubstituted xanthine derivatives with different acetylated chalcones or NO releasing oxime as potential antitumor agents.

Ionic Liquids: Exploiting the Power of Liquid for Drug Delivery Applications

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Salts are high-melting point ordered crystalline structures, composed of cationic and anionic counterparts. However, if salt components are oppositely charged bulky organic compounds, a liquid, rather than a solid, might be obtained, termed ionic liquid (IL). IL's low melting point (below 100°C) is a result of its components failing to form an ordered crystal. Importantly, together with the new liquid form, comes new physicochemical properties and behavior. ILs have long found vast applications in the areas of chemistry and related fields. However, they only found their way into the pharmaceutical and drug delivery field in the last one or two decades. The ability to transform a drug into an IL was reportedly accompanied with improved solubility, dissolution, bioavailability, and stability. Frequently, an enhancement in the pharmacological action was also observed. Alternatively, biocompatible and non-toxic ILs were used as permeation enhancers demonstrating exceptional ability to improve delivery of small molecules and macromolecules. Hence, ILs are mostly used in one of two modalities; 1) as a pre-formulation approach to transform drug properties, or 2) as a delivery vehicle or performance enhancing excipient. In my talk, I will discuss the first modality in detail, presenting work we did in this area, as well as discuss progress made in the second modality.

Clinical Pharmacy Practice in Egypt: Advances and Perspectives

Prof. Mohamed Mahmoud Abdel-Latif
Professor of Clinical Pharmacy and Vice-Dean for Community Services and Environmental Affairs, faculty of Pharmacy, Assiut University

Clinical pharmacy has emerged as one of the latest disciplines of pharmacy in the 21st century. The state of clinical pharmacy in Egypt is witnessing considerable changes in concept and perception in Egypt; and showing significant progress and positive promising advances. The movement towards the adoption of clinical pharmacy professionalism has led to educational changes in curricula and experiential learning in Egyptian universities. Many hospitals have started distinguishing the importance of clinical pharmacy and have taken initiatives for making it possible although at an infancy stage. Furthermore, the existence of clinical pharmacists in medical rounds could support physicians in optimizing pharmacotherapy and improving patient care. Despite these initiatives and movement towards the clinical pharmacy model, specific competencies and professional practice should be defined to play much more important roles in providing patient-oriented services, managing and personalizing medication use and creating healthier communities. Noticeably to achieve this vision requires major changes in pharmacy education, training and practice at a higher and more professional level.

Implementation of Clinical Pharmacy Service in Qena General Hospital, Story & Outcomes

Dr. Abdelsalam Temerik
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The application of clinical pharmacy in the hospitals of the Directorate of Health in Qena was a dream that many Qena pharmacists have because it has an effective role in activating the economic use of medicine and improving the quality of life for the patient. After choosing to inspect the clinical pharmacy in Qena governorate, the dream began to come true. The beginning was from Qena General Hospital, and here we are reviewing the story from its beginning and the achievements that have been achieved with the clinical pharmacy team in the hospital.

Implementation Policy for Antimicrobial Prophylaxis at Adult Surgery Unit in Qena General Hospitals

Dr. Radwa Saad Hussein

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Background: Using preoperative antimicrobial prophylaxis decreases risk of SSIs.

Objective: Increase adherence to antibiotic prophylaxis policy for GIT surgeries in the adult surgery unit & decrease the rate of consumption of ceftriaxone in surgery prophylaxis.

Subjects: 50 patients of hernia repair surgery in adult surgery unit in Qena general hospital were treated with antimicrobial prophylaxis before the surgery.

Results: In all 50 patients no SSIs occurred after surgery.

Conclusions: cefazoline is a good prophylactic preoperative antibiotic in hernia repair surgery.

ORAL PRESENTATIONS OF RESEARCH ARTICLES

Spleen Targeting for Genetic Vaccination

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The spleen is a lymphoid organ that contributes to the immune system in the body. It acts as a filter that removes pathogens, old red blood cells, and particulate matter from the blood. It contains various types of immune cells including dendritic cells (DCs), macrophages, B and T lymphocytes and plays an important role in the elicitation of immune responses in the body. The spleen has a specialized microvasculature characterized by a slow blood circulation rate which facilitates drug delivery to different cell types within the spleen. Spleen targeting is thus an emerging strategy for activation of the immune system against specific pathogens or tumors. Meanwhile, gene delivery to the spleen after systemic administration has recently gained substantial interest for possible use in vaccination. Transfecting antigen-presenting cells (APCs) in the spleen is expected to produce a more efficient immune response, compared to local administration. However, gene delivery to the spleen is challenging due to different biological barriers in blood circulation. In this study, we report on the development of nucleic acid-loaded lipid nanoparticles (LNPs) targeting different immune cells in the spleen aiming to transfect these cells and elicit an immune response against the encoded antigen. We examined the efficiency of the developed LNPs encapsulating plasmid DNA or mRNA as tumor vaccines. The optimized LNPs produced efficient dose-dependent cytotoxic T lymphocyte activities and showed both prophylactic and therapeutic antitumor effects in mice. These results open the possibility of developing novel genetic vaccines for different immunotherapy approaches.

Abiotic Stresses Effects on The Metabolites and Bioactivities of *Balanites aegyptiaca* L. Grown in Egypt

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Balanites aegyptiaca L. is a medicinal wild tree, naturally distributed in wide regions of Africa and South Asia. The fruits are commercially available in Egypt as antidiabetic natural products. The fruit extract of Baris Oasis showed higher saponin contents and saponin metabolites (LC-MS analysis) than the fruit extract of Wadi El-Gemal. Trigonelline, antidiabetic alkaloid was detected in both fruits' extracts. Baris Oasis fruit extract showed twice time inhibition of α-Glucosidase than Wadi El-Gemal fruit extract. Baris Oasis fruit extract showed twice time inhibition of α-glucosidase. The higher in quality and quantity of flavonoids and phenolics of Baris Oasis leaves extract than Wadi El-Gemal leaves extract, have significant effects on the antioxidant and acetyl cholinesterase inhibitory activities.

Design, Synthesis and Biological Evaluation of Some New Heterocyclic Derivatives of 4-Aminosalicylic Acid as Potential Antimycobacterial Agents

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Tuberculosis (TB), an infectious disease, has been reported to cause the death of 1.5 million in 2020, TB is the 13th leading cause of death and the second leading infectious killer after COVID-19 (above HIV/AIDS).1 Due to the emergence of Multi-Drug Resistant-TB, many first-line and second-line drugs have been found ineffective in some cases and associated with toxicities in other cases. Thus, there is an urgent need for introducing safe and cost-effective antitubercular drugs. Para-Aminosalicylic acid (PAS) was initially a first-line treatment for TB, the introduction of more potent antitubercular agents relegated it to the second line of treatment of drug-resistant Mycobacterium tuberculosis infections. Due to the short serum half-life of PAS, large oral doses (10–12 g per day) are required which result in a wide range of adverse effects, such as gastrointestinal symptoms, hypersensitivity reactions, and renal failure. Therefore, structural modifications of PAS are required to improve its potency, safety and efficacy. Hybrid and analogue based approaches will be employed to obtain novel optimized anti-TB compounds. These experiments combine computational study and synthetic organic chemistry.2 Biological activities of these compounds will be investigated.

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Novel Piperazine Carboxylic Acid Derivatives as Potential Multitarget Anti-Alzheimer's Agents

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Alzheimer's disease (AD) is a multi-systemic neurological disorder, characterized by ambiguous and contradicting aetiology. The rate of AD incidence is enormously increasing, that the number of patients might exceed 130 million by 2050. AD considered as the third most common disease in the elderly after cardio/ cerebrovascular diseases and cancer. Unfortunately, most of the current treatment strategies can only alleviate the symptoms rather than ending or reverse the progression of the disease. Consequently, there is an urgent need for the development of novel Multi-Target Directed Ligands (MTDLs) as a promising approach for contending the complex aetiology of Alzheimer's disease (AD). Following this approach, new 1,4-(un/substituted bisbenzyl) piperazine-2-carboxylic acid derivatives and their cyclized -2-azole homologs were designed and synthesized. The compounds are hybrid molecules encompassing the pharmacophoric moieties of Donepezil and β-Secretase inhibitors. The structures of the synthesized compounds were confirmed through elemental and spectral analyses. Molecular modelling studies demonstrate that the designed compounds exhibit docking characteristics similar to that of Donepezil in the active site of both AChE (PDB code: 6O4W) and BuChE enzymes (PDB code: 4BDS). The docking scores are ranging from dG = -8.99 – -7.34 Kcal/mol, which is mostly higher than or comparable to that of donepezil. The interactions involve H-bonding to the key amino acids: Trp 286, Trp 86, Phe 338, & Tyr 341, in addition to Glu 202 and Asp 74 as extra binding. We carried out also flexible alignment study and the results revealed that most of the designed compounds showed excellent alignment with the reference drug, donepezil demonstrating alignment scores ranging from -63.83 Kcal/mol to -55.24 Kcal/mol. Assessment of the IC_{50} of the synthesized compounds against AChE and BChE are undertaken.

Plant Metabolomics Studies: Principals and Applications

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Metabolomics is the approach that deals with the investigation of a biological system by determining its overall metabolite profile at a given time point with the specified set of conditions. Metabolomics has a fundamental prospect in improving the current understanding of plant natural products. Interestingly, this concept could be extended to natural product drug discovery by studying the relationship between the whole metabolome of natural-derived remedies and their biological effect. Also, it provides a broader insight into the biochemical status and gene functions of the studied organisms. Furthermore, the relation between the compounds and their activity in the metabolome could be revealed with advanced bioinformatics tools, which can be useful in pharmacological standardization and fingerprint investigations. Plant metabolomics has a wide range of applications in different fields such as fingerprinting for taxonomic or biochemical purposes, the influence on a metabolite profile by external stimuli, interactions between plants and herbivores, quality control of medicinal herbs, and activity determinations of medicinal plants. Plant metabolomics can be targeted, suspected, or untargeted. Control and incubated plants were extracted and analyzed with serial coupling of HILIC and RPLC columns coupled to different mass spectrometers. The different plant's metabolic profiles were investigated using suspected and untargeted screening analysis workflow. The obtained peaks were evaluated using chemometrics to find the relationship between the different and categorize samples. The performed workflow-enabled identification of several metabolites. In addition, it was capable of differentiating and categorizing the samples.

Synthesis and Anticancer Activity of Substituted 1,2,4-Triazoles

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Synthesis and anticancer activity of substituted 1,2,4-triazoles Osman Mohamed Hassan-Refaata, Kerolos Y. Zakya, Marina GamalShohdya, Andrew N. Boshrab, MA El Mokhtarac, A El-Mawlaad Abu-Bakr M. Abdel-Aalab aStudent Research Unit, Faculty of Pharmacy, Assiut University bDepartment of Pharmaceutical Organic Chemistry, Faculty of Pharmacy, Assiut University cDepartment of Medical Microbiology and Immunology, Faculty of Medicine, Assiut University dDepartment of Pharmacognosy, Faculty of Pharmacy, Assiut University Abstract The current work presents an efficient, environment-friendly procedure for synthesis of substituted 1,2,4-triazoles. Structure variables were introduced at different order to give 3,5-disubstituted, 4,5-disubstituted and 3,4,5-trisubstited 1,2,4-triazole derivatives. All procedures were carried out as one-pot reaction followed by simple work-up and avoiding the use of any organic solvent. various new compounds were synthesized and subjected to evaluation for anti-cancer activity.

The National Pharmaceutical Alliance: Integrated Pharmaceutical Technology Cycle for R&D (IPTC- R&D) and Its Role in Deepening The Local Manufacture of Pharmaceutical Raw Materials

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The pharmaceutical industry is one of the most important sectors of investment in Egypt with 80 billion pounds direct investment. The demand for pharmaceutics is increasing year by year for the local market and for exportation. National alliances are one of the important programs established by the Egyptian Academy of Scientific Research and Technology since 2016 to link the outputs of scientific research with the needs of society and economic activity to increasing the contribution of scientific research in building a technology based economy. The IPTC- R&D alliance members are 11 partners, including research centers, universities, governmental institutions and civil society organizations, to achieve integration in the performance of the alliance's goals. Many subjects addressed through the IPTC- R&D alliance: 1- Establishing an research and development center for pharmaceutical industry The task of this department is to set lines, steps and an executive framework with measurable and follow-up standards to produce the active pharmaceutical ingredient (API) with local technology. It includes the establishment of a semi-industrial and experimental research and development unit for the production of pharmaceutical chemicals on a semi-industrial level. 2- We selected ten pharmaceutical raw materials in the first phase of the project to prepare technological packages for their manufacture • Conducting all measurements and analyzes to prove the similarity of the composition, as well as measuring the effectiveness and safety of the API in accordance with international 3- Using the available technological methods for production, on a semi-industrial scale, of the inactive pharmaceutical ingredient and the fillers used in the pharmaceutical industry.

POSTER PRESENTATIONS OF RESEARCH ARTICLES

Pharmaceutics

Enhancement of Intranasal Delivery of Ivermectin Utilizing Mucoadhesive Nanosuspension for Reducing Upper Respiratory Symptoms of Mild COVID-19

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Background: Intranasal administration represents a promising noninvasive alternative route of drug delivery for treatment of different conditions. However, it suffers from many challenges, e.g., rapid clearance of formulation that determines decrease in drug concentration at the site of absorption, minimum surface area of nasal mucosa and drug must be dissolved and permeate through the mucosal tissues. Ivermectin is an FDA-approved broad-spectrum anti- parasitic agent that in recent years has shown to have anti- viral activity against a broad range of viruses. It is a poorly water-soluble drug with oral bioavailability of around 50%. The objective of the present work was to improve ivermectin solubility, permeability through the nasal mucosa and prolong contact time at nasal mucosa via its formulation as mucoadhesive nanosuspension system. Methods: ivermectin nanosuspension was developed by the nanoprecipitation method followed by ultrasonication. Alginate and Carbopol were used as mucoadhesive agents to provide mucoadhesive properties and long residence time at nasal mucosa. The developed formulation was characterized for particle size, zetapotential, encapsulation efficiency %, morphology, and In-vitro drug release. Results: The selected formulation consists of ivermectin (120µg/mL), Poloxamer188 (2%), sodium alginate (0.2% w/v) and Carbopol (0.1 %w/v) exhibited a particle size of 373.0 ± 16.38 nm, PDI of 0.496 ± 0.086, zeta potential of -31.0 ± 2.15 mV, encapsulation efficiency of 96.20 ± 2.30%.The transmission electron microscope images proved a spherical nonaggregate shape of the ivermectin nanosuspension. In-vitro release studies

demonstrated a sustained release pattern of ivermectin from the mucoadhesive ivermectin nanosuspension compared to the free drug dispersion. In-vivo clinical studies proved that ivermectin mucoadhesive nanosuspension is safe and effective in treatment of mild COVID-19 patients, with rapid viral clearance and recovery of respiratory manifestations (anosmia, cough, and dyspnea). **Conclusions:** The fabricated Alginate-Carbopol mucoadhesive nanosuspension might provide a promising system for Intranasal delivery and for improved ivermectin efficacy in reducing upper respiratory symptoms of Mild COVID-19

Topical Delivery of Voriconazole for Treatment of Fungal Infections

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Fungal infections still remain as one of the major healthcare problems worldwide. Superficial fungal infections of the hair, skin and nails form the most numerous and widespread group of all mycoses. They are most often caused by dermatophytes and yeasts. Azole antifungal agents are the most commonly used antifungals in clinical treatment of both superficial and systemic fungal infections. Voriconazole is an example of Azole antifungal which is a second generation triazole. In this study Voriconazole was formulated as Lyotropic liquid crystals (LLCs) formed from aqueous surfactant systems to provide sustained release of drug and can improve its penetration through the skin. The formulated Voriconazole LLCs was investigated by polarized light microscope, X-ray diffraction and IR spectroscopy. Twelve formulations (F1-F12) were prepared and evaluated for mean droplet size, polydispersity index and zeta potential. Also, the rheological behavior, and spreadability of LLCs were determined. The in-vitro release study using PBS (pH 7.4) was carried out to determine the amount of drug release from different formulations. The results revealed that the optimized formulation showed mean droplet size 23.623 ± 0.07 nm with PDI 0.221 and zeta potential -7.5 ± 0.11 mv. In-vitro drug release study revealed the prolong release of voriconazole for 24 h. The drug release was fitted to first order mechanism. The ex-vivo skin permeation studies showed improved permeation and sustained release up to 24 h compared to free drug hydrogel. Thus, the prepared LLCs gel could target skin and could be a potential alternative for treating topical fungal infections in the future.

Curcumin-Loaded Nlcs for Drug Delivery to The Posterior Segment of The Eye: A Factor Influence Study

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Intravitreal injections are commonly used to treat posterior ocular diseases. However, drugs administered through this route are usually rapidly cleared from the vitreous region before sufficient and effective distribution to the retina is achieved. Intravitreal administration of drug-loaded nanoparticles could offer a solution for this problem as it can be tuned to deliver drugs in a controlled manner. In addition, curcumin was chosen as it showed a significant role in treatment of many ocular disorders. The first aim of this investigation focused on the formulation design, factor screening, and evaluation of the physicochemical characteristics of curcumin-loaded nano-structured lipid carriers (NLCs). Hot-melt emulsification and ultrasonication techniques were used to prepare the NLCs using a 24-1 fractional factorial design. The prepared NLCs were evaluated for their particle size, zeta potential and polydispersity index. Solid lipid, liquid lipid and surfactant types were set as categorical factors, while total lipid percent by weight was set as a numeric factor, each at two levels (low and high). It was found that the surfactant type had the most pronounced effect on particle size. The particle size of the prepared NLCs ranged from 59.5 ± 0.7 nm to 167.2 ± 0.8 nm, and the polydispersity index ranged from 0.19 ± 0.02 to 0.48 ± 0.02. The electrical charge in terms of zeta potential ranged between -1.4 ± 0.125 and -23.0 ± 1.1 mV Overall, these results indicated the successful development of NLCs using the design of experiment approach, which proved to be a valuable, fast and cost effective tool for screening many formulation factors.

Ionic Liquid Forms of Anti-tubercular Drugs for Enhanced Oral Delivery

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Ionic liquids (IL) are molten salts with melting points below 100○C or-favorably-below room temperature. When a drug is combined with a bulky counterion of opposite charge at proper molar ratio, a liquid can form due to failure of crystallization. An IL form of the drug can have unique physicochemical and pharmaceutical properties; favorable changes in solubility, permeability and stability of drugs were experienced upon IL formation. Hence, we investigated IL formation to tackle delivery challenges associated with antitubercular drug(s). Rifampicin (RIF), isoniazid (INH), para-amino salicylic acid (PASA) and streptomycin (STM) are key antitubercular drugs. They can be used as monotherapy or in combination. Their use is negatively affected by different solubility and bioavailability challenges. We explored the ability of basic RIF, INH and STM, as well as acidic PASA, to form ILs with appropriate counterions, and as rational combinations with each other. Solvent evaporation method was used; drug/counterion was dissolved in methanol separately, followed by mixing and sonication (20 mg/mL total concentration). Solvent was evaporated at 40 in oven and examined. Successful IL formation was observed for five pairs: RIF-salicylic acid, RIF-ascorbic acid, INH-PASA, INH-ascorbic acid and INH-citric acid. IL formation depended on molar ratio and solvent evaporation rate. Examination with Fourier transform infra-red (FTIR) spectroscopy revealed unique interactions not observed with physical mixture, where significant hydrogen bonding was observed. These promising results indicate the potential of adopting IL formation as a strategy for modulating properties of antitubercular drugs.

Preparation and Characterization of Multifunctional Hydrogel for Wound Healing

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Every year, millions suffer from various types of epidermal damage including burns, wounds, ulcers and split grafts causing clinical and economic burdens. The development of simple and cost-effective strategies for management of such conditions is of great health and economic benefit. With many available commercial products, there is no gold standard treatment and many common components are expensive. The aim of our work is to develop chitosan-based hydrogel to promote wound healing, prevent infection and avoid complications. Chitosan is a promoter of wound healing with hemostatic effect. Gelatin was used to enhance the hydrogel consistency, while tannic acid and zinc oxide were incorporated for their antibacterial, and antioxidant effects, respectively. Additionally, tannic acid has hemostatic and angiogenic effects. Hydrogel was prepared by simple mixing of different components, and warming was used when necessary. The effect of component concentration and order of addition on the consistency and appearance of the hydrogel was examined. Hydrogel formulation was characterized using Fourier transform infra-red (FTIR) spectroscopy and x-ray diffraction (XRD). An in-vivo study was carried out in rats to investigate wound healing effect of our hydrogel against a commercial product (Mebo®). Developed hydrogel had good consistency that depended on the chitosan and gelatin concentrations. Spectroscopic analysis revealed significant interaction between different components and hydrogen bonding. The in-vivo study showed excellent results as our hydrogel showed accelerated wound healing with efficacy exceeding that of commercial product. Hence, our developed multifunctional hydrogel is a cost-effective and simple product with promising efficacy and wound healing properties.

Formulation and Evaluation of Celecoxib Niosomes as an Ocular Drug Delivery System

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Ocular diseases are mainly treated topically by application of the drug solutions as eye drops. 90% of the available ophthalmic formulations are the conventional dosage forms. One of the major problems associated with topical ocular drug delivery is the rapid precorneal loss caused by drainage and high tearing turnover. Typically, less than 5% of drug absorbed through cornea and reach intraocular tissue and the major fraction of drug absorbed by nasolacrimal duct and conjunctiva due to high blood flow and large surface area. This can result in poor bioavailability and systemic side effects. Celecoxib is a non-steroidal anti-inflammatory drug with selective cox-2 inhibition and poorly soluble in water. Successful examples of nano-formulations used to circumvent the limits of ocular drug delivery include lipid-based nano-carriers as non-ionic surfactant vesicles(niosomes). Decoration of celecoxib in vesicular niosomes by thin film hydration method. drug encapsulation efficiency, particle size, zeta potential and polydispersity index were evaluated. Amount of cholesterol and type of surfactant affect particle size, encapsulation efficiency and in vitro drug release. The niosomes displayed prolonged drug release profile. Stability study of optimum selected celecoxib niosomes was evaluated for 90 days. Niosomes aid in solubilization of celecoxib and improve stability. The selected niosomal formula is designed with thermos-responsive polymer to prepare temperature dependent in situ gel to increase ocular retention time and penetration enhancers to improve permeation of celecoxib through cornea.

Development and Evaluation of Curcumin Loaded Nano Lipid Vesicles

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Curcumin is an FDA-approved natural compound that elicits diverse pharmacological activities. Notwithstanding its many therapeutic potentials, the peroral administration of curcumin is greatly affected by its poor bioavailability due to its extensive first-pass effect and poor solubility. Hence, the current study aimed to develop optimized curcumin transferosomes to enhance the permeability of curcumin. Curcumin transferosomes were formulated using the thin-film hydration method. The transferosomes were evaluated in terms of; vesicle size, surface charge, and encapsulation efficiency. The optimized transferosomes, comprised of Phospholipone 90G (100 mg), and Cremophore® RH 40 (30 mg), were spherically shaped, displayed particle size 664.33 ± 69.3 nm, encapsulation efficiency of 82.83 ± 0.02 %, and negative zeta potential. In vitro drug release was evaluated. The formulated transferosomes displayed a higher in vitro release percentage relative to free drug dispersion, attributed to the dual effect of permeation enhancer and surfactant that improve vesicular bilayer fluidity and enhance curcumin solubility. The results foreshadow the possible application of the proposed nano lipid vesicles to increase drug permeation and bioavailability of curcumin.

Investigation Study for Embedding Metformin into Nanostructured Lipid Carriers

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Background: Along with metformin hydrochloride (MTF) efficacy as a first-line anti-diabetic drug, it possesses pharmacological properties for managing inflammatory skin disorders. MTF is a highly hydrophilic drug with low permeability. Consequently, there is a challenge in embedding this hydrophilic biguanide within lipid carriers. Aim of work: To augment the entrapment of MTF within nanostructured lipid carriers (NLCs) via optimizing the formulation variables. **Methods:** MTF-NLCs were prepared using the solvent evaporation method. The investigated factors include the effect of pH (7 or 12.5) and solid lipids (Beeswax, Compritol® 888ATO, or Precirol® ATO5). The developed NLCs were characterized for entrapment efficiency percentage, particle size, polydispersity index, and surface charge. **Results:** Adjusting the pH of the aqueous phase to 12.5; led to a reduction in MTF solubility, thus enhancing its entrapment efficiency within the NLCs. Moreover, the evaluated solid lipids were observed to significantly affect MTF entrapment efficiency percentage according to the difference in their Hydrophilic lipophilic balance (HLB). The optimized MTF-NLC formulation comprised of; Beeswax(75mg), Oleic acid (25mg), Span 60 (1%w/w) and tween 80 (1%w/w), attained an entrapment efficiency of 53.68 ± 0.27%. The particle size of the selected nanocarrier was in the nanometer range, and the zeta potential was about -75.0 mV, indicating adequate stability of the particles. **Conclusion:** The results indicate the importance of optimization studies in designing an efficient delivery system of MTF to enhance its penetration through the skin layers. The optimum MTF-NLC could be considered a potential delivery system for the management of skin disorders.

Developing Polymer-Based Gels of Concentrated Trichloroacetic Acid For Different Therapeutic Purposes

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Trichloroacetic acid (TCA) is an acetic acid analogue with different therapeutic applications where tissue removal and destruction are required, e.g. chemical skin peeling procedures, warts management and endometrial ablation. In the latter application, destruction of the endometrial layer is required to control abnormal uterine bleeding of organic or non-organic origin. Traditionally, a 100% w/v solution of TCA was shown to be an effective approach resulting in 80-90% reduction in uterine bleeding. Unlike other methods, such as thermal balloon or electrosurgery, it is economic and cheap. However, the use of TCA in the form of solution is associated with vaginal burns as the free solution spreads to unwanted areas after leaking from the uterine cavity. Also, it may be difficult to achieve complete coverage of uterine cavity and ensure destruction of the entire endometrial lay

Development and Characterization of Jojoba Oil-Based Oleogels for Transdermal Delivery of Ketoprofen-Piperine Ionic Liquid

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Ionic liquid (IL) approach provides a useful platform to improve the transdermal delivery of therapeutic agents. In the present work, ketoprofen (KP), a propionic acid-derived NSAID was transformed into an IL upon reacting with piperine (PI), a natural alkaloid, using solvent evaporation method, resulting in equimolar KP-PI IL. Such transformation modified KP's physicochemical properties and consequently, its pharmaceutical features such as solubility, lipophilicity and permeability. The prepared KP-PI IL was formulated into a jojoba oil-based oleogel formulation suitable for transdermal application, using different concentrations of aerosil (3-10% w/w). A preliminary compatibility study of aerosil with KP-PI IL revealed the absence of any chemical interactions between aerosil and KP-PI IL. Formulations containing 5% and 7% w/w aerosil showed the best physical properties, viscosity, pH value and drug content. Moreover, these formulations maintained their integrity and drug content after five freeze-thaw cycles indicating their physical and chemical stability under these exaggerated conditions. The in-vitro release profile of KP from oleogel containing 5% aerosil (F2) was comparable to that from the oil vehicle indicating that oleogel formulation did not negatively affect KP release. The obtained results in this study, demonstrate that formulation F2 could be a promising, economic and simple formulation for transdermal delivery of KP-PI IL which opens the door for a new delivery mode of these drug combinations.

Pharmacognosy and Natural Products Chemistry

Polyphenols Characterization and Acetylcholinesterase Inhibitory Activities of Four Egyptian Cultivars of *Mangifera indica* L. Fruit Fleshes Ethyl Acetate Extracts

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Mangifera indica L. is a long evergreen member of family Anacardiaceae. It is a worldwide economically important cultivated tree. The fruits are edible, rich in vitamins, minerals and nutraceuticals. Antioxidant, anti-inflammatory, immunomodulatory, and anticancer activities of the mango fruit extracts were previously discussed. These findings provoked us to quantify the fruit flesh polyphenols of most common Egyptian cultivars Awis, Sukari, Zebdia, and Sedeka. The fruit flesh polyphenols of the four mango cultivars were extracted from the available market well ripened fresh fruits using ethyl acetate. Total phenolics and flavonoids were performed via colorimetric assays using gallic acid and quercetin as reference compounds. The Awis fruit ethyl acetate extract showed the highest phenolic and flavonoid contents. It contains 10.65 mg/g and 3.62mg/g fresh weight phenolics and flavonoids respectively. The quantitative differences in phenolics and flavonoid contents of the four cultivars provoked us to characterize their polyphenols using HPLC and study the difference in the inhibitory activity of the four mango fruit cultivars extract against acetyl cholinesterase enzyme. HPLC results and the ACHE inhibitory activities are still under investigation.

Phytochemical Investigation of *Amaranthus lividus* L. Aerial Parts

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Traditionally, *Amaranthus blitum* subsp. *oleraceus* (L.) Costea, commonly known as *A. lividus* L., (Amaranthaceae) has been used to treat intestinal disorders, hemorrhage, and roundworms. A few phytochemical studies of *A. blitum* have been found. Therefore, the present study aimed at characterizing phytoconstituents of this unexploited species in Egypt. Column chromatographic techniques were used for phytochemical investigation and structural elucidation of the isolated compounds was based on 1D and 2D NMR spectroscopy and HR-ESI-MS analyses. As a result, a new *N*-phenylpropenoyl-L-amino acid conjugate, *N*-(*Z*-*p*-coumaroyl)-L-tryptophan, was isolated from *Amaranthus lividus* aerial parts along with fourteen known compounds, including *N*-(*E*-*p*-coumaroyl)-L-tryptophan (javamide-I), L-tryptophan, adenosine, 1,1′-biuracil, 3-*O*-β-D-glucopyranosyl-2β,3β-dihydroxy-30-noroleane-12,20(29)-diene-23,28-dioic acid 28-*O*-β-D-glucopyranosyl ester, 4,5-di-*O*-caffeoylquinic acid, *p*-hydroxybenzoic acid, 3,4-dihydroxybenzoic acid, kaempferol-3-*O*-β-D-xylopyranosyl-(1→2)-α-L-rhamnopyranoside-7-*O*-α-L-rhamnopyranoside (sagittatin A), kaempferol-3-*O*-rutinoside (nicotiflorin), kaempferol-3,7-di-*O*-α-L-rhamnopyranoside (kaempferitrin), quercetin-3-*O*-rutinoside (rutin), α-spinasterol, and glycerol monostearate. The phytochemical study is still in progress. Our findings suggest that *A. lividus* L. could be a nutritious foodstuff or dietary supplement, by virtue of high content of various valuable constituents.

Chemical Composition, Hepatoprotective Effect of Leaf Extract of *Calamus Rotang* L. Introduced to Egypt

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Calamus rotang L. is an edible Indian shrub. It has medicinal importance. The current study aimed to study for the first time the hepatoprotective effects of the leaf ethyl acetate (CR) extract on CCl_4 induced hepatotoxic rats, its metabolites characterization using HPLC. The histopathological study proved that CR extract greatly protects the liver tissue through the suppression of TNF α, arginase and induced by CCl_4 as well as its enhancement of the antiapoptotic Bcl-2 protein. Chemical characterization of CR extract by using HPLC led to the identification of 14 compounds of different classes; simple phenolics (Gallic acid, ellagic acid, syringic acid, p-coumaric acid, caffeic acid, pyrogallol and ferulic acid), flavonols (Rutin, quercetin, and kaempferol), flavones (Apigenin, 7-OH flavone and myricetin) and a flavanone (Naringin) . All the detected compounds are powerful antioxidant and anti-inflammatory polyphenols which contribute in the hepatoprotective and DPPH antioxidant effects of CR extract.

Staphylococcus warneri A Bacterial Endophyte of *Solanum nigrum* as A Source of Anticancer Secondary Metabolites Against Some Human Cancer Cell Lines

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Medicinal plants have been used in folk medicine to treat various ailments. Endophytes are poorly investigated store of microorganisms living within their host plants. Endophytes as potential sources of novel natural bioactive products for medical and biotechnological exploitation are relatively unstudied. In this study, a single type of bacterial endophyte was isolated on tryptone soy agar medium from surface sterile solanum nigrum fruits that identified to be *Staphylococcus warneri* by 16S rDNA molecular analysis. Culture filtrate of fermented TSB broth for *S. warneri* was extracted by three organic solvents, hexane, ethyl actate and n- butanol and the chemical composition of each crude extract was analyzed by GC-MS. The major compounds of hexane crude extract were mainly 12-Crown-4, 8A,4A-(Nitrilometheno) Naphthalene,10-EthoxyY-1,2,3,4,5,8-Hexahydro and Boronic acid, ethyl-, dimethyl ester. Ethyl acetate crude extract mainly contained Boronic acid, ethyl-, dimethyl ester; 1-Propene, 1-(Methylthio)-, (E)- and 12-Crown-4 while those for n-butanol extract were Propanedioic acid, phenyl-; hexaborane (10); N-Formyl-beta-alanine, and 12-Crown-4. The SRB (Sulforhodamine B) assay revealed that both hexane and butanol crude extracts induced cell death of DU-145, Hep-G2 and MCF-7 human cancer cells. The inhibitory concentration (IC_{50}) of hexane extract on DU-145, HepG2 and MCF-7 cells was recorded to be 52.6 µg/mL, 65.5 µg/mL and 61.0 µg/mL, respectively. For n-butanol extract, IC_{50} values were 54.5 µg/mL, 75.1 µg/mL and 85.6 µg/mL respectively. Ethyl acetate extract had no effect with IC50 > 300 µg/mL for all tested cell lines. It can be concluded that the isolated Staphylococcus warneri strain could be used as renewable source for biosynthesis of anticancer compounds.

Pseudomonas lactis A *Cucurbita pepo* Bacterial Endophyte That Produce Secondary Metabolites with Invitro Antitumor Activity

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Endophytes are microorganisms that live in host plant tissues with no adverse effects. Endophytic bacteria from various medicinal plants have a wide range of biosynthetic potential producing secondary metabolites with valuable properties. This study aimed to isolate and identify the endophytic bacteria that colonize *Cucurbita pepo* seeds and to explore the anticancer activity of their secondary metabolites. A single bacterial endophyte was recovered from surface sterile *Cucurbita pepo* seeds that identified to be Pseudomonas lactis based on its morphological, biochemical characteristics and 16S rDNA molecular analysis. Culture filtrate of Pseudomonas lactis fermentation broth (TSB) was extracted by three organic solvents and chemical composition of crude extracts was analyzed by GC-MS. The major compounds of hexane crude extract were Benzene, (1-Butylheptyl)-; Benzene, (1-butyloctyl)- and Benzene, (1-pentyloctyl)-. Ethyle acetate crude extract mainly contain Butanoic acid, 2-methyl-. Butanol crude extract major components were Butanoic acid, 3-methyl-, butyl ester; Pentanoic acid, 4-methyl- and Butanoic acid, butyl ester. The SRB (Sulforhodamine B) assay revealed that hexane crude extracts was the most effective against tested human cancer cell lines with inhibitory concentration (IC_{50}) on DU-145, HepG2 and MCF-7 of 86.17 µg/mL, 60.25 µg/mL and 85.42 µg/mL, respectively . IC50 values of Ethyle acetate crude extract were recorded to be 76.48 µg/mL, 176.43 µg/mL and 97.86 µg/mL respectively. Butanol crude extract recorded the least effect against tested cell lines with IC_{50} of 191.0 µg/mL, 638.5 µg/mL and 286.8 µg/mL, respectively. In conclusion, the isolated Pseudomonas lactis strain could be used as renewable biological sources for biosynthesis of anticancer compounds.

Pharmaceutical Organic Chemistry

ß-Carbolines Heterocyclic Derivatives as A Promising Scaffold for Cancer Treatment

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Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, or nearly one in six deaths. Many cancers can be cured if detected early and treated effectively. Thus, there is an urgent need for introducing safe and cost-effective anticancer drugs. β-Carbolines are indole alkaloids having a tricyclic pyrido[3,4-b]indole ring in their structure. B-Carbolines are heterocyclic compounds which have broad spectrum of pharmacological properties including sedative, anxiolytic, hypnotic, anticonvulsant, antitumor, antiviral, antiparasitic as well as antimicrobial activities. The aim of this review is focusing on their anti-cancer activity exploring the molecular docking for compounds containing beta carboline scaffold and the recent synthetic methods.

Design, Synthesis and Anticancer Activity of Some New 1, 2, 4-Triazole and Benzimidazole Derivatives

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Cancer is one of the dreadful diseases with around 18.1 million new cancer cases and 9.6 million deaths as globally estimated in 2018. Recent World Health Organization (WHO) reports stated that an about one in six death cases is mainly due to cancer. Development of efficacious drugs with novel mechanisms is necessary for various cancer types. The chemotherapy drug resistance and non-selectivity toward targets have turned current cancer research to alternative selective targets for the development of potential anticancer agents1. Hybridization of benzimidazole and triazole pharmacophores improves their anticancer activity and decrease their side effects2-3. In the current study, a new series of benzimidazole and 1,2,4-triazole derivatives are designed and synthesized. All new analogues are evaluated as anticancer agents against cancer cell lines using doxorubicin as a standard drug. Tested derivatives exhibited selective cytotoxic activity against MCF-7 and HepG2 cancer cell lines.

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Salicylate Derivatives as Anticancers: Structure-Activity Relationship Study

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The development of new anti-cancer agents with multicellular targets and with higher selectivity to cancer cells may enhance the outcome of cancer therapy. Drugs with multicellular targets might partially replace the use of combination chemotherapy for management of cancer and may also decrease the risk of development of resistance. Although salicylic acid was first prepared in 1838, it is still an attractive compound that inspires chemists to synthesize new derivatives for treatment of several diseases. In this study, we describe our efforts to synthesize new salicylic acid derivatives and investigate their anti-proliferative effects, selectivity, potential mechanisms of anti-cancer activity and structure activity relationships [1-3].

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An Insight into The Protein Targets of Pyridopyrimidine Scaffold for Cancer Treatment

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Pyridopyrimidine, a fused hetero-bicyclic nucleus bearing pyridine and pyrimidine rings, attains considerably a great interest in the field of multi-components synthetic protocols. These derivatives are referred to as second-generation cyclin-dependent kinase inhibitors which have diverse pharmacological applications such as cytotoxic, anti-inflammatory and anti-microbial activities. The aim of this review is focusing on recent synthetic methods and molecular docking studies of pyridopyrimidine scaffold for anticancer activity and thus providing a pool of ideas for novel lead molecules [1].

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Design, Synthesis and Biological Evaluation of Some Novel Nitazoxanide Analogues

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Nitazoxanide (NTZ) is a broad spectrum antimicrobial drug with potent activity against Gram-positive and Gram-negative anaerobic bacteria [1], intestinal protozoa and helminthes including Giardia lamblia, Entamoeba histolytica, *Cryptosporidium parvum*, *Ascaris lumbricoides*, the ulcer-causing pathogen *Helicobacter pylori* [2], *Mycobacterium tuberculosis* [3] and many viral types including good in vitro activity against SARS-CoV-2 in cell culture assays [4]. Some novel nitazoxanide (NTZ) derivatives have been designed and synthesized based on a series of reactions that involve amidation, amino group modification, coupling and/or copper-catalyzed click cycloaddition chemistry. Structures of the newly synthesized compounds were confirmed through different spectroscopic methods such as IR,1H-NMR,13C-NMR and mass spectrometry. Evaluation of antimicrobial activities including (antiparasitic, anthelmintic, antibacterial and antiviral activity) are under investigation.

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Pharmaceutical Analytical Chemistry

A Highly Sensitive HPTLC Method for Determination of Ternary Mixture Composed of Empagliflozin, Pioglitazone and Rosuvastatin in Pharmaceuticals and Biological Samples

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Simple and highly sensitive HPTLC have been developed and validated for analysis of ternary mixture composed of two anti-diabetic drugs named empagliflozin (EMP), pioglitazone (PGZ) and one anti-lipidemic drug named rosuvastatin (ROS). Combination of two or more anti-diabetic drugs in medication has a great effect in lowering glucose level in blood by two different mechanisms. In addition, combination with an anti-lipidemic drug such as ROS is recommended as stated by the Current American Diabetes Association guidelines to decrease cardiovascular problems. The ternary mixture was separated on pre-coated silica gel HPTLC plates G60 F254, utilizing a mixture of n-hexane: methanol: ethyl acetate: acetic acid in ratio (4.2: 1.8: 4: 0.05 v/v/v/v) as mobile phase using UV detection at 242 nm. All experimental parameters were optimized, and the proposed HPTLC method achieved high sensitivity with low limit of detection values 28.84, 16.48 and 28.32 ng/spot for PGZ, ROS and EMP respectively. The developed method was applied for separation of the studied drugs in their dosage forms and in human plasma with good recovery results ensuring high efficiency of the proposed approach.

Analytical Study of Metronidazole and Ciprofloxacin Binary Mixture By High Performance Thin Layer Chromatographic (HPTLC) Method

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A combination of ciprofloxacin hydrochloride (CIP) with an antimicrobial agent active against anaerobes such as metronidazole (MTZ) had a promising strategy for the treatment of mixed aerobic and anaerobic infections. MTZ is a nitroimidazole derivative and considered to be active against anaerobic bacteria. CIP is a second generation fluoroquinolone broad spectrum antibiotic that showed an effective treatment for bacterial infections. A highly selective, sensitive, rapid and cost effective HPTLC method was introduced for separation and simultaneous quantitation of MTZ and CIP in pharmaceutical formulation and for the first time in the biological fluid. Chromatographic separation was done by developing system butanol: water: acetic acid (6.5: 2.5: 1, by volume). The Rf values were 0.65 and 0.18 for MTZ and CIP, respectively. Under optimum conditions and dual UV detection at λmax (310 and 280 nm for MTZ and CIP, respectively), a linear relationship was obtained in concentration range of 10 - 250 ng/band for MTZ and 5 - 150 ng/band for CIP with correlation coefficient (r) 0.9998 for both drugs. The detection limits were found to be 3.16 and 1.66 ng/band for MTZ and CIP, respectively. The developed method was validated and optimized according to ICH and US-FDA guidelines. Additionally the developed method was applied for the analysis of spiked rabbit plasma samples containing MTZ and CIP based on simple plasma protein precipitation steps and extraction procedures. Finally the developed method was successfully applied for the real bioanalytical studies of MTZ and CIP in rabbits.

Determination of Tryptophan Content in Serum of Diabetic Rats as A Biomarker Using High Performance Thin Layer Chromatographic Method

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Tryptophan amino acid metabolism is altered in type 2 diabetes mellitus as its level is reduced due to the increase of its metabolism as a result of increase in the activity of its metabolizing enzymes. This encourages us to develop a highly sensitive, selective, rapid and simple high performance thin layer chromatographic method for estimation of tryptophan concentration in the serum of controlled and streptozotocin-induced diabetic rats. This method is developed to determine the applicability of using tryptophan serum level as a biomarker for type 2 diabetes mellitus. The analysis performed using mobile phase of acetonitrile: ethyl acetate: Britton-Ribbonson (BR) buffer pH 9 (5:2:2 v/v/v) at Rf value of 0.35±0.03. Densitometry scanning was performed at fluorescence and absorption modes. Under optimum conditions, a linear relationship was obtained in concentration range of 25-200 ng/band with correlation coefficient(r) 0.99935. The method was validated according to ICH guidelines for linearity, precision and robustness. The method was successfully applied for its determination in rat serum samples with good recovery. From the obtained results we recommend the administration of a daily dose of tryptophan for diabetic patients to adjust its level and it may improve the blood glucose level for those patients.

Graphene Quantum Dots for Fluorescence "Turn Off-On" Probe Determination of Cytarabine

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Herein, the fluorescence turn off-on sensor has been successfully developed using graphene quantum dots (GQDs) as the sensing probe for the ultrasensitive determination of anticancer drug cytarabine. Cytarabine (CYT); pyrimidine nucleoside analogue; is one of the oldest chemotherapeutic drugs which belongs to the antimetabolites group. For the first time, a fluoremetric platform based on GQDs is described for the determination of CYT in pure, pharmaceutical dosage form and biological fluids. Bottom -up approach is used for the synthesis of GQDs using citric acid as a carbon source by hydrothermal method, producing highly fluorescent dots. The ceric ion Ce+4, one of the lanthanide metals, serves as a fluorescence quencher is then added to build up the fluorescence turn off probe. The addition of CYT peels off Ce+4 ions via co-ordination as well as releases the GQDs, resulting in the recovery of the fluorescence signal (turn on). The sensing platform exhibits a linear response to CYT in the range 10-1000 ng mL-1 giving a detection limit and quantitation limit of 1.22 ng mL-1 and 3.70 ng mL-1, respectively. GQDs have been characterized by several techniques such as transmission electron microscope, UV-Visible spectroscopy, FT-IR, and powder X-ray diffraction techniques. This method has been validated following the ICH guidelines. Additionally, good recoveries of 99-101% are also observed, upon addition of 10-1000 ng mL-1 as spiked samples of CYT into human plasma The proposed method was also applied in pharmaceutical dosage form with good accuracy and high precision. The validated developed method was successfully applied to describe the pharmacokinetic profile of CYT in rabbit plasma samples. Results obtained in this study clearly demonstrates a newly fluorimetric probe for rapid and sensitive determination of CYT in different and complicated matrices.

Quechers-Based Approach Toward The Analysis of Almotriptan, Timolol, and Verapamil in Plasma Samples Using Ion-Pair Chromatography

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A sensitive selective ion pair chromatography (IPC) method with sodium dodecyl sulphate (SDS) as an ion pair reagent was developed for the simultaneous determination of the binary mixture almotriptan -timolol (ALM-TIM) and almotriptan - verapamil (ALM-VER) used for the management of migraine. An IPC procedure based on QuEChERS extraction for the enrichment of the analytes followed by fluorescence detection was used. The method involved the use of online wavelength switching detection at λex 295 and λem 435 nm (0-3 min for TIM), λex 232 and λem 357 nm (2.5 min for ALM) and λex 231 and λem 318 nm (4.5 min for VER). Separations were performed on a C18 analytical column with methanol: 35 mmol L-1 phosphate buffer (60: 40%; with 10 mmol L-1 SDS) of pH 6.8 at a flow rate of 0.8 mL min-1. The linear ranges in rabbit plasma in presence of TIM or VER as internal standard were 0.25-15, 10–60 and 12-38 ng mL-1, with correlation coefficients 0.9959, 0.9914 and 0.9946 for TIM, ALM, and VER respectively. The detection limits were 0.72 ng mL-1 for TIM, 5.92 ng mL-1 for ALM, and 2.22 ng mL-1 for VER. Validation parameters were assessed in compliance with US-FDA guidelines. The method is valuable for investigations concerned the effective targeting of acute or chronic migraine protocol therapy.

Clinical Pharmacy

Budget IMPACT Analysis of an Alternative Meningococcal Conjugate

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Invasive Meningococcal Meningitis (IMM) imposes a substantial public health problem particularly in infants below one year expecting a significant risk of death and long-term disabilities. This study aimed at estimating clinical and economic benefits of providing an alternative meningococcal meningitis conjugate vaccine (MenACWY-DT) in high-risk infants in Egypt. A budget impact model was constructed to adopt the MenACWY-DT vaccine in the Egyptian national immunization program to high-risk infants.

Psychological Impact of COVID-19 on Health Care Workers

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Background: The coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus that affects different people in different ways. The COVID-19 outbreak has affected not only physical health but also mental health and psychological wellbeing. The COVID-19 pandemic had a massive impact on health care systems and increasing the risks of psychological distress in health professionals. **Aim:** The aim of the study was to investigate the psychological impact of COVID-19 on health care workers. Study subjects and methods: A cross-sectional survey was conducted among a randomly selected sample of health care workers. The questionnaire contents constituted of 33 questions pertaining to demographics, workforce factors, health factors, psychological factors and training and preparatory actions towards COVID-19 pandemic. The survey was administered using an online and paper questionnaire, and data were collected and analyzed. **Results:** The data were collected from 495 participants included doctors, pharmacists, nurses and other health care specialties between August and October 2021. Health care workers were exposed to longer work shifts (82%) and vulnerable to exposure to virus infection from infected persons (58.6%). Many factors affecting health care workers' work during COVID-19 including mostly exposure to infected persons (54.94%), personal health (37.37%) and medicines supply (30.30%). Most of the study participants experienced moderate to severe psychological impact. High level of anxiety, stress and depression among health care workers were noted at several aspects including personal, family and work environment, which is a cause for concern. The mental

health and psychological reactions of health care workers are dangerously deteriorating as they struggle to cope with the consequences of the COVID-19 pandemic. Having survived the effects of COVID-19, their ongoing fear, stress and workload pressure is compounded by the daily anxiety, uncertainty and hardship produced by COVID-19 pandemic. **Conclusions:** Since the prevalence of consequences of the COVID-19 among health care workers treating COVID-19 patients, it`s imperative to invest health resources and services to improve knowledge about COVID-19, promote the mental health welfare of frontline health care workers and reduce the negative psychological outcomes of COVID-19 pandemic.

Knowledge, Attitude and Fear Regarding COVID-19 Vaccination Among General Population in Egypt

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Croonavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. The successful approach of fighting of this pandemic is the use of safe and effective vaccines. However, in addition to the common mild side effects of the authorized vaccines, some major adverse reactions are increasingly being reported worldwide. Therefore, this study was aimed to measure the knowledge, attitude, and fear regarding COVID-19 vaccination among population in Egypt. It is a cross-sectional survey conducted in April 2020. The data were collected from 880 participants. Among the participants, 19.8% were not concerned at all about getting COVID-19 infection, 57.5% were concerned a little and 15.6% were very concerned. Regarding the safety of the COVID-19 vaccines received in Egypt, 66.7% said that they know someone who received the vaccine and had serious or dangerous complications. Interestingly, only 9.7% think the vaccines are fully safe, while 62.7% think the vaccines are somewhat safe. Regarding fearing of vaccination, 14.8% were not afraid at all to get vaccinated while 12.7% were little afraid and 11.6% were very much afraid of vaccination. 62% of those who took the vaccine decided to took the vaccine based on their own decision, while 26.11% took the vaccine due to work enforcement. 51% said they strongly encourage family and friends to take the vaccine, while 11.4 % recommend delaying the vaccine and 6.7% recommend not taking the vaccine. The results suggest that most of the Egyptian population has satisfactory knowledge and a positive attitude and perception toward COVID-19 vaccination.

Capecitabine-Induced Hand-Foot Syndrome (HFS) and the Risk of Fingerprint Loss

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Background: Hand-foot syndrome (HFS) and fingerprint loss are regarded as known adverse reactions to some chemotherapeutic drugs, including capecitabine. The importance of fingerprint verification is rising significantly. Nowadays, they are required to unlock smart phones, at the border, and in some workplaces. **Purpose:** This study aimed to evaluate HFS and fingerprint changes in patients treated with capecitabine-containing regimens. **Patients and Methods:** The study included 50 patients ;18 males (36%) and 32 females (64%), who received capecitabine-containing regimens at Assiut and Ain Shams University Hospitals**.** Patients were evaluated for the incidence of HFS and its severity according to **the** National Cancer Institute (NCI) criteria. A forensic medicine expert examined fingerprint changes before the initiation of treatment and after consecutive cycles of chemotherapy. **Results: The occurrence of HFS was** found in 37 patients (74%); 26 patients (52%) suffered from HFS grade 1, while 11 patients (22%) suffered from HFS grade 2. None of the patients showed HFS grade 3 or complete loss of fingerprints. Five patients (10%) had no changes in their fingerprints (10%). Forty five patients (90%) showed fingerprint changes; 15 patients (30%) showed missed ridges and 18 patients (36%) showed a decrease in the depth of the ridges, while 12 patients (24%) showed both types of changes. **Conclusion:** Capecitabine has a significant toxicity in the form of HFS and can induce fingerprint changes with its medico-legal and social consequences. Hence, further work on preventive measures is recommended.

Biochemistry

Strontium Ranelate Ameliorates Monosodium Iodoacetate-Induced Knee Osteoarthritis Via Suppression of Inflammation and Cartilage Degradation

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Osteoarthritis (OA) is the most prevalent degenerative joint disease and one of the most common disabling diseases worldwide. Degradation of the cartilage extracellular matrix is a key feature of the disease with ADAMTS-5 playing central role in aggrecan degradation. Considerable data implicate a role for proinflammatory cytokines in the cartilage destruction associated with OA. Strontium ranelate (SR) is an anti-osteoporosis drug and recently considered as a promising disease modifying osteoarthritis drug. The underlying mechanism of the anti-OA is still unclear. This study aimed to test the effects of SR on the inflammatory process and degradation of the articular cartilage using adult male albino rats model of knee OA induced by intraarticular injection of monosodium iodoacetate (MIA). Histopathological classification of the severity of lesions was graded using Mankin's scoring system. SR (1800 mg/kg/day) was administered orally via gavage for 3 or 6 weeks. To investigate SR effect on cartilage degeneration, determination of aggrecan and ADAMTS-5 expressions were performed. Moreover, the gene expression of inflammatory cytokines (IL1β and IL-10) was measured to examine the anti-inflammatory effects of SR. Histologic and molecular changes in the knee cartilage were evaluated by light microscopy, real-time PCR and immunohistochemistry. SR could effectively increase the expression level of the aggrecan and inhibit ADAMTS-5 expression. In addition, SR markedly decreased mRNA levels of pro-inflammatory cytokine (IL1β) and increased the expression of anti-inflammatory cytokine (IL-10). In conclusion, administration of SR is promising for inhibiting inflammation and protecting against cartilage degradation in OA.

Pharmacology

Ameliorative Effect of Thymoquinone Against Streptozotocin-Induced Diabetic Nephropathy in Rats

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Diabetic nephropathy is one of the most common causes of end-stage kidney disease. The pathogenesis of Diabetic nephropathy is multifactorial and development of an effective therapy remains to be elucidated. The aim of the present study was to assess whether thymoquinone (THQ), has a therapeutic potentiality for prevention of this disease and to explore its underling mechanism in this setting. Diabetes was induced in rats by a single intraperitoneal injection of streptozotocin (STZ) (55 mg/kg). The diabetic rats were orally treated with thymoquinone (10 mg/kg/day) for eight weeks. STZ-treated rats exhibit a marked elevation in the serum level of creatinine, urea and creatinine clearance. This was associated with increased NADPH oxidase isoform, NOX2 expression, superoxide anion ($O2^{-}$) production, malondialdehyde (MDA), transforming growth factor (TGF)-β, and tumor necrotic factor (TNF)-α, while the expression of nuclear factor-E2-related factor (Nrf2), and nitric oxide (NO) bioavailability were significantly diminished. Treatment with THQ significantly inhibited oxidant production and fibrotic/ inflammatory parameters. This was associated with ameliorating the renal function and histopathological abnormalities. The present study demonstrates that THQ protects against STZ-induced diabetic nephropathy through via modulating the Nrf2 signaling pathway.

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18و 19 نوفمبر 2022م

تنظمه كلية الصيدلة – جامعة أسيوط

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الرئيس الفخري

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