4th PUA International Conference

Perspectives in Pharmaceutical Sciences; "Digitalization and Sustainability"

Faculty of Pharmacy
Pharos University in Alexandria, Alexandria, Egypt

IC-PPS / 2024
27 th April

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4th PUA International Conference

Perspectives in Pharmaceutical Sciences;

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April 27, 2024

Organized by

Faculty of Pharmacy

Pharos University in Alexandria, Alexandria, Egypt

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Welcome Note

It is our genuine pleasure to warmly welcome you to the 4th International Conference of the Faculty of Pharmacy, Pharos University in Alexandria, Egypt; Perspectives in Pharmaceutical Sciences: Digitalization and Sustainability" that will be held on the 27th of April, 2024 at the University Grand Hall.

This one-day meeting will provide a great opportunity for scientific exchange, communication with researchers, academics, industrialists and leading experts in pharmaceutical sciences from Egypt and all over the world.

The Conference program will be both exciting and groundbreaking in its wide range and multidisciplinary content, in addition to its keynote session and scientific presentations. We sincerely hope that this conference will deliberate and discuss all the different aspects of pharmaceutical Sciences and come up with recommendations that will lead to a healthier world.

Once again, we are delighted to invite you all to take part in this conference and to make the conference a fruitful grand success.

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Plenary Speakers

Harnessing Artificial Intelligence Tools in Drug Design Rational

Prof. Yaseen El Shaier

Professor of Pharmaceutical Chemistry,
Vice Dean for Research & Postgraduate Studies
Faculty of Pharmacy, University of Sadat city, Egypt

Advanced Field Training Year (Internship Year): Converging Theory and Practice in Pharmacy Education

Dr. Mohy Hafez

Member of the Board of Directors and Head of the Pharmaceutical Industries Division of the Egyptian Federation of Industries, Egypt

Single Use Plastics in Biopharma – A Contradiction in Sustainability

Dr. Cormac MacMahon

Head of Discipline for Finance, TU Dublin's School of Accounting, Economics & Finance, Ireland

Opportunities, Challenges, and Ethical Implications of Using Artificial Intelligence in Psychiatry: Introducing Sustainable Services for Mental Health Care.

Dr. Nancy Ali Mahfouz

Head of Clinical Pharmacy, Department of Neuropsychiatry,
Alexandria University Hospitals, Egypt

Keynote Speakers

Session 1

The Role of Vitamin C in Cancer Epigenetics

Prof. Burkhard Kleuser

Professor of Pharmacology & Toxicology at the Institute of Pharmacy at Freie Universität Berlin, Germany

Pharmacy Makeover:
How AI is Changing the Game

Dr. Rana Mohsen

Medical Marketing & Brand Strategist,
Managing Director of Marklinica agency, Egypt

Artificial Intelligence in Natural Products Discovery:
Navigating the Big Data Era

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Head of Pharmacognosy Department, Faculty of Pharmacy, Alexandria University, Egypt

Session 2

State-of-the-Art Advances in Artificial Neural Networks for Pharmaceutical Analysis

Prof. Hadir Maher

Head of Pharmaceutical Analytical Chemistry Department, Faculty of Pharmacy, Alexandria University, Egypt

Sustainable Pharmaceutical Nano-research with Ultimate Vision of Elaborated Human Health

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Professor of Pharmaceutics, Faculty of Pharmacy, Pharos University in Alexandria, Egypt

Revolutionizing Immunization Training for Pharmacists: A Digitalized Approach Enriched with Experiential Learning

Dr. Hafzan Hanafiah

Clinical Pharmacy, School of Pharmaceutical Sciences, University Sains Malayaia, Malysia

Revolutionizing Immunology through AI: A Pathway to Deeper Understanding and Novel Therapeutics

Assoc. Prof. Radwa Ewaisha

Associate Professor of Microbiology & Immunology, Faculty of Pharmacy, Alexandria University, Egypt

Conference Program

4th PUA International Conference
Perspectives in Pharmaceutical Sciences; "Digitalization and Sustainability"
Faculty of Pharmacy
April 27, 2024

09:00 am - 10:00 am	Registration
10:00 am - 10:30 am	Al Quran Al Kareem Welcome Speech  *Prof. Mahmoud Mohy El Din* University President Pharos University in Alexandria  *Prof. Maged El-Ghazouly* Dean of Faculty of Pharmacy Pharos University in Alexandria

Plenary Speakers' Session

Chairperson: *Prof. Saad Darwish*
Dean of Faculty of Computer Sciences & Artificial Intelligence, PUA, Egypt

10:35 am - 10:55 am	 Harnessing Artificial Intelligence Tools in Drug Design Rational *Prof. Yaseen El Shaier* Professor of Pharmaceutical Chemistry, Vice Dean for Research & Postgraduate Studies Faculty of Pharmacy, University of Sadat city, Egypt
11:00 am - 11:20 am	 Advanced Field Training Year (Internship Year): Converging Theory and Practice in Pharmacy Education *Dr. Mohy Hafez* Member of the Board of Directors and Head of the Pharmaceutical Industries Division of the Egyptian Federation of Industries, Egypt
11:25 am – 11:45 am	 Single Use Plastics in Biopharma – A Contradiction in Sustainability *Dr. Cormac MacMahon* Head of Discipline for Finance, TU Dublin's School of Accounting, Economics & Finance, Ireland
11:50 am - 12:10 pm	 Opportunities, Challenges, and Ethical Implications of Using Artificial Intelligence in Psychiatry: Introducing Sustainable Services for Mental Health Care. *Dr. Nancy Ali Mahfouz* Head of Clinical Pharmacy, Department of Neuropsychiatry, Alexandria University Hospitals, Egypt
12:10 pm- 12:30 pm	Discussion
12:30 pm – 1:30 pm	Coffee Break

Keynote Speakers' Session 1

Chairperson: *Assoc. Prof. Mennatallah Gowayed*
Associate Professor of Pharmacology & Therapeutics, Faculty of Pharmacy, PUA, Egypt

1:30 pm - 1:45 pm		**The Role of Vitamin C in Cancer Epigenetics** *Prof. Burkhard Kleuser* Professor of Pharmacology & Toxicology at the Institute of Pharmacy at Freie Universität Berlin, Germany
1:50 pm – 2:05 pm		**Pharmacy Makeover: How AI is Changing the Game** *Dr. Rana Mohsen* Medical Marketing & Brand Strategist, Managing Director of Marklinica agency, Egypt
2:10 pm - 2:25 pm		**Artificial Intelligence in Natural Products Discovery: Navigating the Big Data Era** *Prof. Eman Shawky* Head of Pharmacognosy Department, Faculty of Pharmacy, Alexandria University, Egypt
2:25 pm - 2:40 pm		Discussion

Sponsors' Session

2:45 pm - 3:00 pm

Ω VITABIOTICS

Vitabiotics Egypt Case Study in Counterfeiting Reduction
Dr Yasser Mekky
Vitabiotics Egypt Business Development Manager

Keynote Speakers' Session 2

Chairperson: *Prof. Rim Haggag*
Head of Pharmaceutical Chemistry Department, Faculty of Pharmacy, PUA, Egypt

3:05 pm - 3:20 pm		**State-of-the-Art Advances in Artificial Neural Networks for Pharmaceutical Analysis** *Prof. Hadir Maher* Head of Pharmaceutical Analytical Chemistry Department, Faculty of Pharmacy, Alexandria University, Egypt
3:25 pm - 3:40 pm		**Sustainable Pharmaceutical Nano-research with Ultimate Vision of Elaborated Human Health** *Prof. Yosra Ebnaggar* Professor of Pharmaceutics, Faculty of Pharmacy, Pharos University in Alexandria, Egypt
3:45 pm – 4:00 pm		**Revolutionizing Immunization Training for Pharmacists: A Digitalized Approach Enriched with Experiential Learning** *Dr. Hafzan Hanafiah* Clinical Pharmacy, School of Pharmaceutical Sciences, University Sains Malaysia, Malysia
4:05 pm – 4:20 pm		**Revolutionizing Immunology through AI: A Pathway to Deeper Understanding and Novel Therapeutics** *Assoc. Prof. Radwa Ewaisha* Associate Professor of Microbiology & Immunology, Faculty of Pharmacy, Alexandria University, Egypt
4:20 pm – 4:30 pm		Discussion
4:30 pm – 5:00 pm		Closing Ceremony

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Plenary Session

Harnessing Artificial Intelligence Tools in Drug Design Rational

Yaseen El Shaier

Prof. of Pharmaceutical Chemistry, Vice Dean for Research & Postgraduate Studies, Faculty of Pharmacy, University of Sadat City, Egypt
E-mail: yaseenorganic@yahoo.com

Abstract:

Drug discovery and development is a risky and lengthy process. This pipeline commences by drug discovery phase in which rational drug design is a corner stone perspective. Utilization of new technologies as artificial intelligence applications in the field of pharmaceutical sciences, especially drug design, is a must nowadays. Here in, roughest theory as machine- learning tools were implemented to explain the most important features allocated in drugs which were repurposed for COVID-19 treatment. The model unveiled the cover for the necessity of certain features as number of rotatable bonds. Furthermore, certain machine learning applications were implemented to predict the best synergy score in anticancer drug combination protocols. These results are assisting in molecular hybrid anticancer drug design based on multi target strategy.

Advanced Field Training Year (Internship Year): Converging Theory and Practice in Pharmacy Education

Mohy Hafez

Member of the Board of Directors and Head of the Pharmaceutical Industries Division of the Egyptian Federation of Industries, Egypt
E-mail: yaseenorganic@yahoo.com

Abstract:

Under the supervision of the Supreme Council of Universities, a compulsory training program (internship) for pharmacists is organized .it aims to develop the capabilities and skills of graduates of colleges of pharmacy to meet the needs of the labor market in terms of competencies and quality of performance and to prepare pharmacists qualified with the latest concepts in the field of health care and the field of drug discovery and development

This training program for the internship year includes six rotating training courses, 4 compulsory and 2 optional training courses. To apply for the internship, the student should pass the number of hours stipulated in the academic regulations for the Bachelor degree, as well as passing the summer field training. Passing the compulsory training (internship) program qualifies graduates of colleges of pharmacy to practice the profession in labor market.

The Sustainability Paradox of Single-Use Plastics: Towards a Circular Economy in the Biopharmaceuticals Sector

Cormac MacMahon

Head of Discipline for Finance, TU Dublin's School of Accounting, Economics & Finance, Ireland
E-mail: Cormac.McMahon@tudublin.ie

Abstract:

Over the past twenty years, single-use plastics (SUPs) have gone hand-in-hand with enormous growth in the biopharmaceuticals industry, enabling economies of scale, process intensification, manufacturing agility and quality assurance. According to life-cycle analysis (LCA), this innovation has seemingly had a negligible environmental footprint. Yet, paradoxically, societal expectations have been driving increased scrutinisation of SUP consumption. Unchecked growth consumption appears less and less viable

Although the biopharmaceuticals industry contributes to human welfare, it is unlikely to remain immune to societal pressure. In line with circular economy aspirations, the European Union's Single-Use Plastics Directive, for example, is emblematic of transition risk faced by biopharmaceuticals manufacturers. Likewise, a proposed ban on PFAS materials, designated as forever chemicals, would be disruptive. This paper provides a review of the literature, seeking to resolve the paradox contained in biopharma's continued ramping up of SUP consumption, and an emerging imperative for banning SUPs. Three interrelated strands of literature inform findings: [i] sustainability policy and regulation, [ii] single-use plastics in biopharma, and [iii] applications of circular economy principles to single-use technology.

Although, we find that life-cycle analysis correctly articulates the benefits of single-use technology over conventional stainless-steel technology, the comparison between the two technologies is non-sensical. Moreover, the long-term environmental and health impacts of plastics in the environment have yet to be fully understood. The literature has yet to explore in any great depth circularity, post-use, and end-of-life considerations for SUPs. With an estimated 30,000 tonnes of biopharma SUPs landfilled or incinerated annually, we explore potential solutions to enhance their sustainability. Although established techniques, such as river straining, waste-to-energy, and chemical recycling offer near-future solutions, biopharmaceuticals manufacturers have yet to pivot towards a sector-wide solution. Additional research is needed to shed light on sectoral adoption pathways

Opportunities, Challenges, and Ethical Implications of Using Artificial Intelligence in Psychiatry: Introducing Sustainable Services for Mental Health Care

Nancy Ali Mahfouz

Head of Clinical Pharmacy, Department of Neuropsychiatry, Alexandria University Hospitals
E-mail: nancy_mahfouz84@yahoo.com

Abstract:

Artificial intelligence (AI) has made significant advances in recent years, and its applications in psychiatry have gained increasing attention. The use of AI offers the potential to improve patient outcomes through its applications in monitoring mental illness, treatment, prediction, and diagnosis. However, the potential benefits of AI in psychiatry are accompanied by several challenges and ethical implications including issues of accuracy, privacy, and bias. Further research and development are required to address the limitations and ensure the safe and ethical integration of AI in the field of mental health. By doing so, AI has the potential to greatly improve patient outcomes and enhance the delivery of more sustainable mental healthcare services.

Multidisciplinary Sessions

Session 1

The Role of Vitamin C in Cancer Epigenetics

Burkhard Kleuser

Freie Universität Berlin, Department of Pharmacology and Toxicology
E-mail: kleuser@zedat.fu-berlin.de

Abstract:

The role of vitamin C in the treatment of cancer has been controversial for decades. In the last 10 years, mechanistic insights into the role of vitamin C in epigenetic regulation have provided a new basis for its potential anti-cancer effect. Indeed, vitamin C is a potent antioxidant and thus a cofactor for a number of enzymes, including α-ketoglutarate-dependent dioxygenases, which are some of the most important epigenetic regulators, the ten-eleven translocation (TET) methylcytosine dioxygenases. TET enzymes are significantly involved in DNA demethylation and are thus able to reactivate epigenetically silenced genes. Epigenetic deregulation is a hallmark of many cancers and a dysregulation of TET enzymes occurs in several types of cancer. There is a direct link between TET activity and mutations in the metabolic enzyme isocitrate dehydrogenase 1 (IDH1). Such mutations lead to metabolic alterations and a sustained formation of 2-hydroxyglutarate. This oncometabolite is able to inhibit TET enzymes. A new therapeutic option is therefore the use of IDH inhibitors, which are already approved for IDH1-mutated acute myeloid leukemia and IDH1-mutated cholangiocarcinoma. However, combinatorial treatment with both, IDH inhibitors and vitamin, enhance global DNA hydroxymethylation and increase gene expression of certain tumour suppressors. These results suggest that combinatorial therapy of IDH inhibitors together with vitamin C is able to

rescue TET activity and is therefore a new option for the treatment of IDH1 mutated cancers.

Pharmacy Makeover: How AI is Changing the Game

Rana Mohsen

Medical Marketing & Brand Strategist, Managing Director of Marklinica agency
E-mail: rana@marklinica.com

Abstract:

In the current landscape of digitalization and sustainability within pharmaceutical sciences, Artificial Intelligence (AI) has emerged as a transformative influence on pharmacy practices. We will smoothly navigate through the dynamic intersection of AI technologies with the pharmacy domain, shedding light on both the remarkable opportunities and complex challenges that arise, and how they contribute to the sustainability of pharmaceutical systems.

Artificial Intelligence in Natural Products Discovery: Navigating the Big Data Era

Eman Shawky

Head of Pharmacognosy Department, Faculty of Pharmacy, Alexandria University, Egypt
E-mail: eman.m.shawky@alexu.edu.eg

Abstract:

In the dynamic realm of natural products discovery, the advent of artificial intelligence (AI) has emerged as a transformative force, revolutionizing traditional methodologies and empowering researchers to navigate the intricate landscapes of the big data era with unparalleled precision and efficiency. This presentation delves into the multifaceted role of AI in reshaping the exploration of nature's vast chemical diversity. By harnessing advanced algorithms and machine learning techniques, AI facilitates the rapid and systematic identification of novel bioactive compounds, streamlining the drug discovery process and expediting the translation of promising leads into therapeutics. Moreover, AI-driven approaches optimize resource allocation and guide bioprospecting endeavors, enabling researchers to uncover hidden treasures within nature's vast repository. Through compelling case studies and real-world examples, this presentation showcases the transformative potential of AI in driving innovation and accelerating breakthroughs in natural products research. Ultimately, AI stands poised to revolutionize the field, heralding a new era of discovery, collaboration, and advancement in the quest for novel therapeutic agents and sustainable solutions for tomorrow's challenges.

Multidisciplinary Sessions

Session 2

State-of-the-Art Advances in Artificial Neural Networks for Pharmaceutical Analysis

Hadir Maher

Head of Pharmaceutical Analytical Chemistry Department, Faculty of Pharmacy, Alexandria University, Egypt
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Abstract:

Artificial neural networks (ANNs) are a subtype of machine learning models which mimic the structure and function of the human brain. ANNs have been widely used in the field of pharmaceutical analysis owing to their ability of prediction, classification, and generalization. The ability of ANNs to generate non-linear and complex correlations contributes to their wide use in many fields of pharmaceutical industry, including the identification of active pharmaceutical ingredients, drug targeting, molecular interactions between drugs and receptors, and the prediction of toxicity profile. Besides, ANNs are promising tools in other pharmaceutical fields ranging from drug discovery, pharmaceutical product development, in vitro/in vivo correlations, pharmacokinetic and pharmacodynamic profiling to prediction of drug-drug interactions and disease liability. The comprehensive structure of training and testing stages of ANNs extends their applicability as one of the most efficient tools in extracting information and deriving correlations in real-life applications. Recently, the effectiveness and robustness of ANNs in data analysis has been found beneficial in extracting the dominant attributes toward COVID-19 pandemics. In addition, ANNs modeling has been

successfully used in many aspects of qualitative and quantitative analysis, including method development and optimization, separation, and quantitation. The most common type of ANNs is feed forward back propagation networks, where the output of one layer is connected to the following layer in a forward manner with back propagation of the calculated errors till acceptable threshold values are obtained. Three data sets are used, training data, validation data, and finally testing data. The use of ANNs provides high degree of accuracy and precision in data handling with a marked ability in handling complex data types including non-linear and missing data, in addition to significant reduction in the overall cost in different pharmaceutical processes. Accordingly, ANNs have been applied to pharmaceutical analysis with a great deal of success.

Sustainable Pharmaceutical Nano-research with Ultimate Vision of Elaborated Human Health

Yosra S.R. Elnaggar

Head of International publication & Nanotechnology Consultation Center (INCC), Faculty of Pharmacy, PUA
Prof. of Pharmaceutics, Faculty of Pharmacy, Alexandria University (in-leave)
E-mail: yosra.elnaggar@pua.edu.eg

Abstract:

Nanotechnology is the forecasted future technology in many life disciplines. Pharmaceutical nanotechnology is a multidisciplinary research field encompasses employment of nano tool to elaborate a better patient-treatment profile. The major vision of our research group (Nanotechnology research team NRT) is to decrease patient suffering via curing diseases with minimal doses and side effects. Eventually; our vision comes in accordance with global SDGs particularly the third goad focusing on Good Health. This talk will highlight the major pillars in our pharmaceutical nano-research that meet the global criteria of sustainability regarding mission; vision and eventually outcomes of sustainable nano-research fulfilling the international criteria.

Revolutionizing Immunization Training for Pharmacists: A Digitalized Approach Enriched with Experiential Learning

Nur Hafzan Md Hanafiah

Discipline of Clinical Pharmacy, School of Pharmaceutical Sciences, University Sains Malaysia, 11800 USM, Penang, Malaysia
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Abstract:

Microcredentials, a flexible digital learning format, are increasingly being incorporated into the professional development framework for pharmacists. This integration is paramount for the continuous updating of pharmacists' knowledge, skills, and competencies within the rapidly evolving healthcare domain. Amidst the COVID-19 pandemic, digitalization allows pharmacists to engage in remote continuous learning, thereby avoiding the necessity for complete physical attendance at conferences or workshops. Given the expanding involvement of pharmacists in global immunization efforts, specialized training assumes a critical role in ensuring the safe and effective delivery of vaccines, particularly in Malaysia.

The Certified Training Programme in Immunization for Pharmacists (CTPIP) provides an encompassing series of microcredential modules, designed to align with Sustainable Development Goals (SDGs) 3 and 4. These modules underscore the significance of perpetual professional development and the imperative of staying abreast of emergent immunization practices. CTPIP integrates various interactive methodologies, including discussions, case studies, forums, and group activities, aimed at nurturing critical thinking, problem-solving, and decision-making skills, thereby augmenting pharmacists'

proficiency in immunization guidelines, event management, and vaccine administration.

Employing an experiential learning paradigm, CTPIP immerses participants in simulated immunization scenarios, facilitating the acquisition of vaccine administration techniques and basic life support (CPR) skills. The program has garnered positive reception, boasting an enrolment of 472 participants by 2023. Financially, it has yielded over RM 15,000.00 (USD 3,174.60), with an anticipated annual income projection of RM 832,000 (USD 176,084.48). The efficacy of the CTPIP course in enhancing pharmacist competency and patient care is systematically evaluated through post-course assessments and participant feedback surveys. The findings indicate a substantial enhancement in pharmacists' knowledge, confidence, and proficiency in immunization procedures, underscoring the utility of microcredential-based CPD in fostering adaptable and personalized learning avenues for pharmacists, thereby enabling them to effectively navigate the evolving healthcare landscape and contribute to the continual enhancement of patient care standards.

Revolutionizing Immunology through AI: A Pathway to Deeper Understanding and Novel Therapeutics

Radwa Ewaisha

Department of Microbiology & Immunology, Faculty of Pharmacy, Alexandria University, Egypt
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Abstract:

Maintaining a healthy body relies on the intricate network of cells, tissues, and organs that comprise the immune system. Deciphering and comprehending this system is crucial in combating both communicable diseases like tuberculosis, malaria, and COVID-19, as well as non-communicable diseases such as cancer, diabetes, and autoimmune disorders. Throughout the last century, scientists achieved groundbreaking milestones that saved countless lives, including the eradication of smallpox, advancements in cancer immunotherapies, and the rapid production of COVID-19 vaccines. Nonetheless, our progress has been hindered by a lack of comprehensive understanding of the complexities of the immune system. Fortunately, artificial intelligence now offers us the tools to bridge these knowledge gaps. This talk explores how machine learning can aid in identifying potential immune targets for the development of innovative therapeutics, with a particular focus on the application of these algorithms in developing novel immunotherapies and creating safer gene therapies.

e- posters

Let's Start!

Research Abstracts

PG-01

Chemical Profiling of Different Plant Parts of Two Bougainvillea Species Using UPLC-MS/MS Spectrometry and *In-vitro* Anti-inflammatory Activity

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Abstract:

Bougainvillea is an important source of environment-friendly safe pigmenting agents, namely anthocyanins that are widely used in food, textile, cosmetic, and pharmaceutical industries. This study aimed at investigating the resemblance and variation in the chemical profiles of *B. spectabilis* Willd and *B. glabra* Choisy flowers and leaves extracts utilizing UPLC-MS/MS analysis in combination with chemometric tools. UPLC/MS/MS analysis revealed forty-four compounds in the tested extracts of *Bougainvillea.* The major encountered classes are flavonoids, anthocyanins, mono-di, and triterpenes in addition to phenolic acids. *B. spectabilis* flowers samples showed significant variations in their chemical profiles compared with other tested extracts. The impact of the tested extracts on the expression of four proinflammatory markers (TNF-α, IL-6, IL-1β, and INF-γ) genes was assessed using real-time-PCR. All tested extracts

decreased proinflammatory genes upregulation to levels comparable to those exhibited by piroxicam, on top were *B. spectabilis* leaves that exhibited the strongest anti-inflammatory activity due to their enrichment of bioactive metabolites that significantly influenced the expression of the proinflammatory biomarkers. Orthogonal projection to latent structure-discriminant analysis (OPLS) and coefficient plots unveiled the biomarkers responsible for the anti-inflammatory efficacy. Caffeic acid hexoside, p-hydroxybenzoic acid, sinapinic acid, quercetin 3-O-(4-caffeoylrhamnosyl-rhamnosyl-hexoside), rutin, neoeriocitrin, luteolin robinobioside, quercetin glucuronide (miquelianin) in *B.spectabilis* leaves samples were the biomarkers that are responsible for the anti-inflammatory activity. This study showed that *Bougainvillea* plants can be important sources of anti-inflammatory compounds besides their pronounced industrial applications.

Keywords:

Bougainvillea, UPLC-MS/MS, Multivariate analysis, Anti-inflammatory activity.

PG-02

Integration of UPLC-MS/MS-based Metabolomics and Activity Evaluation to Explore the Anti-inflammatory Bioactive Metabolites from *Bienertia cycloptera*

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Abstract:

Bienertia is a genus of flowering plants, belonging to Chenopodiaceae, that grows wild in central and southern parts of Iran. This plant occurs in hot climates and temperate and cold deserts. *B. cycloptera* is used in folk medicine for its antihyperglycemic and lipid lowering effects. Literature review showed that very little phytochemical investigation and biological assessment research work have been accomplished on species of the forementioned genus. The target of this study is to analyze the anti-inflammatory activity and chemical composition of *B. cycloptera* and explore the bioactive compounds. Firstly, the anti-inflammatory activity of the different fractions of *B. cycloptera* was evaluated by *in-vitro* experiment on LPS-stimulated WBCs through four pro-inflammatory cytokines (TNF-α, IL-6, IL-1β and IFN-γ). Next, chemical profiling of the different fractions of *B. cycloptera* was

attempted using UPLC/MS/MS coupled with chemometric analysis to decipher the bioactive constituents of the selected plant. In addition, the efficacy-directed markers were revealed using multivariate analysis. Finally, UPLC/MS/MS analysis led to the annotation of 62 compounds belonging to several chemical classes as alkaloids, terpenoids, amino acids, and flavonoids. The anti-inflammatory activity results showed that the *n*-butanol, chloroform, and ethyl acetate fractions of *B. Cycloptera* reduced the upregulation of TNF-α caused by LPS to levels lower than those produced by piroxicam, indicating their higher efficacy. Orthogonal projection to latent structures (OPLS) models and coefficient plots of each pro-inflammatory marker unraveled the important functional constituents. The results showed that p-hydroxybenzoic acid, vanillic acid, tachioside, ferulic acid, staphylionoside D, humilixanthin, bergaptol, and vulgaxanthin I were the most potential metabolites downregulating the inflammatory cytokines α-TNF, IL-1β, ɣ-IFN and IL-6. In addition to that, it was found that Portulacaxanthin III strongly correlated with the downregulation of ɣ-IFN and IL-6. These results help to rapidly explore the active compounds from *B. cycloptera*.

Keywords:

Bienertia cycloptera, Anti-inflammatory, Metabolomics, UPLC/MS/MS.

PG-03

Eastern Mediterranean Complementary Medicine Modulating Neuropathy and Inflammation

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Abstract:

Eastern Mediterranean medicinal plants have long been utilized for immuno-modulation. Indian ginseng roots are among the important Eastern Mediterranean plants that are known for its antioxidant and neuroactive properties. The current research aims to perform an in-depth phytochemical analysis, to examine the Indian ginseng for its antinociceptive and anti-inflammatory potentials, and its possible mechanisms of action. Various chromatographic and instrumental analyses have been utilized to phytochemically analyze the Indian ginseng. Animal models for nociception and inflammation have been used to analyze the anti-neuropathic and anti-inflammatory mode of action. Indian ginseng has been shown to be rich in mixture of steroids (withanolides). The most active steroid when formulated into nano-dispersions have shown superiority as an anti-bacterial agent, and in the management of neuropathy, via thermal and

tactile neuropathy animal models, and inflammation, via acute and chronic inflammatory-pain *in-vivo* models. The antinociceptive and anti-inflammatory mode of action of the Indian ginseng could be due to *in-vivo*-antioxidant potential and modulation of the inflammatory modulators. In conclusion, Indian ginseng is one of the Eastern Mediterranean complementary medicines that could be utilized in modulating neuropathy and inflammation.

Keywords:

Eastern Mediterranean Complementary Medicine, Indian ginseng, Neuropathy, Inflammation.

PG -04

Metabolomic and Chemometric Approaches Provide Insights to Differential Chemical Profiles of Sprouting White Lupine (*Lupinus albus* L.) Bioactive Metabolites

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Abstract:

The current study attempts to illustrate how the chemical and biological profile of white lupine seeds varies throughout the course of various germination days using UHPLC-QqQ-MS combined to chemometrics. Abscisic acid showed maximum level in the un-germinated seeds and started to decline with seed germination accompanied by an increase in the levels of gibberellins which were undetectable in un-germinated seeds. Coumaronochromones were the most prevalent constituents detected in un-germinated seeds while day 2 sprouts showed significant accumulation of flavones. The levels of alkaloids showed significant increase upon germination of the seeds reaching its maximum in day 14 sprouts. The OPLS model coefficients plot indicated that lupinalbin D and F, apigenin hexoside, kaempferol hexoside, albine, and hydoxylupanine showed strong positive correlation to the alpha amylase inhibitory activity of the tested samples while lupinalbin A, lupinisoflavone, lupinic acid and multiflorine were positively

correlated to the inhibition of alpha glycosidase activity. The results obtained indicated that seed germination has a profound effect on the chemical profile as well as the *in-vitro* antidiabetic activity of lupine seeds.

Keywords:

White lupine, Seed germination, Sprouting, Chemometrics, Anti-diabetic.

PG-05

Quality Control Protocol for German Chamomile Authentication and Discrimination from Related Toxic Adulterants Using Near-Infrared Spectroscopy Coupled to Chemometrics

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Abstract:

German Chamomile is one of the top-selling drugs in the growing herbal market due to its wide range of medicinal and therapeutic properties. Owing to the high demand on the plant raw material, it is prone to both deliberate and unintentional adulteration by morphologically resembling flowers. Adulteration by potentially toxic plant-based adulterants adds a great risk considering that German chamomile is widely incorporated in infants' preparations. A methodology based on near infrared spectroscopy and chemometrics tools, is proposed to authenticate, detect, and quantify some of the common toxic adulterants of German chamomile. Authentication of German chamomile and its toxic proposed adulterants was achieved with 100% sensitivity using soft independent modelling of class analogy SIMCA model. Discrimination of the plant from its toxic adulterants and deliberately adulterated mixtures was accomplished using Orthogonal projection to latent structures-Discriminant analysis OPLS-DA model with specificity of 100% and 96% respectively. Partial least squares (PLS)

regression models using variables selection based on variable's importance were successfully constructed. A limit of detection (LOD) and a limit of quantification (LOQ) of less than 0.5% and 1%, respectively, were obtained for each adulterant in the powdered plant material. All the developed methods were comprehensively validated using an external test set proving their accuracy and robustness. This offers a protocol that could be approached on industrial scale for quality assessment of German chamomile with efficacy and safety guarantee.

Keywords:

German chamomile, adulteration, authentication, SIMCA, PLS regression, OPLS-DA, NIR, chemometrics.

PG-06

Anti-cholinesterase Activity of Volatile Constituents of *Plumeria alba* L. and *Plumeria rubra* L. Flowers obtained by Head Space and Hydrodistillation

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Abstract:

Plumeria species have important chemical compositions of their essential oils and biological activities, whose applications in medicine, food, pharmaceuticals, cosmetics, and perfumery are considered to be sustainable alternatives that would favor or help to conserve them. Cholinesterase drugs are currently the only drugs available to treat Alzheimer's disease (AD). This study aimed to investigate the acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) inhibitory activity of *Plumeria alba* L. and *Plumeria rubra* L. flowers essential oils. A comparative study of steam distillation, and headspace analysis of volatile constituents of both plants was conducted using GC/MS analysis. The major identified components of steam distillated sample of *P. rubra* L. were 1-heptacosanol (23.86%), and by headspace were 2-methyl-butyl aldoxime (36.38%). Besides, the major identified components of steam distillated

sample of *P. alba* L. were geranyl benzoate (27.55%), and by headspace are linalool (32.52%). The score plot revealed significant similarities between the two hydro-distillated plant samples, with a notable separation between steam distillated and headspace samples. The most significant essential oil components responsible for this separation were linalool and 2-methyl-butyl aldoxime. The study also found significant differences between different countries, possibly due to the differences in geography, atmospheric conditions, biogenetics, and meteorological conditions. *In vitro* cholinesterase inhibition assays revealed the potential of *P. rubra* L. Molecular docking study was also performed to the tested compounds on both AChE and BChE binding sites to investigate the binding mode of the separated compounds as AD treatment candidates. While dynamic simulation study was applied to Geranyl benzoate being the most promising compound to confirm stability after docking. The docking results were visualized and compared to the downloaded ligands. Both *in- silico* and *in- vitro* results were aligned. In conclusion, plumeria species are recommended in pharmaceutical products as a natural, effective aromatherapy for AD.

Keywords:

Plumeria species, essential oils, Anti-cholinesterase.

PG-07

Using NIR in Conjunction with Multivariate Analysis for the Authentication of Clove Buds Powders and Oils and Inspection of Common Adulterants

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Abstract:

This study looks into the quality control and authentication of clove buds powders and oils using NIR diffuse reflectance spectroscopy with multivariate analysis. Clove and its oil were verified and differentiated from adulterants using supervised and unsupervised chemometric analysis approaches, such as principal component analysis (PCA) and data-driven soft independent modeling of class analogy (DD-SIMCA). The sensitivity and specificity of the SIMCA model in identifying adulterants in samples of clove powder and clove oil were both 100%. This demonstrates how the DD-SIMCA technique reliably and accurately distinguishes between various classes. Test samples were used to validate the models, and permutation was used to verify that noise modeling was not present. To determine the amount of adulterants in the samples of clove powder and clove oil, PLS regression analysis was used. The RMSEC values for clove oil and powder ranged from 0.68 to 1.5% and 0.96 to 1.27%, respectively, indicating that the models yielded satisfactory results. The limits of quantification for clove powder and clove oil varied from 1.8% to 4.9% after external validation. The models are able to verify validity and identify sample adulteration. The findings demonstrated the

potential of the recommended approach and models for high throughput authentication sample authentication, detection of sample adulteration, and authenticity assurance. The technique offered a number of benefits, such as ease of use and quick analysis without the need for sample preparation.

Keywords:

Clove, NIR, adulteration, powders, oils, multivariate analysis.

PG-08

Chemical Profiling and Anti-diabetic Activity Testing of Two *Ziziphus* Species: Metabolomics, Chemometric and *in-vitro* Studies

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Abstract:

Ziziphus is a highly versatile tree species widely recognized for its nutritional and medicinal attributes, yet, *Ziziphus spina-christi* and *Z. lotus*, native species of Arabia, have received limited attention in scientific research. This study aimed to explore the metabolic variation in different organs (seeds, fruits and leaves) of *Z. lotus* and *Z. spina-christi* and identify bioactive metabolites associated with their *in-vitro* anti-diabetic activities. Phytochemical analyses revealed the presence of diverse compounds, including amino acids, alkaloids, flavonoids, phenolic acids, and fatty acids. Comparative profiling of the organs demonstrated significant variability in the chemical composition, with amino acids predominant in fruits,

cyclopeptide alkaloids in seeds, and flavonoidal glycosides in leaves. Multivariate statistical analysis, including PCA and OPLS-DA, revealed distinct clustering patterns based on the chemical profiles of the different plant parts rather than plant species and identified discriminant metabolites for each plant part. The inhibitory effects of the extracts on α-amylase and α-glycosidase enzymes showed dose-dependent suppression, with *Z. spina-christi* extracts exhibiting the maximum α-glycosidase inhibitory activity and *Z. lotus* fruit extract as the most potent α-amylase inhibitor. Glucose uptake assays demonstrated increased utilization in HepG2 cells treated with *Z. lotus* extracts. Furthermore, multivariate analyses provided insights into the clustering patterns of samples based on bioactivity and highlighting metabolites positively correlated to the tested bioactivity. Notably, caffeic acid, ferulic acid, betulinic acid, hemsine, zizyotin, apetaline, quercetrin, jujubogenin, and zizyphursolic acid were identified as potential bioactive compounds. These findings may contribute to the understanding of *Ziziphus* chemical diversity and highlight its potential as a source of putative natural antidiabetic agents.

Keywords:

Ziziphus species, anti-diabetic, chemical profiling, UPLC/MS/MS, multivariate analyses.

PG-09

Metabolome Profiling of *Lagenaria siceraria* Leaves Extracts of Different Growth Regulators Using UPLC/MS/MS Analysis

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Abstract:

Lagenaria siceraria (Mol.) Standl, Family Cucurbitaceae, commonly known as bottle gourd, is a medicinal plant widely cultivated in African and Asian countries. It is official in Ayurvedic Pharmacopoeia. It is commonly known as lauki, Ghiya (Hindi), Kadoo (Marathi) and bottle gourd (English). *L. siceraria* has become widely cultivated in many countries for its medicinal uses. There is a great interest in its pharmacological activities and the corresponding bioactive constituents which has an amazing and significant ability for the treatment of various diseases. Most common bioactive compounds of *L. siceraria* include secondary metabolites such as phenolic compounds, pigments, antibiotics, alkaloids, and mycotoxins. Plant tissue culture represents a great promise for controlled production of countless beneficial secondary metabolites. It is also a potential renewable source of valuable medicinal compounds. This study was conducted to investigate organogenesis from *L. siceraria* explants and the effects of various plant growth regulators on its metabolic profile. Seventy four metabolites were annotated in bottle gourd via

UPLC/MS/MS analysis. These metabolites were belonging to terpenoids, flavonoids, amino acids, organic acids, and phytosterols classes. *Lageneria* leaves extracts of different growth regulators exhibited significant antioxidant activities using DPPH technique. Genus *Lagenaria* is considered a good candidate for antioxidant activity. *Lagenaria* sps is considered as a very promising lead for antioxidant drugs. To the best of our knowledge, this is the first study concerning tissue culture and metabolomic profiling of the resulted callus of *Lagenaria sciraria*. This study provides new possible attributes for in nutrition and health-care fields.

Keywords:

Lagenaria siceraria, Tissue culture, Metabolic profiling, Antioxidant, DPPH.


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PL-01

Prospective Cardioprotective Effect of Octreotide in Isoproterenol-Induced Myocardial Infarction in Rats

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Abstract:

Myocardial infarction (MI) is a global health care problem, which instigates irreversible cardiac tissue damage and sudden death, necessitating new prevention and management strategies. Hence, the cardioprotective effect of octreotide in MI was scrutinized by tackling the possible underlying trajectories involved. Isoproterenol (ISO)-induced acute MI model was adopted using ISO (85 mg/kg/day, S.C.) for 2 days. Rats in octreotide groups were pretreated with 20 or 40 µg/kg/day S.C. for 8 days and ISO was given on the 7th and 8th days. Octreotide showed a restoration of ECG changes, cardiac hemodynamics abnormalities, serum cardiac markers elevation (creatine kinase MB, troponin I, lactate dehydrogenase, and aspartate aminotransferase), and cardiac histoarchitecture abnormalities. In addition, octreotide pretreatment showed a significant increase in the cardiac and serum level of the diagnostic microRNA-133a. Octreotide attenuates oxidative

stress indices (MDA, GSH, SOD, TAC, and HIF-1α), besides a better adjustment of NOX-1/-2/-4 expression and protein levels. Mitochondrial morphology and mtDNA copy number were preserved following the pre-treatment of Octreotide. The inflammatory pathway p38 MAPK/Erk-1/-2/p-STAT3/NF-κB pathway and the proinflammatory cytokines (TNF- α, IL-6, and IL- 1β) were attenuated. The proapoptotic markers (cyt c, caspase-3/-9, and Bax) were also attenuated and the antiapoptotic Bcl2 marker was increased by the preadministration of octreotide. In almost all parameters, Octreotide 40 μg/kg/day was more prominent than its lower dose. Octreotide possesses dose-dependent cardioprotective properties via its antioxidant, anti-inflammatory, and anti-apoptotic capabilities.

Keywords:

Octreotide, Dose-dependent, NOXs, Mitochondrial structure, Inflammation, Apoptosis.

PL-02

A Significant Role of Estrogenic Receptor-α in the Cardiomyocyte Mitochondrial Regulation in Ovariectomized Rats

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Abstract:

Estrogen (E2) is implicated in controlling mitochondrial function and homeostasis through its estrogenic receptors (ERs) in most cell types. However, its direct mechanisms and targets still need further elucidation. Since ERβ is currently believed to be responsible for most estrogen's mitochondrial function, this study aimed at investigating the molecular relationship between the mitochondria, E2, and its receptors in cardio-protection after menopause using the selective estrogenic receptor downregulator, fulvestrant. Female Wistar rats were subdivided into sham and bilaterally ovariectomized rats (OVX), then treated with E2, fulvestrant, or a combination of both for 28 days.The deficiency of estrogen actions in untreated OVX and fulvestrant-treated rats has led to disturbed lipid and cardiac profiles, cardiac mitophagy, autophagy, and decreased mitochondrial function. Those effects have been corrected upon E2 administration. Coadministration of fulvestrant with E2 has

completely blocked the effect of E2 on all lipid and cardiac mitochondrial biogenesis parameters in OVX, while it mainly affected PTEN-induced putative kinase 1 (PINK1), mitochondrial fusion protein 2 (MFN2) sand microtubule-associated protein 1 light chain 3 beta (LC3B) markers of autophagy and mitophagy. On the other hand, cardiac profile parameters were mostly not affected by fulvestrant blockage. In conclusion, the current study elaborates the role of ERα in the E2 regulation of mitochondrial biogenesis. Highlighting the fact that the responsiveness of ERα in cardiomyocytes is higher than ERβ. This opens a new perspective in drug development towards cardiovascular diseases in postmenopausal women.

Keywords:

Estrogen, fulvestrant, selective estrogenic receptor downregulator, mitochondria, cardiovascular diseases.

PL-03

Evaluation of the Potential Nephroprotective Effect of Phosphodiesterase 4B Inhibition on Cyclosporine Induced Nephrotoxicity in Male Rats

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Abstract:

Cyclosporine, a potent immunosuppressant, is extensively utilized to prevent organ rejection in transplant recipients, including kidney, liver, and heart transplants. Furthermore, it is employed in treating various autoimmune disorders. However, its application is limited by nephrotoxicity. Numerous studies have aimed to mitigate the nephrotoxic effects of cyclosporine; nevertheless, they have not fully succeeded. This study explores a new nephroprotective approaches using apremilast, a PDE4 enzyme inhibitor, renowned for its anti-inflammatory properties. Four groups of male Sprague-Dawley rats were randomly assigned. Apremilast was given orally to two groups from day one to day fourteen, one at a dose of 10 mg/kg/day and the other at 20 mg/kg/day. Moreover, Cyclosporine was administered at a dose of 20 mg/kg/day to both the treatment group and the

positive control group from day four to day fourteen. Conversely, the negative control group received DMSO/cremophor. Serum samples were collected at baseline, day 8, and day 14 for urea and serum creatinine analysis. After 14 days, the rats were euthanized, and kidney tissue samples were collected. Hematoxylin and eosin dyes were used for histopathology; similarly, PDE4B Monoclonal Antibody staining was used for immunohistopathology. Apremilast effectively ameliorated cyclosporine-induced nephrotoxicity in both treatment groups, as evidenced by a reduction in serum creatinine and urea levels. Additionally, the normal histological features of renal tissue were restored in the groups treated with apremilast. Furthermore, there was a significant decline in the expression of PDE4B, a key trigger of inflammation, compared with its elevated expression in the positive control group.Our findings suggest that apremilast represents a promising therapeutic tool against cyclosporine-induced nephrotoxicity.

Keywords:

Cyclosporine, apremilast, PDE4, nephrotoxicity.

PL-04

Evaluation of the Potential Protective Effect of Melatonin and Pioglitazone on Atorvastatin-Induced Myopathy in Rats

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Abstract:

Statins-induced myopathy is a common disturbing side effect, sometimes leading to discontinuation of the drug. Recently, ferroptosis, a programmed iron-dependent cell death, was found to be responsible for atorvastatin-induced muscular injury.

The current study investigates the potential beneficial effect of the combined targeting of Nrf2/GPx/ACSL4 pathway, involved in atorvastatin-induced ferroptosis, by melatonin and pioglitazone.

Rats were treated daily with atorvastatin (Ator) (80mg/kg), melatonin (Mel) (20mg/kg), pioglitazone (Pio) (3mg/kg), Ator+Mel,Ator+Pio, and the combination of Ator+Mel+Pio for eight weeks. Creatine kinase (CK), myoglobin and lactatae dehydrogenase (LDH), were detected in the serum. The gastrocnemius muscle was used for determination of glutathione peroxidase (GPx), malondialdehyde (MDA), citrate synthase, antioxidative transcription factor Nrf2 and Acyl-CoA synthetaselong-chainfamilymember 4 (ACSL4). Histopathological examination was done to evaluate muscle injury by atorvastatin alone and in combination with melatonin and pioglitazone.

Parameters of myopathy; CK and myoglobin and of mitochondrial dysfunction; LDH and citrate synthase were significantly increased in the Ator group. Atorvastatin induced ferroptosis by downregulating the expression of muscle Nrf2andGPx and by upregulating ACSL4 and MDA, proving the involvement of ACSL4 in Ator-induced myopathy. Co-administration of Ator with either Mel or Pio ameliorated all parameters of myopathy and mitochondrial dysfunction, in a comparable manner. The combined targeting of NrF2 and ACSL4 by both drugs in Ator+Mel+Piogroup offered the most significant beneficial outcome reaching normal values in most of the studied parameters.

Keywords:

Ferroptosis, Nrf2, ACSL4, atorvastatin, melatonin, pioglitazone.

PL-05

Morin Hydrate Ameliorates Endoplasmic Reticulum Stress-Induced Apoptosis and Mitophagy in Huntington's Disease-an Experimental Neuroprotective Approach

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Abstract:

Endoplasmic reticulum stress (ERS) with aberrant mitochondrial-ER contact (MERC), mitophagy, and apoptosis are interconnected determinants in neurodegenerative diseases. Morin hydrate (MH), a potent antioxidant flavonoid was found to mitigate Huntington's disease (HD)-3-nitropropionic acid (3-NP) model. We aimed to evaluate its impact on combating the ERS/MERC, mitophagy, and apoptosis.

Rats were subjected to 3-NP for 14 days and post-treated with MH and/or the ERS inducer WAG-4S for 7 days. Disease progression was assessed by gross inspection and striatal biochemical, histopathological، and transmission electron microscopical (TEM) examinations.

MH decreased weight loss and motor dysfunction using rotarod test. It halted HD degenerative striatal neurons and

nucleus/mitochondria ultra-microscopic alterations reflecting neuroprotection. Mechanistically, MH deactivated striatal mTOR/IRE1-α/XBP1s and *p*-Mfn2 signaling pathways, besides enhancing *p*-PGC-1α. WAG-4S was able to ameliorate all effects initiated by MH to different extents.

MH alleviated HD-associated ERS, MERC, mitophagy, and apoptosis. This is mainly achieved by combating the mTOR/IRE1-α signaling and *p*-Mfn2 to be worsened by WAG-4S.

Keywords:

MH, 3-Nitropropionic acid, Huntington's disease, ER stress, Mitophagy, Neuronal apoptosis.

PL-06

The Silent Liver Disease "Nonalcoholic Steatohepatitis (NASH)": Targeting Necroptosis and Ferroptosis by Natural Compounds

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Abstract:

Non-alcoholic fatty liver disorder (NAFLD) is a complex disorder, with clinical signs becoming serious only when progressed to non-alcoholic steatohepatitis (NASH), cirrhosis and HCC. NASH is a common chronic liver disease that is closely associated with diabetes and obesity. Human NASH exhibits necrosis and necroinflammation, indicating that different cell death mechanisms may contribute to the disease's etiology. Necroptosis is a key form of programmed cell death that is required to regulate inflammation in many tissues. Ferroptosis (FPT) is a type of programmed necrosis and identified as an iron- and lipid hydroperoxide-dependent non-apoptotic cell death. Hepatic ferroptosis also plays an important role as the trigger for initiating inflammation in steatohepatitis and may provide a hopeful and attractive therapeutic target for preventing progression of NASH. AMPK controls fat and glucose metabolism based on the cell's energy level. The cellular energy markers and redox potential are the primary inputs that activate AMPK that AMPK renders the acetyl-CoA carboxylase 1 (ACC1) inactive, which in turn prevents the expression of the genes involved in lipogenesis, including fatty acid synthase (FAS) & sterol regulatory element binding

protein-1 (SREBP-1). Moreover, the control of metabolic pathways, particularly lipid and steroid metabolism, is greatly influenced by retinoic acid receptor-related orphan receptor (RAR) that maintained normal triglyceride levels. Overall, the current studies investigated the underlying different mechanisms of pentoxifylline's (PTX), mioglitazone and natural products as kaempferol (KP), Fenugreek seeds extract (FE) and Diosgenin (DSG) in NASH induced animal model. Pentoxifylline and its association with kaempferol improve NASH-associated manifestation in mice through anti-apoptotic, anti-necroptotic, antioxidant, and anti-inflammatory mechanisms. FE and DSG have a prophylactic effect against NASH induced model. FE and DSG affected several hepatic pathways including, activation of AMPK signaling, down-regulation of RAR, and inhibition of ACC1 thus inhibiting lipid accumulation in hepatocytes.

Keywords:

Diosgenin, Fenugreek, Ferroptosis, Kaempferol, NASH, Necroptosis, Pentoxifylline, Pioglitazone.

PL-07

Potential Efficacy and Proposed Mechanisms of Action of Empagliflozin for the Management of Experimentally-Induced Migraine Headache

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Abstract:

Migraine is a primary headache disorder that is listed as the sixth most disabling disorder globally. The particular migraine pathophysiology is not completely understood. Recently, epigenetics provided new insight into migraine pathogenesis and therapeutic response elucidation. Despite advances in therapeutic progress, migraine treatment is still unsatisfying. Triptans (e.g., zolmitriptan (ZOL)), a chief option for acute migraine treatments, have many central and cardiovascular adverse effects as well as poor membrane penetrability which may negatively influence their efficacy. Sodium-glucose co-transporter-2 inhibitors (e.g., empagliflozin (EMPA)), are a class of antihyperglycemic agents that can efficiently cross the

blood-brain-barrier to maintain glucose homeostasis. EMPA has myriad pharmacological actions with potential beneficial effects for migraine management. Thus, the current study aimed at exploring potential EMPA efficacy and mechanisms for treating migraine headache, emphasizing epigenetic mechanisms.

Using an animal model of migraine headache, the effect of oral/intranasal EMPA relative to ZOL on migraine headache serum pain marker; Substance-P and migraine symptoms; pain, and photophobia were assessed biochemically and behaviorally, respectively. Further, the influence on the expression of HDAC6/CGRP/CREB pathway components, Mir155-5P, 5HT1D, and c-fos in brain tissue was determined by qRT-PCR. Additionally, serum and brain serotonin levels as well as blood sugar/amylin levels were all assessed using ELISA technique.

Results showed that both oral and intranasal EMPA significantly reduced migraine headache as evidenced by the decreased serum level of substance-P and pain symptoms. The intranasal route showed more powerful EMPA-induced pain reduction than the oral route. EMPA significantly increased brain serotonin levels and modulated the HDAC6/CGRP/CREB pathway, while ZOL acts by increasing brain serotonin levels and CGRP/CREB pathway without affecting the HDAC6 epigenetic pathway. Unlike intranasal EMPA, ZOL and oral EMPA demonstrated significant hypoglycemic effects.

In conclusion, intranasal EMPA is a safe promising option to manage migraine headache that can modify altered migraine epigenetics.

Keywords:

Migraine, Epigenetics, Zolmitriptan, Empagliflozin.

PL-08

Crosstalk between Renin-Angiotensin System and Neuropilin Pathways in Adjuvant-Induced Rheumatoid Arthritis in Rats

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Abstract:

Rheumatoid Arthritis (RA) is a serious autoimmune disease, characterized by aggressive synovial hyperplasia causing articular joint destruction. The renin-angiotensin-system (RAS) is an important inflammation and tissue damage modulator whose components are expressed in the synovial tissues. Neuropilin-1 (NRP-1) is also expressed in synovial tissue and was recently found to be involved in RA pathogenesis. Herein, the crosstalk between RAS and NRP-1 pathways in RA was verified via testing the influence of RAS disruption, using valsartan/ramipril, on NRP-1 ligands binding, dimerization, and downstream-signaling. The potential efficacy of valsartan/ramipril on RA regression was compared to the standard of care; methotrexate.

RA was experimentally induced using complete Freund's adjuvant intra-articular injection. Twenty days post-RA induction, rats received oral methotrexate (0.5mg/kg/3

times/week), valsartan (30 mg/kg/day), and ramipril (10 mg/kg/day), for 14 days post-RA induction. Knee joint swelling was assessed weekly by measuring knee-joint diameter. The influence of RAS blockade on NRP-1 dimerization and ligand binding was detected by western blotting and visualized by immunohistochemistry using specific antibodies to the dimerization, VEGF-165, and Sema-3A binding domains. In addition, the impact on NRP-1 ligands; VEGF-165 and Sema-3A, and Rho/Erk signaling expression was assessed by q-RT-PCR. Moreover, RA inflammatory markers; anti-CCP, TNFα, and IL-1β and bone-remodeling marker; RANKL, were assessed by ELISA. Furthermore, knee joints and synovium tissues were histopathologically graded and visualized using a scanning electron microscope, where electron micrographs were subjected to morphometric analyses.

Results revealed a significant decrease in the expression of NRP-1 domains available for eitherVEGF-165 and Sema-3A binding or NRP-1 dimerization as well as ERK following valsartan treatment relative to either methotrexate or ramipril. Alternatively, methotrexate had a greater influence on RA inflammatory markers, osteoclastogeneses, and histological grade.

In conclusion, angiotensin receptor blockade has a great impact on NRP-1 signaling at ligand, receptor, and signal transduction levels with potential efficacy for RA treatment.

Keywords:

Adjuvant Induced Arthritis, Methotrexate, Neuropilin, Ramipril, Valsartan.

PL-09

Cisplatin-Induced Liver Failure via Changes in Drug-Metabolizing Enzymes, Redox Status, Apoptotic and Inflammatory Markers: Mitigating Role of Ginseng

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Abstract

Cisplatin is one of the most effective chemotherapeutic medications, it triggers detrimental side effects. The present study investigated the role of ginseng as one of the strongest antioxidants against liver toxicity induced by cisplatin in rats. Animals were treated intraperitoneally with cisplatin (4 mg/kg BW/week) for three months. Cisplatin provoked liver drug-metabolizing enzymes destruction particularly, cytochrome P450, cytochrome b5, amidopyrine N-demethylase, aniline 4-hydroxylase, and NADPH cytochrome C-reductase. Additionally, it caused a significant disturbance in the gene expression of hepatic phase I enzymes (Cytochrome P1A1, Cytochrome P2E1, Cytochrome P2D6, and Cytochrome P3A4). Cisplatin increased liver tumor necrosis factor-alpha (TNF- α), interleukin 6 (IL-6), cyclooxygenase-2 (COX-2), transforming growth factor (TGF-β), necrosis factor kappa-B (NF-κB), p53 tumor suppressor protein and Caspase-3. In a cisplatin-induced hepato-pathological response, oxidative stress is one of the

upstream processes that reflect varying degrees of liver damage. Liver histological and histochemical picture documented the hazard effect of cisplatin. Co-administration with ginseng (100 mg/kg BW/day) obviously neutralized the hepatotoxicity induced by cisplatin and counteracted its tissue damage. These results suggested that ginseng as an antioxidant agent possesses protective effects against hepatotoxicity induced by cisplatin via restoring the drug-metabolizing enzymes, reducing oxidative stress and inflammation, and reforming the apoptotic factors.

Keywords:

Cisplatin and ginseng, Hepatotoxicity, Drug-metabolizing-enzymes, Oxidative-stress/Inflammation, Apoptosis.

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PC-01

Development and Validation of a Liquid Chromatographic Method for Determination of Reserpine Residues for Cleaning Validation in Solid Production Line

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Abstract:

Cleaning validation is a fundamental part of current good manufacturing practices in any pharmaceutical industry. Nowadays, several pharmacologically potent pharmaceuticals are manufactured in same production area. Carefully designed cleaning procedure and its validation can ensure that residues of the API will not carry over and cross contaminate the subsequent product. The cleaning procedures must be validated and the methods to determine trace amounts of drugs have therefore to be considered with special attention. A high-performance liquid chromatographic (HPLC) method for the assay of reserpine residues in swab and rinse samples collected from various surfaces involved in drug product manufacture is described. Residues were determined by high-performance liquid chromatography on a C18 BDS Thermohypersil 25 cm × 4.6 mm, 5 µm column at 25°C in the isocratic mode using 1: 1 mixture of acetonitrile and aqueous ammonium chloride solution (1 : 100 w/v), maintained at pH 5.6 as the mobile phase.

UV detection was performed at 218 nm. The method was validated over a concentration range of 24 - 320 ng/mL. Accuracy and precision of the method were also studied. The limits of detection and quantitation were evaluated to be 8 and 24 ng/mL, respectively. The stability of reserpine at different steps of the sampling procedure and the precision of the swabbing procedure were also investigated.

Keywords:

Cleaning validation, Reserpine, HPLC, swab and rinse sampling.

PC-02

A Sustainable and Technically Smart Spectrophotometric Manipulation of PAXLOVID; a Comprehensive Ecological and Analytical Performance Rating

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Abstract:

The last update for the use of ritonavir (RIT)-boosted nirmatrelvir (NMV) was on May 25, 2023. The Food and Drug Administration (FDA) authorized their administration for the treatment of mild to moderate COVID-19 in individuals who are at a high risk of developing severe COVID-19. Targeting sustainability and environmental friendliness is as vital as validating the recently established methodologies. In concordance with these, simple, eco-friendly, and sustainable spectrophotometric methods were established for the concurrent estimation of RIT and NMV in their newly launched co-packaged pills. The suggested solutions for resolving the spectral overlap were the mathematically manipulated methods namely, first derivative method (^{1}D), second derivative method (^{2}D), and dual wavelength zero-order method (DWZ). Using

Ethanol, as a green diluting solvent, the linearity range was adjusted (10–250 µg/mL) for both drugs. The procedures showed high correlation coefficient (not less than 0.9996) and satisfactory levels of detection and quantification. Additionally, the methods' validation was performed in accordance with International Council for Harmonization norms. Moreover, a detailed ecological and sustainability evaluation protocol was established to confirm the methods' greenness and whiteness. Finally, the proposed methods along with the reported methods analyzing NMV and RIT were reviewed analytically and ecologically.

Keywords:

COVID-19, ritonavir, nirmatrelvir, spectrophotometric methods, eco-friendly, sustainable.

PC-03

ICH Validated Spectrophotometric Assay of Two Quinolones with Dexamethasone in Pharmaceutical Eye Drops containing Benzalkonium Chloride as Preservative

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Abstract:

Pharmaceutical antibiotic eye drops are frequently used for eye infections or post-operative as prophylaxis. Quinolones are widely prescribed for both ear and eye bacterial infections in combination with a corticosteroid acting as an anti-inflammatory to relief the inflammation, redness, swelling and itching accompanying the infection. In the international market, dexamethasone combination with Gatifloxacin or Ofloxacin is widely used in ophthalmic solutions for treatment of ocular bacterial conditions. Meanwhile, these multi-dose ophthalmic preparations require preservation to maintain their sterility. Thus, Benzalkonium chloride is commonly added to these pharmaceutical drops as a preservative. Besides its bactericidal activity, it may act as a corneal penetration enhancer for the co-formulated drugs. This work shows direct and derivative ratio spectrophotometric methods for the determination of these two binary mixtures in the presence of benzalkonium chloride without any interference. The methods were fully validated according to the International Conference on Harmonization (ICH) guidelines. The reliability and analytical performance of the proposed procedures were statistically validated with respect to linearity, range, precision, accuracy, selectivity and detection & quantitation limits. Linear regression lines were obtained

yielding high correlation coefficient values (higher than 0.999). Green analytical procedures are becoming very important nowadays and can be applied by using green sample pretreatment, using eco-friendly solvents and reagents, less energy consumption and short analysis time. Greenness assessment was performed by Green Analytical Procedure Index (GAPI) and Analytical GREEnness (AGREE) Metric Approach.

Keywords:

Gatifloxacin, Ofloxacin, Dexamethasone, ICH, Green methods.

PC-04

Validated HPTLC Method for the Analysis of Two Ternary Mixtures Used as Supportive Care for Cancer Patients

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Abstract:

Mild and moderate cancer associated pain is usually managed by treatment with opioids and analgesics. Thus, a reliable, simple and rapid high performance thin layer chromatographic – HPTLC method had been proposed and validated for estimation of two ternary mixtures that can be used as supportive therapy for pain relief in cancer patients. The two mixtures are composed of Tramadol (TMD), Dicyclomine (DIC) with either Domperidone (DOM) (Mixture 1) or with Paracetamol (PAR) (Mixture 2). Chromatographic separation of the two ternary mixtures was performed on aluminum plates coated with "silica gel 60 F_{254}" while the solvent system consisted of ethyl acetate: methanol 4:6 (v/v). Densitometric scanning of the separated zones was done at 210 nm for both mixtures and the retardation factor (R_f) values were 0.36, 0.60, 0.89 and 0.92 for TMD, DIC, DOM and PAR, respectively. The method validation was performed in accordance to International Conference on Harmonization guidelines covering all validation parameters as linearity, range, accuracy, precision and specificity. Linearity ranges were 0.1-2.4 µg/band, 0.2-6 µg/band, 0.2-1.2 µg/band and 0.2-3.25 µg/band for DIC, TMD, DOM and PAR,

respectively. In addition, the proposed chromatographic technique was successfully applied to the assay of the three drugs in each mixture in laboratory prepared tablets to mimic the dosage forms with their excipients. The proposed method can be considered a high throughput and simple technique for routine analysis of these two mixtures in their bulk and tablets dosage forms.

Keywords:

HPTLC, Tramadol, Dicyclomine, Domperidone, Paracetamol, Supportive-cancer therapy.

PC-05

Exploring Potential Intracellular Allosteric Modulation of CCR4 Protein Using MD Simulations

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Abstract:

CCR4 is a member of the CC chemokine family, identified as a drug target for the treatment of inflammatory diseases such as asthma, atopic dermatitis. It is also suggested to play a role in cancer, including T-cell lymphomas and immunomodulation of tumor immunity through regulatory T cells. Thus, CCR4 represents an interesting drug target for treatment of such diseases. There are currently no FDA approved drugs for CCR4. Inhibition of chemokine receptors is achieved by binding molecules to either the orthosteric or the allosteric pocket. Recently, an intracellular allosteric binding site (IABS) has been reported in four chemokine receptors: CCR2, CCR7, CCR9 and CXCR2. Allosteric modulators represent an area of huge pharmaceutical interest, owing to their ability to remotely

modulate the activity of the natural orthosteric ligand and being less conserved thus presenting a chance for the discovery of selective ligands. In this work, we aim to explore the potential presence of an IABS in CCR4. Overlay of the structure of CCR4 on the crystallized coordinates of CCR2 showed high sequence identity and similarity in the IABS of 80% and 100%, respectively and an RMSD of 0.92 Å. A series of pyrazinyl-sulfonamide CCR4 antagonists has been reported to require access to the cytoplasm for their activity suggesting the presence of IABS. Accordingly in this work, we attempt to check for the presence of IABS in CCR4 protein. A 100-ns MD simulation of the inactive state of CCR4 bound to a pyrazinyl sulfonamide compound, a previously reported CCR4 inhibitor, showed high stability and supporting its potential binding to the IABS of CCR4. Our results support the presence of an IABS in CCR4 similar to that of CCR2, highlighting key residues crucial for allosteric modulation and thus provide structural insights for future design of ligands binding in this pocket.

Keywords:

CCR4, GPCR, allosteric modulators, MD simulation.

PC-06

Design, Synthesis and Biological Evaluation of New Substituted Pyrimidine Derivatives

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Abstract:

A series of novel substituted 5-cyano pyrimidine derivatives **[III (a-f) & IV (a-f)]** were designed, synthesized, and evaluated for their antibacterial activity against different microorganisms. Compounds (**III e & IV f)** displayed a promising antibacterial activity against Gram-positive and Gram-negative bacteria *S. aureus* and *B. subtilis* respectively compared to the reference drug amoxicillin. Selected compounds of candidate series **(III)** were evaluated for their antiproliferative activity against 60 cell lines through the National Cancer institute (NCI-MSD, USA) screening program. The preliminary screening results showed that **(III a)** had moderate cytotoxic activity against CNS cancer SNB 75 cell lines with 35% Growth inhibition. Nevertheless, compounds (**III a** and **IV a)** displayed enzymatic inhibition effect toward EGFR and CDK2 enzymes (EGFR: 56.57± 1.81 µM, 25.02 ± 0.94 µM CDK2: 84.68 ± 2.06 µM, 63.48± 2.14 µM). The encouraging results of the preliminary screening of the antibacterial activity suggest the potential of the synthesized

compounds to be considered as a potential antibacterial agent consequently need further investigation.

Keywords:

Pyrimidines, Antibacterial activity, Antiproliferative activity, Biginelli.

أوركيديا
للصناعات الدوائية

تحتل أوركيديا المرتبة الأولى
على مستوى السوق المصرى
من حيث قيمة المبيعات فى
مجال الرمد

50 منتجًا تقوم أوركيديا بتصديرهم

36 دولة أجنبية نصدر إليها

8 على مستوى السوق المصرى من حيث قيمة المنتجات المصدرة للخارج

1 أول شركة متخصصة فى قطرات العيون بالشرق الأوسط تعمل بتقنية (BFS) وهى تكنولوجيا لتعبئة وتصنيع القطرات دون تدخل بشري

1 أول شركة متخصصة فى قطرات العيون بالشرق الأوسط تقوم بإنتاج قطرات أحادية الجرعة وهى تكنولوجيا لإنتاج قطرات خالية من المواد الحافظة

عنيك عنينا

بدأت الحملة فى عام ٢٠١٨ بمبادرة من شركة أوركيديا و جمعية صناع الخير لمكافحة مسببات العمى
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عدد المستفدين من القوافل ١,٠٠٠,٠٠٠

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PP-01

Formulation and Evaluation of Luteolin-loaded Nanogel: A Promising Nanomaterials Platform for Skin Regeneration

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Abstract:

Luteolin is a flavonoidal compound with strong anti-inflammatory and antioxidant properties. It suffers from challenging physicochemical properties that limited its use as topical healing agent. The aim of this work is the development and characterization of luteolin nanogel using anti-solvent precipitation technique for improved physicochemical properties of luteolin for skin regeneration. The nanoparticles were nano-sized (255.4±3.20 nm) with high negative charge (-38.90±4.90 mV) and good dispersibility with entrapment efficiency and drug content in between 99% and 100% respectively, demonstrating almost no drug loss. In addition, the *in-vivo* assessment for wound healing efficiency and skin regeneration was carried out to evaluate and compare the activity of different formulations of luteolin nanogel. Three different doses were

investigated to select the optimum dose. Further investigations were done to assess the effect of luteolin on the modulation of the immune wound niche and wound healing promotion. ELISA investigations were carried out for IL-17A, IL-13, and VEGF serum parameters as well as PCR quantification for miR-223. The *in-vivo* results confirmed the superiority of hyaluronic based luteolin nanogel in wound healing and skin regeneration by modulation of cytokines and growth factors involved in inflammatory and proliferative phases of skin regeneration.

Keywords:

Luteolin, nanogel, skin regeneration, miR-223.

4th PUA International Conference
Perspectives in Pharmaceutical Sciences;
"Digitalization and Sustainability"
Faculty of Pharmacy
April 27, 2024
Pharos University in Alexandria, Alexandria, Egypt

PP-02

Formulation and Evaluation of Paliperidone Controlled Release Dosage Form Using Liquisolid Technology

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Abstract:

Paliperidone (PAL) is a drug used in the treatment of schizophrenia. This work aims at sustaining the release of paliperidone by a new technique called "Liquisolid technology" in which the drug was mixed with a non-volatile vehicle, carrier and coating materials to change drug solution into powder admixtures that were compressed into tablets. This work is the first of its kind to apply a simple low-cost technique "Liquisolid technology" to increase the bioavailability and sustain PAL release compared to the brand product technique which used the patented expensive OROS technology. The produced PAL formulations were characterized by pre-compression studies; for example, measuring angle of repose, % Carr's index and Hausner ratio to test its flowability. In addition, post-compression studies were carried out to choose the optimum formula, such as: differential scanning calorimetry (DSC), Fourier Transform Infra-red (FT-IR), weight uniformity, content uniformity, thickness, diameter, hardness, disintegration, friability tests for produced tablets and *in-vitro* release studies to test the sustained release properties for the tablets. The selected

PAL formula showed acceptable flowability parameters. Also, the selected formula showed acceptable results with respect to quality control tests; 467.58 ± 0.67mg, 95.15 ± 4.123 %, 0.42 ± 0.004 cm, 1.012 ± 0.007 cm, 0.60 ± 1.952 mN, 118.2 ± 6.196 min and 0.90 ± 0. 712 % regarding weight uniformity, content uniformity, thickness, diameter, hardness, disintegration and friability tests, respectively. Formula with 20% PAL showed conversion of PAL from crystalline to amorphous in DSC test and showed no compatibility issues between PAL and other ingredients in FT-IR findings. Regarding *in-vitro* release, suggested PAL formula showed sustained release profile for PAL very close to comparator product (Invega®). Finally, *in-vivo* evaluation for the selected formula was performed and it achieved very close parameters, such as, Cmax, Tmax and AUC compared to the control PAL formula.

Keywords:

Paliperidone, Liquisolid Technology, Carrier, Vehicle, Flowability, Quality control, Sustained release.

PP-03

Exploring the Potential of Repurposing Celecoxib with Chitosan Nanoparticles for Anti-Toxoplasmosis Effect: *In Vitro* and *In Vivo* Study

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Abstract:

Toxoplasma gondii is a parasitic protozoan that can infect humans and animals causing serious complications, including encephalitis, pneumonia, and eye problems. In pregnant women, the parasite can be transmitted to the fetus, leading to congenital disabilities or even stillbirth. Celecoxib is a drug known for its anti-inflammatory properties, and chitosan nanoparticles can enhance drug delivery. This combination may lead to improved efficacy and reduced side effects compared to traditional treatments for toxoplasmosis. The aim of this study was to explore the potential of repurposing celecoxib with chitosan nanoparticles for its anti- toxoplasmosis effect on the murine model of acute toxoplasmosis.

Chitosan nanoparticles encapsulated celecoxib were prepared using emulsion-ionic gelation technique and characterized by entrapment efficiency, particle size (PS), zeta potential (ZP),

polydispersity index (PDI) and transmission electron microscope (TEM) images. The in vivo study was performed in a mouse model to monitor for infection progression, parasite load, survival rate and histopathological examinations of liver and spleen tissues.

The Celecoxib nanoparticles exhibited a spherical shape without aggregations, with PS, ZP, and PDI measuring 160.43±35.5 nm, 10.4725±2.09 mV, and 0.297, respectively. Fourier-transform infrared (FTIR) analysis indicated no excipient interaction. Transmission electron microscopy (TEM) images revealed nanoparticles adhering to the surface of tachyzoites, leading to disruption of plasma membranes and distortion of shape. In terms of efficacy, the survival rate analysis showed that treatment with celecoxib nanoparticles at a lower dose of 0.1 mg and shorter duration of 3 days resulted in a significantly higher survival rate compared to the standard treatment of sulfamethoxazole at 0.2 mg and longer duration of 7 days ($p<0.01$).

Celecoxib demonstrated significant anti-Toxoplasmosis effect when delivered using chitosan nanoparticles. This repurposed application has the potential to lower drug costs and promote sustainable drug use.

Keywords:

anti-toxoplasmosis, anti-parasitic activity, toxoplasma gondii, celecoxib, repurposing, chitosan, nanoparticles.

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PM-01

Assessment of Knowledge, Attitude and Practice regarding Drug Disposal of Unused Medications: Online Survey

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Abstract:

Medication waste is a public health problem affecting developed and developing countries. According to the World Health Organization, a large amount of medicine is inappropriately prescribed or sold, resulting in tons of solid waste of expired and unused medications leading to medication disposal burden.

A survey study was conducted within two months in Alexandria from 15th March to 15thMay 2023. The questionnaire was distributed to participants via social media channels. The questionnaire was constituted of 22 items divided into four sections: demographic information, knowledge, practice and attitude regarding the disposal of unused or expired medication.

The survey involved 408 responders with nearly two-thirds were female and about 95% educated. A 69% of the respondent had a previous knowledge about medicine waste and 97% responded that unsafe disposal of unused or expired medicine poses a threat to human health and can harm the environment. A (92.4%) of participants have unused quantity of purchased medication. The main reasons for the unused/expired medicines at home were improvement in medical condition (72.04%)

followed by change of medication by prescribers (19.6%). A (32%) of the respondent through the unused medication in household garbage, (22%) keep the medication at home till expired, (11%) flash unused medication in sink and only 11% return the unused medication to pharmacy. The majority of respondents believed the risk stemmed from the presence of an undesired drug in the home, the potential harm to children, a lack of proper information on safe disposal practices, and the necessity for a take-back program. A (92%) of the participants agreed on that the health care professionals should provide advice on safe drug disposal.

In conclusion, patients' education regarding safe medication disposal and availability of medication disposal program is necessary to improve appropriate medication waste methods and decrease possible environmental harm.

Keywords:

Medicine disposal, unused medication.

PM-02

The Anti-angiogenic Activity of Anti-IL-17 and Anti-CCL20 in Breast Cancer Tumor Microenvironment

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Abstract:

Breast cancer remains a significant global health challenge, necessitating innovative therapeutic approaches. Despite of the good prognosis of primary breast cancer, once it metastasizes the prognosis drops markedly. The complex interplay between malignant cells and the surrounding microenvironment is a critical determinant of cancer progression that plays a pivotal role in sustaining tumor growth and facilitating metastatic dissemination. IL-17, a pro-inflammatory cytokine, and CCL20, a chemokine implicated in immune cell recruitment, have been linked to tumor progression and angiogenesis. Accordingly, we aimed in the current study to assess the impact of IL-17 and CCL20 monoclonal antibodies on pro-angiogenic factors such as CD31 on breast tumor tissue cultures. The results showed a significant decrease in the expression of the angiogenic marker CD31 in the breast tumor cultures cultured in the presence of Anti-IL-17 and Anti-CCL20 compared to the untreated tumor tissue cultures ($p<0.0001$) with superior activity to Anti-IL-17 antibody. These results highlight the promising role of targeted inhibition of IL-17 and CCL20 attenuating angiogenic responses

in breast cancer, potentially disrupting the intricate interplay between the immune system and tumor microenvironment.

Keywords:

Breast cancer, Angiogenesis, tumor microenvironment, Anti-IL-17, Anti-CCL20.

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PN-01

Resistance Profile of Pathogens Causing Neonatal Sepsis in Neonatal Intensive Care Unit at Alexandria University Children Hospital

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Abstract:

Sepsis caused by multidrug resistant pathogens is a significant cause of morbidity and mortality. This study was conducted to identify resistance profile of pathogens causing early and late onset neonatal sepsis, estimate their incidence rates and guide antibiotic stewardship programs.

A retrospective, medical records review, cohort study was conducted on neonates admitted to El-Shatby neonatal intensive care unit at Alexandria University children between December 2017 and December 2019. In addition to all ordered cultures between January 2018 and December 2019. WHONET® software was used to calculate the level of susceptibility of isolates and prevalence of different types of resistance. Bacterial isolates non-susceptible to at least one agent in three or more antimicrobial categories were considered Multidrug Resistance.

Those susceptible to only one or two categories were considered Extensive Drug Resistance and those non-susceptible to all tested agents in all tested antimicrobial categories were considered Pan Drug Resistance.

Late onset sepsis was the most common form of neonatal sepsis. The incidence rates, early and late onset multidrug resistant bacterial sepsis were 27 and 101 per 1000 birth lives respectively. In both Early and late onset sepsis, Gram-negative bacteria dominated with *Klebsiella pneumoniae* being the main isolated one. 58.1% susceptible to Colistin, >75% resistant to Carbapenem. *Staphylococcus aureus* was the main isolated Gram-positive pathogen 10% non-susceptible to linezolid. 47.4 % of bacterial isolates were Extensive Drug Resistance. Alarming Extensive Resistance was found among *Enterococcus*, *Acinetobacter* and *Klebsiella pneumoniae isolates*. Fungal sepsis caused by *Candida* was more common in late onset sepsis (22.8%) than early onset sepsis (11.4%).

Antibiotic stewardship programs should focus on initiating empiric antibiotic therapy targeting multidrug resistant *Klebsiella pneumoniae* and Methicillin resistant *Staphylococcus aureus*, and to reserve last resort antimicrobials by preauthorization and restriction of Colistin, Linezolid and Carbapenems.

Keywords:

Neonatal Sepsis, Level of Susceptibility, Multidrug Resistance, Neonatal Intensive Care Unit & Resistance Profile.

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Students' Abstracts

S-02

Using the Natural Eco-Friendly Phytochemical, Methyl Dihydrojasmonate, for Management of Huntington's Disease: An *In-vitro*/*In-vivo* Evaluation

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Abstract:

Methyl dihydrojasmonate (MJ) is an environmentally friendly hormone derived from jasmine flowers. Recently it has demonstrated neuroprotective effects in preclinical studies, suggesting its potential in improving neurodegenerative conditions. Ongoing research explores the integration of nanotechnology formulations to enhance the characteristics of MJ, aiming to optimize its delivery, bioavailability, and targeted release in an animal model of Huntington's disease (HD). MJ-loaded solid lipid nano-carriers (MJ-NLCs) were prepared using the hot homogenization method. Some blank formulations were also prepared using the same procedure. The prepared formulations were later subjected to visual inspection and

examination under the microscope to detect any separated oil droplets, phase separation, or any signs of physical instability. Male Sprague Dawley rats were injected with 3-nitropropionic acid to induce HD and then treated with MJ, NLCs, or MJ-NLCs for 21 days. HD progression was assessed using behavioral tests.The prepared MJ-NLCs were characterized for their colloidal properties in terms of PS, PDI, Zeta potential, morphological appearance, and drug release pattern and they showed acceptable colloidal properties and sustained release profile. Rats treated with MJ-NLCs have shown significant improvement in the behavior score, rotarod performance, Y-Maze, and open field evaluation indicating improvement in spontaneous motor activity and spatial working memory. In conclusion, the current study elaborates on the role of solid lipid nano-carriers in enhancing the MJ characteristics showing advancement in the neurological signs of the HD rat model. This opens a new perspective on using nature-derived methyl dihydrojasmonate in addressing neurological health challenges.

Keywords:

Methyl dihydrojasmonate, Huntington's disease, Phytohormones, Solid lipid nanoparticles, Passive targeting.

S-03

Smart Handy Plate: Can it help in Microbiology Practical Sessions?

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Abstract:

As the number of infectious diseases increases, the demand for simple ways to identify the cause of these diseases also increases. One of the primary techniques to identify any organism is the pure cultures using agar plates. Pure cultures are still used because of their cost and time effectiveness in identifying the organism, in addition, assessing the bacterial susceptibility to antibiotics and colony enumeration. Techniques that use digitalization to improve the interpretation of cultural results are developed to save more time and improve clinical decisions. One of these techniques is using an automated plate assessment system (APAS) which matched those from manual techniques by 95.13% concerning bacterial growth pattern identification. Moreover, APAS saved the time of processing

and sorting the culture plates. The other is the semi-automatic system for colony-forming unit counting which also showed nearly similar results when compared to the manual techniques in colony enumeration and saved enumeration time. Such solutions offer accurate results but rely on non-portable and expensive instruments. Through our work, we developed a smart handy plate (SHP) with computer software to be used on a small scale to help the students in their practical sessions to identify the organism by colony morphology already stored in the software library. In addition, it enumerates the colonies by analyzing the image and applying image processing algorithms. The software showed promising results in identifying the organisms and colony enumeration. We hope in the future to add more features to SHP like antibiotic susceptibility testing (AST) and compare the results with the Clinical and Laboratory Standards Institute (CLSI) to help in the proper choice of antibiotics, thus improving clinical decisions. SHP is a simple, low-cost, portable, and promising tool in the world of digitalization in clinical microbiology.

Keywords:

Digitalization, Smart Handy Plate (SHP), Colony Morphology Identification, Enumeration, Clinical Microbiology.

S-04

Evaluating an Eco-Friendly Lipid Nanocarrier Loaded with *Coleus forskohlii* for Antimicrobial, Anti-Inflammatory, And Wound Healing Efficacy

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Abstract:

Lipid-based herbal formulations are known for enhancing the bioavailability and therapeutic efficacy of hydrophobic herbal extracts. There is a dearth of research into the impact of *Coleus forskohlii* extract on wound healing.

The lipid nanocarriers (LNCs), loaded with the crude plant extract, were prepared using the phase inversion technique. Their colloidal and physicochemical properties were thoroughly assessed. *In-vitro* characterizations included measurements of particle size, zeta potential, polydispersity index, Fourier-transform infrared spectroscopy (FTIR), and content assessment using UV-Spectrophotometry, along with an evaluation of entrapment efficiency using the ultracentrifugation method. The crude plant extract was used as reference for quantitative measurements.

Biological studies involved cytotoxicity assessments, antibiofilm assays, anti-inflammatory assays using the human red blood corpuscles membrane stabilizing method, and *in-vitro* and *in-vivo* wound closure degree assays.

Notably, the loaded-LNCs exhibited a particle size of (38.42±5.091nm) and a polydispersity index of (0.223±0.005), with a content equal to (2.7mg/mL). The entrapment efficiency for LNC-loaded *C. forskohii* extract achieved approximately 98.42% drug entrapment within the carrier. The 50% inhibitory concentration (IC_{50}) of the loaded-LNCs was (87.68±0.04µg/mL). The antibiofilm assay was conducted against different gram-positive and gram-negative bacteria as well as the unicellular fungus model. The loaded-LNCs exhibited biofilm inhibition with 58% and 46% against *C. albicans* and *E. coli*, respectively. The trial revealed compelling evidence supporting the potential of LNC-loaded *C. forskohii* extract, with a remarkable 72% anti-inflammatory activity compared to Diclofenac. Furthermore, the *in-vitro* wound scratch assay on human skin fibroblast cells showed complete wound healing after 72 hours compared to control untreated cells. Subsequently, *in-vivo* studies on wound closure degree in rats treated with loaded-LNCs exhibited complete healing of wounds within seven days. This comprehensive investigation sheds light on the therapeutic potential of *C. forskohlii*-loaded

lipid nanocarriers for wound healing, emphasizing their anti-inflammatory and anti-microbial effects.

Keywords:

Lipid nanocarriers, Nutraceuticals, Antibiofilm, Anti-inflammatory, Wound healing.

S-05

Unmasking Long-COVID: Insights into Causes, Consequences, Pathogenesis and Diagnosis

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Abstract:

The COVID-19 pandemic has deeply affected individual worldwide, causing immense suffering and tragically claiming countless lives. We have been coping with the challenges of this crisis, another concerning issue has emerged; long COVID. This condition is characterized by persistent symptoms lasting beyond 20 months post-infection with the SARS-CoV-2 virus presents a significant burden for individuals and communities globally.

Despite the hope brought by highly effective vaccines, the threat of long COVID persists, posing ongoing health and economic challenges. However, diagnosing long COVID remains complex

due to the lack of consensus on its definition and diagnostic criteria. Symptoms can vary widely, affecting individuals of all ages and initial disease severity, and may include anything from fatigue to cognitive dysfunction. Understanding the underlying mechanisms of long COVID, such as the role of extracellular vesicles (ECVs), adds further complexity to its diagnosis and management.

Our study aimed to provide a comprehensive overview of long COVID, exploring its definition, prevalence, risk factors, clinical manifestations, pathophysiological mechanisms, and complications. Additionally, we will focus on the use of Artificial Intelligence (AI) and Machine Learning (ML) techniques in improving the diagnosis of long COVID by identifying patterns and biomarkers associated with the condition. By harnessing the power of AI and ML, we hope to enhance diagnostic accuracy and develop personalized management strategies for individuals affected by long COVID.

Keywords:

Long-COVID, Extracellular vesicles, Artificial intelligence, Machine learning.

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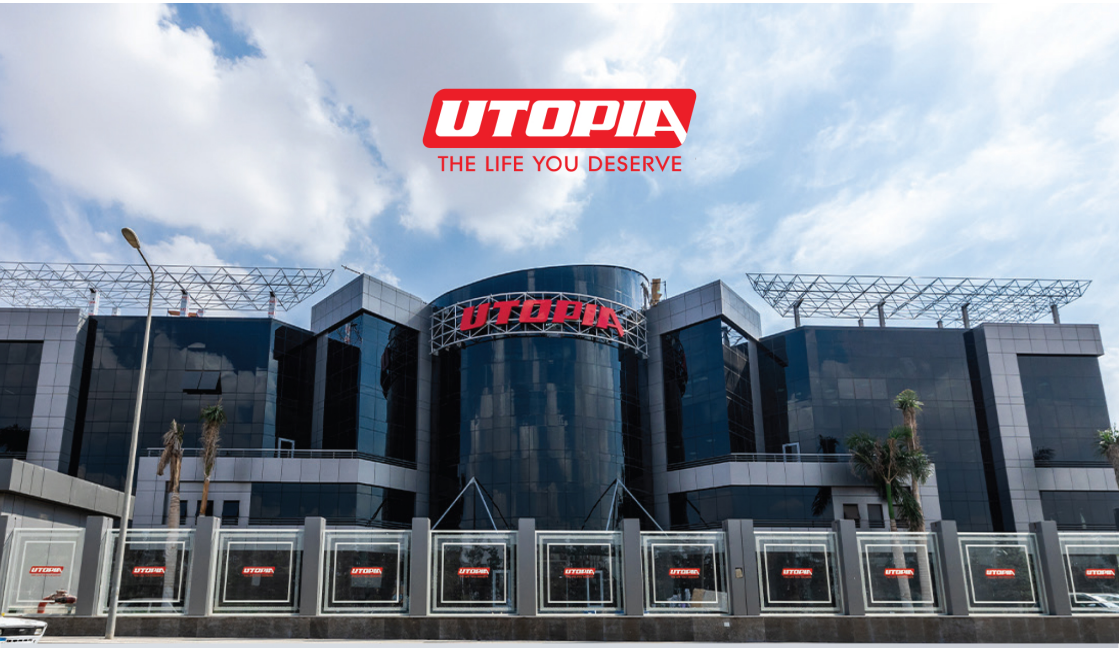

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