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About Amity University

Amity University, a leading research and innovation-driven university, has been ranked among the top 3% of universities by QS and Times Higher Education, UK (the world's leading university rankings organizations). The university is also Asia's only not-for-profit university to be awarded US Regional Accreditation by WASC, USA, and QAA, UK, setting a new standard of academic excellence in India.

Amity University has been ranked among the top universities globally, with a NIRF rank of 35th (2023) for producing the most employable graduates in a survey conducted by Times Higher Education, UK, among 9,000 employees worldwide. Amity University is the flagship institution of Amity Education Group, established over two decades ago. Today, Amity has over 175,000 brilliant students across pre-nursery to PhD levels, pursuing more than 400 programs in 90 diverse disciplines, ranging from Management to Psychology, besides future-focused areas like Renewable Energy, Nuclear Science, and Nanotechnology.

The Group is driven by its vision of building a Global Knowledge Network, providing globally benchmarked education. Today, the Group comprises 11 Universities, 28 schools, and 16 international campuses across London, Singapore, Dubai, New York, San Francisco, Amsterdam, Mauritius, Abu Dhabi, Sharjah, Tashkent, South Africa, besides India. Amity's relentless pursuit of excellence is reflected in its steadfast commitment and contribution towards cutting-edge research and innovation. For instance, Amity in the last four years has filed over 1,600 patents. It is also engaged in conducting over 300 high-end Government-funded as well as international research projects including those funded by the Bill & Melinda Gates Foundation, USAID, and Leverhulme Trust, UK. In the field of management, the university has developed over 3500 case studies in the past years that have been bought across 110 countries by 2300+ leading institutions and organizations like Harvard, Stanford, Oxford, McKinsey, and KPMG. Amity has instituted an extensive scholarship programme, benefiting over 25,000 students so far. These brilliant students have filed 100 patents and published over 1100 Scopus-indexed research papers. Today, the Amity community of outstanding students has exceeded over 120,000 alumni worldwide, who are successfully pursuing their careers in top organizations or pursuing further studies at leading institutions in top global universities like Stanford, Oxford, Harvard, and Columbia.

About Amity Institute of Pharmacy

Amity Institute of Pharmacy (AIP) is one of the premier pharmacy institutes in India with a NIRF ranking of 21st (as of 2023) offering UG, PG, and PhD programs. Currently, AIP offers a B.Pharm program with an intake of 100 and M.Pharm programs in Pharmaceutics, Pharmacology, Drug Regulatory Affairs, Pharmaceutical Chemistry, Pharmaceutical Analysis, Industrial Pharmacy, and Phyto-Pharmacy. The Institute stands amongst the top institutes with NIRF ranking and has led in the top 25 institutions in the past two years. The Institute has received several research grants over the past five years from funding agencies like SERB, ICMR, AAYUSH, and CCRUM. AIP has more than 500 Scopus/WoS listed research publications and 25 patents to its credit in the last five years in diverse research areas like novel drug delivery systems (NDDS), medicinal chemistry, neuropharmacology, phytopharmaceuticals, drug regulatory requirements and pharmaceutical analysis, etc. The thrust areas of research include NDDS for skin disorders and burns, drug discovery and development for cancer, diabetes, autoimmune diseases, neurodegenerative diseases like Alzheimer's, and Parkinson's disease, and global regulatory framework for drugs, medical devices, etc.

Objectives of PTTDCBR 2024

The conference aims to achieve the following objectives:

- Investigate the wealth of traditional knowledge from various cultures and regions that have utilized natural products, herbal remedies, and ancient practices in health and wellness.
- Examine the scientific basis behind traditional remedies and practices by elucidating the chemical and biological mechanisms of action.
- Identify active compounds and understand their interactions with biological systems. Bring together experts from diverse fields, including chemistry, biology, pharmacology, ethnobotany, and traditional medicine, to encourage collaboration and knowledge exchange and to undertake clinical and validation studies for translation.
- Consider the potential contributions of biotechnology, stem cell research, and genetic engineering to addressing modern health challenges, including non-communicable diseases, mental health, and wellness, and confirm how biotechnology complements traditional medicines.

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Message from Chief Patron

Dr. Ashok K. Chauhan

Hon'ble Founder President, Amity Education Group;
Ritnand Balved Education Foundation & Chairman, AKC Group of Companies

It is a matter of great pride that Amity Institute of Pharmacy (AIP), Amity University Uttar Pradesh (AUUP), Noida campus, is organizing the International Conference on Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals (PTTDCBR) in association with Amity Foundation for Science, Technology & Innovation Alliances (AFSTIA) and supported by Drug Research Cluster, AUUP from Wednesday, 20th March to Thursday, 21st March 2024. Pharmaceutical technology stands as the cornerstone of modern healthcare, enabling the development of novel drugs, vaccines, and therapies that alleviate suffering and enhance the quality of life. The goal of translational research, a fast-developing field in biomedical science, is to expedite and simplify the integration of scientific findings into clinical settings. In this context, I am pleased to note that the conference aims to provide a platform for comprehensive and intensive deliberations on traditional knowledge systems and to explore the symbiotic amalgamation of traditional medicines with modern systems of medicines encompassing biotechnology.

I extend my hearty welcome to all eminent speakers, distinguished subject experts, scientists, researchers, and worthy participants from various national and international universities, institutions, and research establishments. I am sure that their brainstorming on such an important area would pave the way for forging bonds and mutual cooperation, undertaking joint research projects and joint publications, achieving long-term goals, and establishing significant and long-term contacts for mutual benefits. It will be an equally enriching experience for brilliant faculty members, scientists, research scholars, students, and other participants.

I appreciate the Defence Research and Development Organisation (DRDO), the Department of Science & Technology (DST), and the Science Engineering Research Board (SERB) for sponsoring the conference. My sincere appreciation to all the members of the Organizing Technical Committee and Scientific Evaluation Committee and to Dr. Havagiray R. Chitme, Deputy Director (Research), AIP & convener of the conference as well as the co-conveners of the conference Dr. Tanveer Naved, Dr. Viney Lather and Prof. Mallika Pathak for their dedicated involvement and earnest engagement in the conference. I also recognize the efforts of all members of the Organizing Committee including the Organizing Secretary, Dr. Navneet Sharma, all joint secretaries, student coordinators as well as the dedicated faculty members, research scholars, fellows, brilliant students, and staff, who under the valuable guidance of Dr. Balvinder Shukla, Vice Chancellor, AUUP, have made all praiseworthy efforts to ensure the success of the conference. The most strategic and visionary leadership of Dr. Atul Chauhan Ji, Chancellor, AUUP and President, Ritnand Balved Education Foundation (RBEF), would lead to outcome-based and result-oriented success of the conference, which is the soul and essence of any conference.

I once again extend a warm welcome to all the participants and convey my best wishes for the success of the conference!

Message from Patron

Dr. Atul Chauhan

Hon'ble Chancellor, Amity University Uttar Pradesh, Noida;
President, Ritnand Balved Education Foundation; & CEO, AKC Group of Companies

On behalf of Amity University, Noida, it gives me immense pleasure to greet you all at the two-day International Conference on Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals, 2024, from March 20th to 21st.

Amity Education Group is not only a collection of top-notch educational institutions, but it is also an experience where those involved share a dream and a mission to ensure that we develop genuinely exceptional talents and leaders. Indians possess the intelligence, talent, and capacity to outperform any other people in the world. For this reason, in 1986, we founded the Ritnand Balved Education Foundation with the goal of establishing educational institutions that will develop the next generation of leaders into whole, morally driven human beings and skilled professionals who have a strong sense of humanity. These are the folks that are going to rule the globe in the future. We feel honored that Amity is now known for its practical, industry-focused education and that it draws the top students and instructors to help develop them. The fact that our graduates work for the greatest organizations in the world is a credit to both our incredibly gifted professors, who instill in every student a sense of dedication, sincerity, and loyalty through their example, and to all the corporations who enthusiastically support our objective.

The nexus of chemistry and biology is a legacy of the strength of multidisciplinary cooperation and creativity in the pharmaceutical industry at a time when scientific discoveries are continually stretching the limits of what we know and are capable of. In the ongoing effort to improve human health, Pharma Technology & Translational Development in Chem-Biology Research stands at the leading edge. Through the use of chemistry, biology, and translational science, scientists are laying the groundwork for the creation of novel treatments that could improve the lives of millions of people worldwide. As we look to the future, let us continue to support and invest in this important work, knowing that the discoveries made today will shape the healthcare landscape of tomorrow.

We recognize the efforts of various individuals and sponsors in making this event successful.

I extend my best wishes for PTTDCBR 2024!

Message from Co-patron

Prof. (Dr.) Balvinder Shukla

Vice Chancellor, Amity University Uttar Pradesh

It gives me immense pleasure to share that Amity Institute of Pharmacy is organizing an International Conference on 'Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals' (PTTDCBR 2024) from March 20-21, 2024 at Amity University, Noida, Uttar Pradesh.

This conference presents a timely and crucial platform to explore the exciting convergence of pharmaceutical technology, translational research, and the immense potential of traditional biopharmaceuticals. As we strive to address the ever-evolving healthcare landscape, this unique synergy holds tremendous promise for the development of novel therapeutic strategies and improved patient outcomes.

The focus on traditional biopharmaceuticals is particularly noteworthy. Leveraging the wisdom of indigenous knowledge systems and natural resources offers a valuable avenue for drug discovery and development. By integrating these age-old practices with cutting-edge scientific advancements, we can unlock a treasure trove of possibilities in the realm of medicine.

I am confident that the esteemed speakers and researchers assembled for this conference will engage in stimulating discussions and share groundbreaking research findings. This collaborative exchange of ideas will undoubtedly foster innovation and pave the way for significant contributions to the field of pharmaceutical sciences.

I congratulate and commend the efforts and devotion of the organizing team of AIP for organizing the conference on such an important theme.

I am certain that the conference will be a resounding success, fostering knowledge exchange, propelling scientific discovery, and ultimately contributing to the betterment of global health.

Prof. (Dr.) Balvinder Shukla
Co-Patron, PTTDCBR 2024
Prof. Dr. Balvinder Shukla
Vice Chancellor, Amity University Uttar Pradesh

Message from Chief Advisor

Dr. W. Selvamurthy

President, Amity Science, Technology and Innovation Foundation (ASTIF),
Amity University Uttar Pradesh

This 2nd PTTDCBR Conference on Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals is yet another effort to traditionally bring the students, researchers, post-doctoral fellows, and young investigators together for deeper exploration of pharmaceutical technology and translational development, revealing the union of biology and chemistry as a crucial intersection directing the course of contemporary drug discovery. It gives me great pleasure to talk about the changing face of research today, where pharmacotherapy is taking on new forms thanks to interdisciplinary partnerships and cutting-edge approaches.

The conference will act as a perfect platform for interaction and provide immersive, innumerable knowledge of combinatorial chemistry, computer modeling, pharma technology, and the ever-changing field of research, where pharmacotherapy is being reshaped by interdisciplinary collaborations and novel methodologies.

I appreciate and applaud the efforts of the organizing team toward the successful completion of the herculean task of putting together countless ideas to make this event meaningful and successful.

My best wishes and blessings in future endeavors.

Dr. W. Selvamurthy

Message from Chairperson

Dr. B.C. Das

Chairman & Hargobind Khorana Chair Professor, Amity Institute of Molecular Medicine & Stem Cell Research (AIMMSCR), Amity University Uttar Pradesh

I am elated to know that Amity University Noida campus is organizing a two-day International Conference on Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals 2024 from March 20th to 21st, 2024, to be organized at Amity University, Noida, Uttar Pradesh.

This event offers an important opportunity to enhance your understanding of Pharma Technology & Translational Development in Chem-Biology Research. I am certain that you will find great information regarding the subject. I trust that you will embrace the conference's message of interest and inclusion and that you will find the experience enriching. The goal of translational development is to close the knowledge gap that exists between lab research and clinical implementation. Translational development in the context of traditional biopharmaceuticals is refining manufacturing procedures and bioprocessing methods to maximize output while maintaining product efficacy, safety, and quality. This covers developments in formulation tactics, purification processes, and cell culture procedures.

I commend you on your efforts, and I wish you an enlightening and informative experience. I strongly believe that all the conference attendees, especially the budding scientists and students will benefit from the innovative ideas and excellent deliberations shared in this two-day conference.

Message from Co-chairperson

Dr. A.K. Singh

Senior Vice President, Amity Foundation for Science Technology & Innovation Alliances (AFSTIA)

On behalf of Amity University, it is indeed a great pleasure to welcome all the delegates from India for the 2nd International Conference on Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals.

Amity University has a strong foundation of value-based education integrated with best academic practices and innovative research in frontier areas making the campus a world-class institution because 'Amity Connects & Cares'. It has instituted global standards in education, training, and research activities backed by state-of-the-art infrastructure and technology. The university caters a core faculty of qualified researchers from prominent institutions and eminent visiting faculty from renowned organizations. It is a proud moment for Amity to organize this international event that covers every global aspect of research and findings in the field of Pharma Technology & Translational Development in Chem-Biology Research.

The program has already been shaped up in an excellent form, and the networking opportunities will be indeed outstanding. It will feature highly respected internationally and nationally renowned speakers who will discuss the significant new developments and scientific advancements in the field that can impact the future of pharma technology in chem-biology research. The conference enhances celebrity lectures, keynote speakers, plenary talks, public lectures, special panel discussions, and poster presentations with both academic and industrial scientific sessions.

I thank everyone for their stupendous contributions in making this conference successful. My best wishes to all the delegates, invited guests, distinguished speakers, and students for the grand success of PTTDCBR 2024!

Message from Convener

Dr. Havagiray R. Chitme

Deputy Director, Amity Institute of Pharmacy,
Amity University Uttar Pradesh, Noida

I am honoured to extend a warm welcome to the delegates and distinguished guests to the Amity University Noida campus on March 20–21, 2024, for the two-day international conference titled "Pharmaceutical Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals 2024."

The advent of high-throughput screening, combinatorial chemistry, and computational modeling has revolutionized the drug discovery pipeline, empowering researchers to interrogate vast chemical libraries and predict molecular interactions with unprecedented accuracy. By harnessing these cutting-edge tools, we navigate the intricate relationship between chemical structure and biological function, unraveling the mysteries of disease pathogenesis and unlocking new avenues for therapeutic intervention.

Pharmaceutical technology uses an assortment of techniques, including high-throughput screening, computational modeling, and structure-based drug design, to aid in the discovery and development of conventional biopharmaceuticals. For the purpose of establishing the regulatory environment and assisting the clinical translation of conventional biopharmaceuticals, both translational development and pharmaceutical technology are essential.

In the realm of traditional biopharmaceuticals, pharmaceutical technology and translational development are fundamental pillars of chem-biology research that facilitate the discovery, development, production, and clinical translation of innovative medicines to address unmet medical needs.

I extend my warmest welcome to all attendees, including delegates, students, and expert speakers. It gives me great pleasure to inform you that every member of the organizing committee contributed diligently to ensure the success of this occasion and your pleasant sojourn. I hope the participants' journey is intellectually and culturally enlightening.

I wish PTTDCBR, 2024 a great success!

Message from the Organizing Secretary

Dr. Navneet Sharma

Assistant Professor

On behalf of the Amity Institute of Pharmacy, I am pleased to extend my heartfelt greetings to everyone taking part in the International Conference on Pharma Technology & Translational Development in Chem-Biology Research: Traditional to Biopharmaceuticals, 2024.

This event provides a platform to explore the learnings and practices of recent developments in traditional biopharmaceuticals, including new formulation techniques, improved manufacturing processes, and enhanced drug delivery methods. This involves bridging the gap between chemical and biological sciences and translating laboratory discoveries into clinical applications. Presentations and discussions will focus on emerging technologies impacting the field, such as artificial intelligence in drug discovery, high-throughput screening techniques, and novel analytical methods for characterizing biopharmaceuticals. I would like to thank everyone in attendance for their commitment to fostering knowledge and understanding among individuals of interest.

I commend you on your efforts, and I wish you an enlightening and informative experience.

Dr. Navneet Sharma
Organizing Secretary, PTTDCBR 2024

TRACK I

Traditional Scientific Knowledge and Ancient Wisdom

Speakers

Speakers

Dr. Hemant Kumar Pandey

Scientist F and Head,
Phytomedicine Division,
Defence Institute of Bio-Energy Research,
Defence Research and Development Organisation,
Uttarakhand

Dr. Hemant Kumar Pandey is presently posted at the Defence Institute of Bio-Energy Research (DIBER), Field station, Pithoragarh, and Head of the Phytomedicine Division. He has been actively engaged with different conservation and promotional aspects of Himalayan medicinal plants for the last 34 years and developed seven herbal products, viz. *Anti-leucoderma Herbal Product (Lukoskin), Anti-eczema Herbal Product (Exoskin), Anti-toothache Herbal Solution (Amtooth), an advance version of Lukoskin, i.e., Anti-leucoderma Herbal Product (Mark-II), Herbal Health Supplement, Anti-UV Radiation herbal cream, and Anti-oxidant and immuno-stimulant Herbal Capsules (Immunoboost)* through continuous R&D efforts on Himalayan medicinal plant. The technologies of the first four products have been transferred to four reputed herbal pharmaceuticals of our country. Two herbal products for the cure of leucoderma (LUKOSKIN) and for the cure of eczema (Exoskin) have been launched into the market by AIMIL Pharmaceuticals (India) Ltd., New Delhi. In the last five years, the total sale of Lukoskin has been more than 100 crores, generating 3 crores in royalties for the Defence Research and Development Organisation (DRDO). This herbal product is a boon for leucoderma-affected people, which is an almost incurable skin disease and considered as big social stigma in our country. The herbal product has given a very good name and fame not only to the DIBER but also to DRDO as well. He has filed nine patents on these herbal products. He is the author of three books and has more than 150 research publications in various international and national journals of repute. He has also presented research papers in more than 90 national and international seminars and conferences. He is a life member of various scientific societies and a recipient of numerous prestigious awards including DRDO's most prestigious award *DRDO Agani Award Year 2005, the DRDO Scientist of the Year Award 2020, the DRDO Technology Day Award Year 2011, Bioved Fellowship Award Year 2014, Agri-innovation Award Year 2015, Laboratory Scientist of the Year Award Year 2016, Dr. Gorakh Prasad Vigyan Puraskar, National Technology Award Year 2019, Fellow of Indian Society of Horticultural Research Year 2023 and Samarpan Samman Puraskar Year 2023*.

Abstract

Title of Talk: LUKOSKIN: A Very Effective Herbal Treatment for Incurable Skin Disease Leukoderma Developed by DIBER (DRDO), Pithoragarh

Abstract: Leucoderma or vitiligo is a pigmentary disfigurement of the skin in which white spots occur on the skin with varying sizes and locations. The worldwide occurrence of this skin disorder is 1%. In India, 3–4% of the population is affected by this ailment, but in some pockets of Gujarat and Rajasthan, its incidence is as high as 8–9%. It is considered a significant social stigma in our country, and people often mistake it for leprosy. The affected person remains always in constant depression with the feeling

of being a social outcast. There is no cure for this disorder however, some treatments are available in Ayurveda, Unani, homeopathy, allopathic, surgical, etc., but none of these treatments have a satisfactory cure for leucoderma. Secondly, these treatments are either very costly or single component-based, with a very low level of efficacy, and develop blister, edema, and irritation on the skin; as a result, most of the patients discontinue their treatment. Considering all etiological factors of this skin disorder, an herbal product for the treatment of leucoderma (Lukoskin) has been developed by DIBER, Pithoragarh, which has shown good efficacy against leucoderma. The transfer of technology of this herbal product has been done with AIMIL Pharmaceuticals, New Delhi, the company has launched this product into the market by the trade name of LUKOSKIN. The clinical efficacy of the product is 65–70%. The total market sale of LUKOSKIN by AIMIL Pharmaceuticals, New Delhi, in the last five years was more than Rs. 100 crores, generating Rs. 3 crores in royalties for the DRDO. Still, there was scope to enhance the efficacy of the product and to reduce recovery time. Hence, a project was sanctioned and an improved version 'Anti-leucoderma Herbal Product Mark II' has been developed. This product contains furanocoumarins as the main bio-molecules. The toxicological studies of this herbal formulation have been carried out for the presence of Heavy metals, Acute oral and dermal toxicity, sub-acute oral and dermal toxicity (28 days), sub-chronic oral and dermal toxicity (90 Days), chronic oral toxicity (180 Days), etc. The clinical trials of this herbal product have been carried out at State Ayurvedic College and Hospital, Lucknow, and clinical efficacy was found to be 85–90%. The patent on this herbal product has been granted. The technology of the advanced version of Lukoskin has been transferred to AIMIL Pharmaceuticals India Ltd., New Delhi for its commercialization. The company is planning to launch the advanced version of Lukoskin into the market very soon.

Speakers

Dr. Suhel Parvez

Dean, School of Interdisciplinary Sciences,
Jamia Hamdard,
Delhi

Dr. Suhel Parvez holds a bachelor's degree in chemistry from Aligarh Muslim University and completed his M.Sc. and Ph.D. in Toxicology in 2003 from the Department of Toxicology, School of Chemical and Life Sciences, Jamia Hamdard. He did his first post-doctoral at the Department of Neurology, Magdeburg University, Germany, from 2003 to 2005. He was a post-doctoral scientist at the Laboratory of Cell Molecular Signaling, Queens Medical Center, USA, from 2005–2008. Before joining Jamia Hamdard as Associate Professor in 2010, he worked as a Group Leader and *Humboldt Fellow* at the Department of Neurophysiology, Leibniz–Institute of Neurobiology, Germany, from 2008 to June 2010. Currently, Dr. Parvez is a Professor in the Department of Toxicology, and Dean of the School of Interdisciplinary Sciences and Technology, Jamia Hamdard, New Delhi. He is a recipient of the *Alexander von Humboldt* fellowship and he is also the Fellow of the Royal Society of Biology, UK. He has been actively engaged in research focused on basic life sciences with application in translational research during the span of the last two decades. *He has published more than 200 research papers in peer-reviewed PubMed/Scopus-indexed journals with an average impact factor of around 5, h-index: 48, total citations of more than 6675, i10: 71, i50: 31 and i100:15 (Ref.: Scopus data).*

He has completed/ongoing 15 research grants from international and national extramural funding agencies both as Principal as well as Co-Investigator. He guided more than 40 Ph.D. research scholars as supervisor/co-supervisor who have been awarded their degrees. In addition, Dr. Parvez is the University Coordinator of the Promotion of University Research and Scientific Excellence (PURSE) program, Fund for Improvement of S&T Infrastructure (FIST) program, and Synergistic Training program utilizing the Scientific and Technological Infrastructure (STUTI) program by Department of Science and Technology, Government of India.

Over the years Professor Parvez has successfully imbibed an expertise in both *in vitro* and *in vivo* models used to explore basics of neurosciences. He has extensively worked to explore the possible therapeutic interventions of nutraceuticals and their mechanism for the treatment and prevention of several neurodegenerative and neurological disorders.

In addition to rodent models, he has also been working extensively on the development of alternative models to gain mechanistic insights into the mechanism of neurodegenerative disorders such as Alzheimer's disease and Parkinson's disease. He has been working on the *Drosophila* model to screen the potential drugs for neuroprotective effects in Alzheimer's. The *C. elegans* model has also been established recently in his lab to screen possible therapeutic targets for neuroprotection in Alzheimer's and Parkinson's disease.

Speakers

Dr. Ghazala Javed

Assistant Director (Unani),
Central Council for Research in Unani Medicine (CCRUM),
Ministry of Ayush

Dr. Ghazala Javed is working as *Assistant Director (Unani)* in the Headquarters of Central Council for Research in Unani Medicine (CCRUM), Ministry of Ayush, Government of India, where she is looking after technical work and is involved in planning, implementation, coordination, and monitoring of research and development in Unani medicine, fundamental research, drug standardization, quality control and other related activities of peripheral institutes. She is also in charge of the *Drug Standardisation Research Unit* in New Delhi. As a nodal officer, she is coordinating activities of premier institutes of CCRUM-National Research Institute of Unani Medicine for Skin Disorders, Hyderabad, and Regional Research Institute of Unani Medicine, Mumbai, including the co-location centre at JJ Hospital, Mumbai, and Unani Speciality Clinic, Goa.

During her 27-year job tenure, she has participated in many professional meetings and conferences and made a niche for herself as an expert from CCRUM and Ministry of AYUSH, Govt. of India. *An alumna of Jamia Hamdard she has an excellent academic record with a gold medal to her credit.* She holds a *PG Diploma in Intellectual Property Rights* and a *WHO Fellowship* in managing *Public Health Programs*. She is a *trained bioethicist* and has done a *long-term training program in bioethics* jointly conducted by ICMR-NIH, USA.

She has published around 90 papers as an author/co-author in reputed national and international journals, participated in more than 200 national and international scientific platforms, and edited/reviewed around 20 books.

During her tenure of eight years in the Ministry of Ayush, Government of India, she looked after the work related to International Cooperation and actively contributed to the globalization of Ayush systems. *Amongst other areas, she dealt explicitly with work related to the American Division, and UN bodies like WHO, WIPO, UNESCO, etc. She has participated as a delegate from India several times in the Inter-Governmental Committee meeting on the Protection of Traditional Knowledge, Traditional Cultural Expressions and Folklore in World Intellectual Property Organization (WIPO), Geneva,* and took part as an international delegate *in a Seminar on Intellectual Property and Traditional Knowledge held at WIPO and talked about "Protection of Traditional Knowledge—Initiatives from India".* She was also involved in developing the *National Position Paper on the Protection of Traditional Health Knowledge* by closely working with the team from Jawaharlal Nehru University. She has also served as an advisory member for the Forum for Indian Traditional Medicine (FITM) set up by the Ministry of Ayush at Research and Information System for Developing Countries (RIS).

She was deputed as a *visiting scholar in the Unani stream to the National Centre for Natural Products Research, the University of Mississippi, Oxford, USA*, for 03 months to get exposure and hands-on

training in Natural Products Research where she had active interactions with a team at the United States Food and Drug Administration (USFDA). She also worked as a consultant from the Ministry of Ayush to assist the Indian Institute of Foreign Trade (IIFT) to conduct a Study on Export Potential for Ayush products in SAARC and ASEAN countries.

She was a special invitee to interact with President Obama and Michelle Obama during their visit to India in Jan 2015. *She has been conferred the Make in India award for "Brilliant contribution in the field of Unani Medicine" by Hon'ble Minister, Shri Ashwini Choubey; "NCR DELHI RATAN" award* for the recognition of the distinguished services rendered by her to the society at large in the 40th Annual Celebration Year 2019, All India Conference of Intellectuals. She has also been *conferred the Dr. Abdul Razzack Award* by All India Unani Tibbi Congress and NGO, dedicated to promoting Unani medicine.

She has also been awarded one of the most prestigious *Dr. Sarojini Naidu, the International Award for Working Women* which was presented to the 100 most important women from fifteen countries of the world by the Asian Academy of Arts, a three decades old organization in association with the International Chamber of Media Industry during 6th Global Literary Festival 2020.

Abstract

Title of Talk: Recent Advances in Unani Medicine

Abstract: Unani medicine is one of the well-established Ayush systems that is flourishing in the country with a strong infrastructure in place with ample government support. The system adopts a holistic approach to maintaining health, preventing diseases, and treating disease conditions. Unani medicine has a global presence and is practiced in several countries. Since its introduction in India around the 8th century CE, India's continuous contribution to the further development of Unani medicine has been globally recognized. The Sustainable Development Goal 3 (SDG 3) for good health and well-being focuses on ensuring healthy lives and promoting well-being for all at all ages. Traditional medicine including Unani medicine, with its comprehensive approach, enables achieving the targets of SDG 3. Mainstreaming of Ayush systems in public health care is one of the key strategies of the Government of India to provide healthcare to the masses. Integration of these systems including Unani medicine in mainstream healthcare aims to assist in achieving Sustainable Development Goal 3 and Universal Health Coverage. Research and development in Unani medicine has been witnessing sharp growth during the last decade after the establishment of the dedicated Ministry for Ayush in 2014. Due to its widespread network of research, academia, and entrepreneurship in Unani medicine, India is well positioned to do experience sharing and present recent advancements in the system at national and international levels. Central Council for Research in Unani Medicine, an apex organization under the Ministry of Ayush has taken many initiatives for research and development to scientifically nurture the traditional heritage and ancient wisdom to bring it into the mainstream healthcare delivery system. In this presentation, the strengths of Unani medicine and its integration into mainstream healthcare, highlighting the recent advancements in education, research, and development will be highlighted.

TRACK II

Stem Cells, Tissue Engineering and Pharmacology

Speakers

Speakers

Dr. Rajesh Arora

Scientist G,
Defense Institute of Physiology & Allied Science,
Defence Research & Development Organisation

He is a Senior Scientist and Additional Director with the Government of India. His innovative contributions in the area of drug design and development and augmentation of medicinally useful secondary metabolites using biotechnological interventions have received wide international acclaim. Dr. Arora has steered numerous specialized training programmes on the prevention and management of disasters. He was actively involved in the Training of Trainers and Responders during the Common Wealth Games 2010 and has received certified Multi-Agency Strategic Command Training. He was an expert member associated with the development of National Disaster Management Guidelines by the National Disaster Management Authority. Dr. Arora has been a Visiting Scientist in the EU, is a Marie Curie Fellow, a Fellow of the Royal Society of Chemistry, a Fellow of the Linnean Society of London, a Fellow of the Union of Scientists, Bulgaria, and is an alumnus of the US George C. Marshall Center for Security Studies. Dr Arora's name is included in the Who's Who of the World, USA, Who's Who in Science and Engineering, USA and International Biography, UK. He is a recipient of several prestigious international and national fellowships and awards, including the DRDO Laboratory Scientist of the Year Award (2010) and DRDO Technology Group Awards (Awarded Twice). He serves on the Editorial Boards of more than twenty-five international journals and is a reviewer for over a hundred peer-reviewed journals. Dr Arora has more than 250 publications, 17 patents, and 14 books to his credit.

Abstract

Title of Talk: Modern Biopharmaceuticals from Evidence-based Complementary and Alternative Medicine (CAM): Walking the Right Rope Reverse Forward

Abstract: Biopharmaceuticals have transfigured the treatment of a broad range of ailments since their inception and play an important role in almost every arena of medicine. The market for biopharmaceuticals has grown significantly in recent years, and in view of its high demand, it is anticipated to grow dynamically to an estimated USD 853 billion by 2030. A paradigm shift in the field of modern medicine has been brought about by the introduction of biopharmaceuticals. These drugs have made it possible for medical practitioners to focus on the underlying cause of illness, resulting in a more individualized and effective treatment regime- leading fast toward personalized and omics-based medicine. The targeted therapy it provides reduces the likelihood of side effects while improving the therapeutic efficacy. In contrast to traditional medicines synthesized from chemical processes, the majority of biopharmaceuticals are derived from biological processes such as extraction from living systems or via recombinant DNA technology. These are produced using transgenic organisms, particularly genetically modified plants, animals, or microbes. Biologics have improved the quality of living and given new hope to people with conditions like cancer and autoimmune disorders. Scientific knowledge and technological advancement have made it possible to create even more advanced

biologics, such as gene and cell-based therapies. These novel strategies have the potential to cure diseases that were thought to be incurable and revolutionize emerging medical practice. Researchers today wish to leverage the therapeutic potential of holistic methods and natural treatments while maintaining safety, effectiveness, and adherence to scientific standards by incorporating evidence-based complementary and alternative medicine (CAM) therapies into biopharmaceutical development. This strategy opens the door for a more all-encompassing and patient-centered healthcare system by increasing treatment alternatives and bridging the gap between complementary and mainstream medicine. Leads from traditional medicine have often been applied for the development of biopharmaceuticals and some such reverse-forward emerging technologies will be deliberated upon during the lecture.

Keywords: Biopharmaceuticals, Modern and Traditional Medicine, Targeted Therapeutics

Speakers

Dr. Yogesh Verma

Scientist F,
Institute of Nuclear Medicine and Allied Sciences,
Defence Research & Development Organisation,
Delhi

Dr. Yogesh Verma is presently posted as Scientist 'E' in Institute of Nuclear Medicine and Allied Sciences (INMAS), Defence Research & Development Organisation (DRDO), Delhi, India. He has completed his M.Sc. and Ph.D. in Biomedical Science from University of Delhi, India, and also has another M.Sc. degree in Bioinformatics from Punjab Technical University, India. He is presently working in the areas of *molecular biology, bioinformatics, stem cell research, microencapsulation, regenerative medicine, tissue engineering, and data mining and analysis for repairing/ regenerating various types of tissues for Defense application*.

Abstract

Title of talk: Tissue Engineering and Stem Cells

Abstract: Tissue engineering (TE) is a field of biomedical engineering that combines engineering principles with biology for the replacement, repair, and regeneration of damaged tissue and organs. It utilizes a combination of cells, materials, and suitable biochemical factors to restore, maintain, improve, and replace different types of biological tissues. Cells, especially stem cells, are used for TE applications. Stem cells have the potential to self-renew themselves and differentiate into various lineages. On this basis they are categorised as totipotent, pluripotent, multipotent and unipotent. Growth factors used in TE are naturally occurring substances that can stimulate cell proliferation, wound healing, and cell differentiation (e.g., EPO, NGF). Materials utilized in TE are classified based on their origin, bioactivity, and structural activity. For example, polymers, metals, ceramics, and composites. Materials, cells, and growth factors are combined to fabricate scaffolds by methods like hydrogelation, electrospinning, salt leaching, and 3D bioprinting. Once prepared, the scaffolds are characterized by techniques, FTIR, UTM, TGA, UV spectroscopy, etc. Their suitability for human applications is tested *in vitro* (cell proliferation, adhesion, migration, etc.) and in *in vivo* models. For example, calvaria defects, jawbone defects, and critical size defects are used as models for bone regeneration. Subsequently, *in vivo* imaging -MRI, CT, X-ray- monitors the process of repair and regeneration. For acceptance by the regulatory authorities, the prepared scaffolds should follow the American Society for Testing and Materials (ASTM) standards and medical device guidelines for human applications. At INMAS, in the SCTERG, we are endeavouring for bone, muscle, and corneal stroma replacement with different compositions of scaffolds. The scaffolds are being designed based on data mining and *in silico* predictions to induce regeneration by the scaffolds impregnated with drug/ stem cells and tissue-resident stem cells. The prepared muscle and bone scaffolds were found to improve the regeneration in the Sprague-Dawley rat model, mimicking the defence injury. In addition, corneal substitutes are being evaluated to mimic the characteristics of the natural cornea.

Speakers

Dr. Pawan Kumar Raghav

Scientist,
UCSF Health
University of California, San Francisco,
USA

Dr. Pawan Kumar Raghav, Ph.D., PGDCI, M.Phil., M.Sc., B.Sc., is a distinguished Scientist with over a decade of experience who has significantly contributed to research in stem cells and computational biology. Dr. Raghav received his Ph.D. in Life Sciences from Bharathiar University, Coimbatore, India. During his Ph.D. at the Institute of Nuclear Medicine and Allied Sciences (INMAS), Defense Research Development Organization (DRDO), Delhi, India, he delved into designing and evaluating molecules with applications in stem cell regulation, focusing on proliferation, differentiation, and apoptosis. As a research associate at INMAS, DRDO, he contributed to hematopoietic stem cell research, formulated peptides-PLGA nanoparticles, and validated their efficacy in in vitro and in vivo studies. Dr. Pawan Kumar Raghav is the recipient of a National Postdoctoral Fellowship from the Department of Science and Technology (DST), Science and Engineering Research Board (SERB), Government of India. As a principal investigator of the project at the Department of Computational Biology, IIT Delhi, India, he developed tools using machine learning algorithms and databases. As a Scientist 'D' in the Stem Cell Facility, All India Institute of Medical Sciences, New Delhi, India, Dr. Pawan Kumar Raghav carried out stem cell informatics and tissue engineering experimental studies to generate clinical-grade mesenchymal stem cells (MSCs). Dr. Raghav's career has centered on experimental and computational biology, with research spanning stem cells, immunology, cheminformatics, structural biology, tissue engineering, and molecular biology. Dr. Raghav's contributions are evident through numerous publications in prestigious scientific journals, book chapters, books, and patents that provide insight into stem cells and immunology. He also serves as an editor and reviewer for various international journals and books. Dr. Pawan Kumar Raghav earned several international recognitions including travel, research excellence, and best research awards. He is a member of the American Society for Histocompatibility and Immunogenetics (ASHI) and the International Society for Computational Biology (ISCB).

Speakers

Dr. Hemant K. Gautam

Chief Scientist & Professor,
Institute of Genomics and Integrative Biology,
University of Delhi,
Delhi

Dr. Hemant K. Gautam earned his Master's and Ph.D. degrees in microbiology from the Indian Agricultural Research Institute, New Delhi, India. He has post-doctoral experience in France and Israel. He presently works as a Chief Scientist and Professor at the Institute of Genomics and Integrative Biology, New Delhi. He is affiliated with several universities and belongs to a variety of scientific and academic organizations. He is a recipient of the SARC Award, Bharat Excellence Award, Biotechnology Award, Israel Government Fellowship, UNESCO Fellow, and International Project Reviewer RBUCE-UP, UniverSud, Paris. He has authored over 100 academic papers, and two books, and has submitted over 500 novel sequences to the NCBI database. He has visited several countries, including France, Israel, Australia, Bulgaria, China, Thailand, Germany, the United States, Singapore, Vietnam, Malaysia, and Ukraine. He is a biosafety expert from the Department of Biotechnology, India. Dr. Gautam is involved in a variety of interdisciplinary projects, including in the areas of microbiology, microbial biotechnology, genomics, and nanobiotics. Dr. Gautam's goal is to develop techniques for rationally engineering next-generation smart antimicrobials by understanding their fundamental features and exploiting such structures to battle the "Antimicrobial resistance" silent pandemic knocking on the door.

Abstract

Title of Talk: Exploring Microbiome: A Treasure Trove for Novel Pharmaceutical Fascinated Molecules

Abstract: Drug discovery is a complex and dynamic process aimed at identifying new therapeutic compounds to treat various diseases. Significant technological and methodological developments over the last few decades have revolutionized the drug discovery sector and produced new medications with enhanced safety and efficacy characteristics. A large and varied pool of bioactive chemicals, many of which have been the basis for the invention of life-saving medications, is found in microorganisms. Microbial diversity is still a great place to find new, potentially medicinal bioactive chemicals. Through the utilization of sophisticated culture methods, genetic instruments, and multidisciplinary strategies, scientists may access this extensive natural product pool to tackle unaddressed medicinal needs and counter new threats like cancer and antibiotic resistance. The investigation of microbial variety holds promise for the identification of novel medications that could revolutionize healthcare and enhance patient outcomes as we gain a deeper understanding of microbial ecosystems and their metabolic capacities. Researchers have been working harder in the past few years to investigate the diversity of microbes in different habitats in the hopes of finding new chemicals that may be used in medicine. Progress in genomics, metagenomics, and synthetic biology, along with ongoing investigation of microbial ecosystems, could lead to the discovery of new medications to treat unmet medical needs and counter new health risks. Through the utilization of microbial variety, scientists can facilitate the

advancement of next-generation therapies aimed at enhancing human health and welfare. The rapidly changing landscape of drug discovery is being fuelled by advances in science, technology, and changing patient requirements. The field of drug development has a bright future ahead of it, despite obstacles like drug resistance and budgetary limitations. Personalized, targeted medicines and cutting-edge treatment methods have the potential to transform patient care and enhance public health everywhere.

Speakers

Prakash Baligar

Professor,
Amity Institute of Molecular Medicine and Stem Cell Research,
Noida, Uttar Pradesh

Dr. Prakash Baligar did his Ph.D. from Karnataka University, Dharwad, and Postdoctoral Research for 7 years at the National Institute of Immunology (NII), New Delhi. Dr. Prakash joined the Amity Institute of Molecular Medicine and Stem Cell Research (AIMMSCR) in 2015, and his research focus is on Stem Cell and Tissue Engineering. Dr. Prakash flags the major concerns in transplantation medicine to overcome the shortage of donor organs/tissues and their timely availability to treat many diseased/injured patients. Thus, his research focuses on stem cell therapy for human degenerative and genetic diseases. Presently, he has been engaged in the development of an ex-vivo partial liver organ by using natural scaffold composite and stem cells to replace the damaged liver and it can also be used for many liver drug tests. He is also working on novel skin grafts for burns and bone injury. His long-term goal is to direct the differentiation of stem cells in situ into different lineages (hepatocytes, cardiomyocytes, keratinocytes, etc.) with scaffold and ex-vivo organ development by over-expressing/inducing master regulator genes/factors in the stem cells. Recently, Dr. Prakash, co-organized an EMBO Lecture Course on "Tumour metabolism: Current understanding and opportunities for novel drug discovery" at Amity Institute of Molecular Medicine and Stem Cell Research, Amity University, Uttar Pradesh.

Current Research Project:

1. *DST-SERB* funded a research project entitled "Ex vivo partial liver organ development by using stem cells and tissue engineering approaches".
2. *ICMR (Ad-hoc)* funded research project entitled "Development of natural skin with hair follicles and skin integumentary organs using 3D printed gelatin-elastin composite and iPSCs"
3. *DBT*-funded research project.

Abstract

Title of Talk: Tissue Engineering for Liver Diseases Using Stem Cells

Abstract: Stem cell-based tissue engineering is an emerging tool for developing functional tissues of choice. To understand pluripotency and hepatic differentiation of mouse embryonic stem cells (mESCs) on a three-dimensional (3D) scaffold, we established an efficient approach for generating hepatocyte-like cells (HLCs) from hepatoblast cells. We developed a porous and biodegradable scaffold, which was stimulated with exogenous growth factors, and investigated the stemness and differentiation capacity of mESCs into HLCs on the scaffold *in vitro*. In animal studies, we cultured mESCs-derived hepatoblast-like cells on the scaffold and then, transplanted them into the partially hepatectomized C57BL/6 male mice model to evaluate the effect of gelatin scaffold on hepatic regeneration. The 3D

culture system allowed the maintenance of stemness properties in mESCs. The step-wise induction of mESCs with differentiation factors leads to the formation of HLCs and expressed liver-specific genes, including albumin, hepatocyte nucleic factor 4 alpha, and cytokeratin 18. In addition, cells also expressed Ki67, indicating cells are proliferating. The secretome showed expression of albumin, urea, creatinine, alanine transaminase, and aspartate aminotransferase. However, the volume of the excised liver which aids regeneration has not been studied. Our results indicate that hepatoblast cells on the scaffold implanted in PH mouse indicates that these cells efficiently differentiate into HLCs and cholangiocytes, forming hepatic lobules with central and portal veins, and bile duct-like structures with neovascularization. The gelatin scaffold provides an efficient microenvironment for liver differentiation and regeneration both *in vitro* and *in vivo*. These hepatoblast cells would be a valuable source for 3D liver tissue engineering/transplantation in liver diseases.

TRACK III

Drug Discovery and Biologicals

Speakers

Speakers

Manish Narang

M.Pharm, Ph.D.
Director, Medical Affairs-Asia Pacific,
Abbott Vascular

A Ph.D. in pharmaceutical sciences with a specialization in drug standardization with over 25 years of industry experience in medical affairs, clinical research, scientific content and strategy, general management, professional affairs, and consulting in cardiovascular drugs and devices. Currently working at Abbott Laboratories, a Global Healthcare leader in its Medical Devices (Cardiovascular) Division as Director of Medical Affairs-Asia Pacific.

Responsible for leading various First in Man, Pilot, and Pivotal clinical studies in DES/BVS clinical development in the Asia Pacific Region including China, Japan, Australia, India, Korea, and many more countries.

A much sought-after speaker, moderator, and expert in scientific discussions in the cardiovascular space, I have presented at international and national conferences across the world, including AsiaPCR, TCTAP, ENCORE, and IndiaLive. I have also published more than 15 articles in leading international journals.

Speakers

Dr. Nidhi Sandal

Scientist F,
Institute of Nuclear Medicine & Allied Sciences,
Defence Research & Development Organisation,
Delhi

Dr. Nidhi Sandal is a Scientist working at Institute of Nuclear Medicine & Allied Sciences (INMAS), Defence Research & Development Organisation (DRDO). She has a Doctorate in Pharmaceutical Sciences with more than 15 years of experience in the field of pharmaceutical sciences and Intellectual Property Rights (IPR). Prior to joining DRDO, she had worked as a Research Scientist at Wockhardt Research Centre, Aurangabad. She has also served at IPR Group at Directorate of Extramural Research & Intellectual Property Rights (DER&IPR) for 9 years. At her present posting in INMAS, she is working on the development of formulations for the decorporation of internalized radionuclides. She has the first-ever Technology Development Fund Project of the Life Science Cluster which is successfully progressing to make India self-reliant in strategic drugs.

She has a keen interest in encouraging scientists to use patent documents for their R&D. Patent landscape report on Air Independent Propulsion System, Compendium of Granted & Active Patents of DRDO, DRDO IPR Policy, IPR group web portal and Intellectual Property Management System on intra-net of DRDO are her major contributions during her previous tenure of IPR Group, DER&IPR, DRDO headquarters.

She is a recipient of many awards and holds more than 8 granted Indian Patents, 5 under prosecution, and 2 Trademark applications. She also has published several papers in national and international journals.

She has attended several advanced training courses including a JPO/IPR training course at JPO, Tokyo, Japan, an advanced course on IPR at Cambridge University, London, and a PRG course, USA. Her areas of interest include the use of Patent formulation development, method validation, internal decorporation, regulatory issues, information for R&D, freedom to operate, etc.

Speakers

Dr. Chinmoy Kumar Hazra

Associate Professor,
Department of Chemistry,
Indian Institute of Technology Delhi

Dr. Chinmoy Kumar Hazra, an accomplished organic chemist, was born on November 24, 1985, in India. He completed his undergraduate studies in chemistry at the University of Calcutta's Ramakrishna Mission Residential College in Narendrapur, where he graduated in 2007. After that, he finished his postgraduate studies in chemistry at the Indian Institute of Technology Bombay, working with Professor I.N.N. Namboothiri for years from 2008 to 2010. Motivated by a strong desire to do research, Dr. Hazra traveled overseas to pursue his Ph.D. studies. From 2010 to 2013, he studied organic chemistry at Westfälische Wilhelms-Universität Münster in Germany, where he was supervised by Prof. Martin Oestreich. Following that, he started a string of esteemed postdoctoral appointments, which included stays at the University of Strasbourg in France, Korea Advanced Institute of Science & Technology (KAIST) in South Korea, and King Abdullah University of Science and Technology (KAUST), Saudi Arabia, where he collaborated with leading researchers and honed his expertise in various aspects of organic synthesis. In 2019, Dr. Hazra joined the Department of Chemistry at the prestigious Indian Institute of Technology Delhi (IIT Delhi) as an Assistant Professor, subsequently promoted to Associate Professor in 2023. At IIT Delhi, he has made significant contributions to the field of organic chemistry, particularly in the development of novel catalytic methodologies for the synthesis of biologically active molecules and pharmaceuticals. Dr. Hazra's research endeavors have led to numerous publications in esteemed scientific journals, both before and after his tenure at IIT Delhi. His work has been recognized with several awards and accolades, including the Merck Young Scientist Award 2023, the Thieme Chemistry Journal Award, and acknowledgment as an Emerging Sportsperson of the Year 2022 for his achievements in the Inter IIT Staff Sports Meet. Apart from his research pursuits, Dr. Hazra is actively involved in mentoring and supervising graduate and postgraduate students, fostering the next generation of scientists. His commitment to advancing knowledge in organic chemistry and his dedication to academic excellence continue to inspire and influence the scientific community worldwide.

Speakers

Dr. Alka Ahuja

Professor and Chair of the Pharmacy Program,
National University of Science & Technology,
Oman

In the pharmaceutical industry, Dr. Alka Ahuja is a well-known individual with an impressive career spanning almost 40 years. She currently holds the esteemed title of Chair of the Research and Innovation Committee in addition to her roles as Professor of Pharmaceutics and Chair of the Pharmacy Program at the College of Pharmacy, National University of Science and Technology, Muscat, Sultanate of Oman. A 21-year stay at Jamia Hamdard, India, where she taught and conducted research before moving to Oman, marked the beginning of Dr. Ahuja's academic career. Dr. Ahuja has exhibited unmatched skill and a commitment to furthering pharmaceutical research and teaching over her lengthy career. Her dedication is demonstrated by her substantial participation in numerous academic and research groups for more than 35 years underscores her commitment to shaping the academic landscape. A sought-after speaker at both national and international forums, she has presented her groundbreaking research at esteemed conferences worldwide, including notable events such as the Controlled Release Society conference in Paris and the FIP conference in Spain. A true pioneer in her field, Dr. Ahuja has made significant contributions to pharmaceutical research, particularly in the realm of Mucoadhesive drug delivery systems. Her innovative work has not only garnered international recognition but has also been featured in renowned publications, including the esteemed book "Bioadhesive Drug Delivery Systems: Fundamentals, Novel Approaches, and Development." Over the course of her career, Dr. Ahuja has spearheaded 20 major research projects supported by various esteemed organizations, including Indian Council of Medical Research (ICMR), University Grants Commission (UGC), Department of Science and Technology (DST), All India Council for Technical Education (AICTE), and Ministry of Higher Education, Research and Innovation (MoHERI), Oman. Her exemplary contributions have earned her numerous accolades, including the University Gold Medal, the Indian Drugs Manufacturers Association sponsored G.P. Nair Award, and the Career Award for young teachers by the All India Council for Technical Education. In addition to her academic achievements, Dr. Ahuja is a prolific author, having penned 11 books across diverse pharmaceutical subjects. She has also contributed chapters to various publications, further cementing her reputation as a leading authority in her field. With over 250 publications in prestigious journals and a plethora of presentations at seminars and conferences worldwide, Dr. Ahuja's impact on the pharmaceutical landscape is undeniable. Moreover, Dr. Ahuja's commitment to mentorship is evident through her supervision of over 100 theses at graduate, postgraduate, and doctoral levels. Her expertise extends beyond academia, as she has also lent her insights to consultancy projects supported by esteemed organizations such as Scottish companies and prominent drug manufacturing companies in Muscat.

Abstract

Title of Talk: Pharmacokinetic Principles in Drug Development

Abstract: Drug research encompasses several disciplines united by a common goal, i.e., development of novel therapeutic agents. Two stages in achieving this include drug discovery and drug development. Drug development is a process of bringing a novel drug from “bench to bedside”. It is focused on the evaluation of toxicity and efficacy of new drug candidates. The main pharmacokinetic (PK) causes of drug failure include poor bioavailability due to low aqueous solubility and/or high first-pass metabolism, inadequate duration of action due to high clearance, short half-life, and unanticipated drug interactions. This results in variable PK properties and undesirable effects on drug efficacy and safety. Various principles including steady state, the time course of drug action, ADME, half-life, etc. govern the drug development will be discussed.

Conference Schedule

Wednesday, 20th March 2024	
Time	***Program***
08:00 am– 09:30 am	Registration
08:00 am– 09:30 am	Breakfast
Inauguration Function 10:00 am–12:30 pm	
10:30 am– 10:35 am	Lighting of the Lamp with Chanting of Saraswati Vandana
10:35 am– 10:40 am	*Welcome Address by the Convener* Dr. Havagiray R. Chitme, Deputy Director, Amity Institute of Pharmacy, AUUP, Noida
10:40 am– 10:50 am	*Address by Chairperson PTTDCBR* Prof. (Dr.) B.C. Das, Dean, Faculty of Health and Allied Sciences, AUUP, Noida, India
10:50 am– 11:00 am	*Introduction to the Conference by Organizing Secretary* Dr. Navneet Sharma
11:00 am– 11:10 am	*Address by Co-Chairperson* Dr. A.K. Singh, Sr. Vice President, Amity Foundation for Science, Technology and Innovation Alliances (AFSTIA)
11:10 am– 11:20 am	*Address by Chief Advisor* Dr. W. Selvamurthy, President, AFSTIA, AUUP, India
11:20 am– 11:30 am	*Address by Co-Patron* Prof. (Dr.) Balvinder Shukla, Hon'ble Vice Chancellor, AUUP, Noida, India
11:30 am– 11:40 am	*Address by Guest of Honour* Dr. Arshad Khuroo, Head, Bioavailability and Bioequivalence Division, Sun Pharma, Gurgaon
11:40 am– 11:50 am	*Address by Chief Guest* Dr. Rajeev Singh Raghuvanshi, Drug Controller General of India (DCGI)
11:50 am– 12:05 pm	Blessing by Hon'ble Founder President, Dr. Ashok K. Chauhan, Amity University
12:05 pm– 12:15 pm	Vote of Thanks by Dr. Tanveer Naved, Deputy Dean, Health and Allied Science, AUUP, Noida

Wednesday, 20th March 2024				
Keynote Session				
12:15 pm–01:00 pm	Keynote Address by Guest of Honour Dr. Arshad Khuroo, Head, Bioavailability and Bioequivalence Division, Sun Pharma, Gurgaon *Chair:* Dr. Tanveer Naved			
01:00 pm–02:00 pm	**Lunch Break**			
Scientific Session I				
02:00 pm–05:00 pm	**Traditional Scientific Knowledge and Phytopharmaceuticals**			
	Speakers	***Title of Talk***	***Session Chairs***	***Parallel Session***
02:00 pm–02:30 pm	Dr. Sanchit Sharma, Executive Managing Director, AIMIL Pharmaceuticals, Delhi		*Chair:* Prof. (Dr.) Harsha Khadwal and Dr. Maryam Sarwat	Oral/Poster Presentation and Evaluation
02:30 pm–03:00 pm	Dr. Hemant Kumar Pandey, Scientist F and Head, Phytomedicine Division, Defence Institute of Bio-Energy Research, Defence Research and Development Organisation (DIVER-DRDO), Uttarakhand	LUKOSKIN: A Very Effective Herbal Treatment for Incurable Skin Disease Leukoderma Developed by DIBER (DRDO), Pithoragarh		
03:00 pm–03:30 pm	Dr. Suhel Parvez, Dean, School of Interdisciplinary Sciences, Jamia Hamdard, Delhi	Targeting Mitochondria in Alzheimer's Disease: Repurposed Drugs and Unani Formulations as Promising Strategy		
03:30 pm–04:00 pm	Dr. Ghazala Javed, Assistant Director (Unani), Central Council for Research in Unani Medicine (CCRUM), Ministry of Ayush	Recent Advances in Unani Medicine		
04:00 pm–05:00 pm	**Tea and Snacks**			

Thursday, 21st March 2024				
Scientific Session II				
10:00 am–12:00 pm	**Stem Cells, Tissue Engineering and Pharmacology**			
	Speakers	***Title of Talk***	***Session Chair***	***Parallel Session***
10:00 am–10:25 am	Dr. Rajesh Arora, Scientist G, Defense Institute of Physiology & Allied Science, Defence Research & Development Organisation (DIPAS, DRDO)	Modern Biopharmaceuticals from Evidence-based Complementary and Alternative Medicine (CAM): Walking the Right Rope Reverse Forward	*Chair:* Dr. Bhupesh Sharma and Dr. Vikesh K. Shukla	Oral/Poster Presentation and Evaluation
10:25 am–10:50 am	Dr. Yogesh Verma, Scientist F, Institute of Nuclear Medicine and Allied Sciences, Defence Research & Development Organisation (INMAS, DRDO), Delhi	Tissue Engineering and Stem Cells		
10:50 am–11:15 am	Dr. Pawan Raghav, Scientist UCSF Health, USA	Stem Cell-based Drug Delivery System		
11:15 am–11:40 am	Dr. Hemant Gautam, Chief Scientist and Professor, Institute of Genomics and Integrative Biology Academy of Scientific and Innovative Research, Delhi University, Delhi	Exploring Microbiome: A Treasure Trove for Novel Pharmaceutical Fascinated Molecules		
11:40 am–12:00 pm	Dr. Prakash Baligar, Associate Professor, Amity Institute of Molecular Medicine and Stem Cell Research, Noida, Uttar Pradesh	Tissue Engineering for Liver Diseases Using Stem Cells		

Thursday, 21st March 2024				
Scientific Session III				
12:00 pm–01:00 pm	**Drug Discovery, Formulations, and Regulatory Compliance I**			
	Speakers	***Title of Talk***	***Session Chair***	***Parallel Session***
12:00 pm–12:30 pm	Dr. Manish Narang, Director of Medical Affairs, Asia Pacific Abbott Vascular	Synchronizing Clinical Development Strategy with Technological Innovations in Medical Devices/ Drugs	Chair: Dr. Nitin Sharma and Dr. Vinay Lather	Oral/Poster Presentation and Evaluation
12:30 pm–01:00 pm	Dr. Nidhi Sandal, Scientist F, Institute of Nuclear Medicine & Allied Sciences (INMAS), Defence Research and Development Organisation (DRDO), Delhi	Role of the Science and Technology in Intellectual Property Rights		
01:00 pm–02:00 pm	**Lunch Break**			
Scientific Session IV				
02:00 pm–03:30 pm	**Drug Discovery, Formulations, and Regulatory Compliance II**			
	Speakers	***Title of Talk***	***Session Chair***	***Parallel Session***
02:00 pm–02:30 pm	Dr. Chinmoy Hazra, Associate Professor, Department of Chemistry, Indian Institute of Technology Delhi	Organocatalytic Transformation of Feedstock Molecules to Value–added Products and its Mechanistic Investigation	Dr. Abdul Rahman and Prof. Malika Pathak	Oral/Poster Presentation and Evaluation
02:30 pm–03:00 pm	Dr. Rajendra Singh, Vice President Drug Regulatory Affairs, Mankind Research Center, Gurugram			
03:00 pm–03:30 pm	Dr. Alka Ahuja, Professor and Chair of the Pharmacy Program, National University of Science and Technology, Oman	Pharmacokinetics Principles in Drug Development		
03:30 pm–05:00 pm	Valedictory Session			
05:00 pm–05:30 pm	**Tea and Snacks**			

Thursday, 21st March 2024	
03:30 pm– 05:00 pm	Valedictory Session
03:30 pm– 03:35 pm	Welcome Address by Dr. Havagiray R. Chitme, Deputy Director, AIP, AUUP, Noida
03:35 pm– 03:40 pm	Address by Chairperson PTTDCBR: Prof. (Dr.) B.C. Das, Dean, Health and Allied Sciences, AUUP, Noida, India
03:40 pm– 03:45 pm	Conference Report by Dr. Navneet Sharma
03:45 pm– 03:50 pm	Address by Dr. W. Selvamurthy, President ASTIF, AUUP, India
03:50 pm– 04:55 pm	Address Prof. (Dr.) Balvinder Shukla, Hon'ble Vice Chancellor, AUUP, Noida, India
03:55 pm– 04:05 pm	Address by Guest of Honour Dr. Asim Ali Khan, Dean, School of Unani Medical Education and Research, Jamia Hamdard University
04:05 pm– 04:20 pm	Address by Chief Guest Dr. N. Zaheer Ahmed, Director General, CCRUM, New Delhi
04:20 pm– 04:25 pm	Feedback from Participants
04:25 pm– 04:40 pm	Distribution of Certificates
04:40 pm– 04:50 pm	Blessing by Hon'ble Founder President, Dr. Ashok K. Chauhan, Amity University (Subject to Confirmation)
04:50 pm– 05:00 pm	Vote of Thanks by Dr. Vinay Lather, Central Head, Pharmaceutical Chemistry, Amity University, Noida

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TRACK I

Traditional Scientific Knowledge and Ancient Wisdom

Abstract

Advancements in Anti-cancer Drug Development: A Comprehensive Review

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Abstract

Background: *Cancer remains one of the leading causes of morbidity and mortality worldwide, necessitating continuous efforts in drug development to combat this multifaceted disease. Recent years have witnessed remarkable advancements in understanding the molecular mechanisms of cancer and the development of novel therapeutic strategies.* ***Aim:*** *This abstract aims to review the recent advancements in anti-cancer drug development, highlighting key breakthroughs, challenges, and future directions in the field.* ***Methodology:*** *A comprehensive literature search was conducted using various databases to identify relevant studies and reports on anti-cancer drug development. The search encompassed articles published within the last decade, focusing on therapeutic innovations, mechanisms of action, and clinical outcomes.* ***Discussion:*** *The advent of targeted therapies and immunotherapies has revolutionized cancer treatment paradigms, enabling more precise and effective interventions with reduced toxicity. Targeted therapies exploit specific molecular aberrations in cancer cells, while immunotherapies harness the power of the immune system to recognize and eliminate tumor cells. Furthermore, the emergence of personalized medicine approaches, facilitated by genomic profiling and biomarker-driven strategies, has paved the way for tailored treatment regimens tailored to individual patient characteristics. Advances in anti-cancer drug development have ushered in a new era of precision medicine, offering unprecedented opportunities for improved patient outcomes and prolonged survival. By leveraging cutting-edge technologies and interdisciplinary approaches, the field of anti-cancer drug development holds promise for addressing the unmet needs of cancer patients and advancing toward a future of personalized, targeted therapies.*

Keywords: Cancer Therapy, Drug Discovery, Targeted Therapy, Immunotherapy

An Abstract on Traditional Scientific Knowledge (TSK) and Phytopharmaceutical

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Abstract

Traditional scientific knowledge (TSK) and phytopharmaceuticals represent two distinct yet interconnected domains that have long contributed to the understanding and treatment of various ailments. TSK encompasses the accumulated knowledge, practices, and beliefs passed down through generations within specific cultural contexts, often rooted in Indigenous communities. Phytopharmaceuticals, on the other hand, involve the study and application of medicinal properties derived from plants for therapeutic purposes. This abstract aims to explore the interface between TSK

and phytopharmaceuticals, emphasizing their complementary roles in modern healthcare. Despite advancements in pharmaceutical research, TSK continues to offer valuable insights into the utilization of natural resources for healing. Indigenous communities possess profound knowledge about local flora and their medicinal properties, which often serve as the foundation for phytopharmaceutical development. Additionally, TSK provides a holistic understanding of health and well-being, encompassing spiritual, social, and environmental dimensions. Phytopharmaceuticals leverage scientific methodologies to validate the efficacy, safety, and mechanisms of action of plant-derived compounds. Through rigorous research and clinical trials, these natural remedies are integrated into mainstream medicine, offering alternative or adjunctive therapies for various conditions. Furthermore, phytopharmaceuticals hold promise for addressing global health challenges, including antimicrobial resistance and chronic diseases, while minimizing adverse effects associated with synthetic drugs. However, the convergence of TSK and phytopharmaceuticals also raises ethical, cultural, and regulatory considerations. Collaborative approaches that respect Indigenous knowledge systems, promote equitable partnerships, and ensure informed consent are imperative for ethical research and development practices. Moreover, regulatory frameworks must balance traditional wisdom with scientific rigor to ensure the safety, quality, and accessibility of phytopharmaceuticals. In conclusion, the synergy between TSK and phytopharmaceuticals underscores the importance of preserving traditional wisdom while embracing scientific innovation in healthcare. By fostering interdisciplinary dialogue, ethical collaboration, and inclusive policies, we can harness the potential of both domains to enhance global health outcomes and promote cultural diversity in medicine.

Keywords: Phytopharmaceuticals, Traditional Medicine, TSK, Regulatory

Analyzing the Psychological Effects of Yoga Practice in People with a Sedentary Lifestyle

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Abstract

This research delves into the psychological effects of yoga practice among individuals leading a sedentary lifestyle. Engaging in a sedentary lifestyle has been associated with a spectrum of psychological challenges including feelings of anxiety, stress, and disruptions in mood etc. Yoga with its holistic approach encompassing physical postures, breathing techniques, and meditation, holds promise as a complementary intervention to mitigate these psychological challenges. Using a combination of qualitative and quantitative methods this study aims to explore the impact of yoga practice on the psychological well-being of sedentary individuals. The research will involve participants with sedentary lifestyles engaging in regular yoga sessions over a specified period. Pre- and post-intervention assessments will be conducted to measure psychological changes. Quantitative data will be collected using psychological assessment tools, while qualitative data will be gathered through questionnaires, interviews, etc. Additionally, objective measures such as heart rate variability and cortisol levels may be utilized to provide further insight into the physiological responses to yoga practice. The findings of this research are anticipated to shed light on the efficacy of yoga as a psychological intervention for sedentary individuals. Regular yoga practice is believed to lead to reductions in various psychological issues and

overall well-being. Moreover, qualitative data will provide valuable insights into participants' subjective experiences, perceptions, and motivations regarding yoga practice. The implications of this research extend beyond academia to inform healthcare professionals, educators, and policymakers about the potential benefits of integrating yoga into sedentary lifestyles. This study helps to elucidate how yoga enhances mental health and well-being, further bolstering the evidence that advocates for yoga as a holistic approach. In conclusion, this research endeavors to bridge the gap between sedentary behavior and psychological health by examining the transformative potential of yoga practice. By elucidating its psychological effects, this study aims to empower individuals with sedentary lifestyles to embark on a journey of self care and holistic wellness through the practice of yoga.

Keywords: Yoga Practice, Sedentary Lifestyle, Psychological Effects, Anxiety, Stress, Food, Well-Being, Intervention, Holistic Approach, Mixed-methods Research, Qualitative Insights, Quantitative Data, Mental Health, Self Care, Meditation, Mindfulness

Eco-friendly Extraction Techniques for Sustainable Production of Traditional Medicinal Ingredients

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Abstract

The extraction of traditional medicinal substances is critical in several industries, including pharmaceuticals and herbal medicine. However, traditional extraction processes frequently include the use of hazardous solvents and high energy consumption, which pose substantial obstructions to sustainability and environmental preservation. ***Aim:*** *This article aims to look into eco-friendly extraction processes for the sustainable manufacture of traditional medicinal components, evaluating their performance, environmental impact, and potential for broad use in the pharmaceutical and herbal medicine sectors. Through this investigation, the article aims to contribute to the development of ecologically sensitive methods in traditional medicine manufacturing.* ***Method:*** *A literature survey was carried out by Scopus, Elsevier, and PubMed.* ***Discussion:*** *The review highlights the vital need for environmentally sustainable extraction methods in reducing the harm traditional medicine manufacturing does to the environment. More selectivity and less energy use are just two benefits of each technology, but problems with scalability and cost-effectiveness still exist. The long-term sustainability of traditional medicine manufacturing depends on stakeholders working together to overcome these challenges and promote the widespread adoption of environmentally friendly extraction techniques.* ***Conclusion:*** *To summaries, environmentally friendly extraction technologies offer strategies to mitigate the harmful impacts of traditional extraction methods on the environment, which bodes well for the long-term production of traditional medicinal components. Despite challenges linked to scalability and cost-effectiveness, collaborative efforts play an important role in accelerating these approaches and ensuring their widespread integration, therefore creating a more realistic possibility for traditional pharmaceutical manufacturing.*

Keywords: Traditional Medicine, Extraction Techniques, Pharmaceutical Manufacturing, Phytoconstituents

Effect of Shankhprakshalan on Digestive Health

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Abstract

The effective operation of the gastrointestinal system, which includes the stomach, intestines, liver, and pancreas, is referred to as digestive health. It entails procedures like waste removal, nutrition absorption, and digestion. Consuming a well-balanced, high-fiber diet, drinking plenty of water, controlling stress, getting regular exercise, and abstaining from excessive alcohol and tobacco usage are all important for maintaining excellent digestive health. Shankha Prakshalana Kriya, a yogic practice with its origins in ancient texts, is a technique of cleansing that is aimed at detoxifying the alimentary canal, highlighting natural processes, and avoiding drug usage or dangerous purgatives. In this elaborate account, the study focuses on the procedure, physiology, and clinical applications of Shankha Prakshalana thus explaining its traditional background and its place in present-day health practices. The process starts with the importance of taking saline water and performing specific yoga poses. Physiologically speaking this involves dynamic yoga poses enabling water to flow downwards thereby enhancing an effective bowel-cleaning process. This results in the regeneration of the digestive system, and cellular detoxification as well as tackling many types of diseases such as digestion problems; gynecological complications; and chronic inflammatory ailments.

Keywords: Chronic Inflammation, Well-balanced, High-fiber Diet, Digestive Health

Effectiveness of Specific Yoga and Shatkarma Practices as Complementary Approaches for Managing Hypothyroidism: A Comprehensive Review

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Abstract

Hypothyroidism affects about one in ten out of every thirty-five persons, which is a fairly significant prevalence. Reduced thyroid hormone (TSH) production is a common endocrine disease known as hypothyroidism. Reduced thyroid hormone levels slow down metabolic processes, leading to a variety of general symptoms such as weariness, dry skin, poor energy, etc. Whereas Shatkarma focuses on purification techniques, yoga incorporates physical postures, breathing techniques, and meditation. The usefulness of particular yoga and Shatkarma techniques as supplemental methods for treating hypothyroidism is assessed in this thorough review. Using predetermined search terms relating to yoga,

Shatkarma, and hypothyroidism, a thorough search was carried out across electronic databases, including Pub Med, Scopus, and Web of Science. the effects of yoga and Shatkarma on thyroid function, the alleviation of symptoms. This review looks at how yoga and Shatkarma affect thyroid function, how symptoms are relieved, and how well people with hypothyroidism live. The results imply that these methods might provide advantages like better thyroid function, reduced symptoms, and increased well-being. More investigation is necessary to validate these results and clarify the processes underlying the therapeutic benefits of yoga and Shatkarma in the therapy of hypothyroidism due to methodological constraints and heterogeneity in study designs. By incorporating these additional methods into established treatment plans, hypothyroidism patients may receive care that addresses both the physiological and psychological components of their condition.

Keywords: Hypothyroidism, Yoga, Shatkarma, Thyroid Function, Quality of Life

Effects of Yoga in Patients with Type 1 and Type 2 Diabetes

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Abstract

This extensive review evaluates the possible advantages of yogic practices for both T1DM and DM2. T1DM is marked by the autoimmune destruction of beta cells, which results in a total loss of insulin production. In children and adolescents, this condition can have a negative impact on their physiological as well as psychological growth such that it interferes with their physical and emotional maturation. Daily insulin injections, glucose monitoring, and dietary adjustments are important in managing this type. The research is focused on DM2 which is a major global health problem characterized by rising prevalence rates. It examines the effects of yoga on key parameters such as glycemic control, lipid profiles, and body composition among others. Favorable results are also noticed when it comes to postprandial and fasting blood sugar levels, reduction of weight, and enhanced BMI. Apart from hyperglycemia coupled with insulin resistance, yoga might also be tuned towards oxidative stress, blood pressure regulation, mood swings, quality sleep as well as drug usage among adults with DM2. Despite being positive, the research stresses that it must be interpreted carefully due to methodological constraints and variations among the studies surveyed. The study highlights the need for more high-quality research on whether standardized yoga programs can manage diabetes. This is shown through investigating such human responses as changes in neuroendocrine/ inflammatory markers via yoga which enlighten on its prospective influence on DM2. Additionally, this review notes that little is known about T1DM; hence, more investigations should be carried out to evaluate how yoga affects clinical results, inflammatory markers, and overall quality of life in individuals with T1DM. The headline Effects of Yoga in Patients with Type 1 and Type 2 Diabetes speaks to the broad purpose of this study which is to provide evidence-based recommendations for incorporating yoga into comprehensive diabetes care.

Keywords: Hyperglycemia, Insulin Resistance, Blood Pressure Regulations, Mood Swings

Efficacy of a Yoga Intervention in Patients with Rheumatoid Arthritis—A Review

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Abstract

Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by inflammation of the joints, leading to pain, stiffness, and disability. Despite advances in medical management, many individuals seek complementary and alternative therapies to alleviate symptoms and improve their quality of life. Yoga, an ancient mind-body practice, has gained attention for its potential benefits in managing RA. This literature review aims to examine the role of yoga in the management of RA by synthesizing findings from existing research studies. A comprehensive search of databases PubMed and Google Scholar was conducted to identify relevant articles published between 2018 and 2023 focusing on randomized controlled trials and systematic reviews. The review highlights the physiological and psychological mechanisms through which yoga may exert its effects on RA symptoms, including reduced inflammation, improved joint flexibility, decreased pain perception, and enhanced mental well-being. Furthermore, the review explores various yoga interventions, such as asanas (postures), pranayama (breathing exercises), and meditation, and their specific impacts on RA outcomes. Despite promising findings, limitations in study design, sample size, and methodological inconsistencies across studies underscore the need for further research to elucidate the optimal types, durations, and frequencies of yoga practices for individuals with RA. Nevertheless, the existing evidence suggests that yoga can serve as a valuable adjunctive therapy in the holistic management of RA, offering potential benefits for physical function, pain management, and psychosocial well-being.

Keywords: Rheumatoid, Arthritis, Yoga, Mindful Practice

Exploring Eugenol as a Promising Antifungal Agent Against Resistant *Mucor circinelloides* and *Rhizopus delemar*: Insights from In vitro and Molecular Studies

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Abstract

Mucor circinelloides and Rhizopus delemar widely distributed fungi, are major contributors to the emerging infectious disease mucormycosis, associated with significant morbidity and mortality. Managing Mucor infections poses a challenge due to inherent resistance to the majority of clinically available antifungal drugs. Understanding the virulence factors in M. circinelloides and R. delemar is crucial for developing new antifungal treatments. Promising targets include spore coat protein CotH3 and high-affinity iron permease FTR1, essential proteins for pathogenicity. Plant-derived aromatic

compounds show antimicrobial potential for therapeutic use. This study aims to assess the antifungal efficacy and understand the eugenol interactions with CotH3 and FTR1 proteins. A total of 30 soil samples were collected from various locations outside hospital premises in the National Capital Region of India to isolate M. circinelloides and R. delemar. Among these samples, 14 Mucor isolates were obtained, with three identified as M. circinelloides and five as R. delemar. Molecular identification was carried out by sequencing the 18S ITS region. Screening for azole and amphotericin B resistance, following E-strip and CLSI M38-A2 guidelines, was conducted for all Mucor isolates. Antifungal susceptibility tests revealed that 1 M. circinelloides and 2 R. delemar isolates exhibited high Minimum Inhibitory Concentration (MIC) values for POS and Amp B (>4 µg/mL), and a high MIC value was observed for voriconazole in all the Mucor isolates. Additionally, the in vitro MIC and IC50 of eugenol were determined against these isolates, revealing its antifungal activity with MIC values ranging from 12.5 to 25 µg/mL. Furthermore, the impact of eugenol on the conidial germination of R. delemar and M. circinelloides was observed under a light microscope. It was found that eugenol effectively inhibited the conidial germination of both Mucorales within 24 hours of incubation. Additionally, molecular docking studies were conducted, placing eugenol within the active sites of CotH3 and FTR1. In-silico results demonstrated significant binding scores of eugenols with the protein targets of M. Circinelloides and R. delemar. The study concluded that eugenol seems to be a potential antifungal agent against resistant M. circinelloides and R. delemar. Thus, eugenol could lead to the discovery of future antifungals.

Keywords: *Mucor circinelloides, Rhizopus delemar*, drug resistance, eugenol

Harnessing the Healing Potential Herbs and Spices in Preventing and Treating Chronic Condition

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Abstract

Background: *Spices are natural flavors used as preservatives, thickening agents, or emulsifying agents. Medicinal plants with their rich source of bioactive compounds could be a potential substitute for controlling pathogens associated with diseases. The phytochemicals may also supplement the requirement of the human body by acting as natural antioxidants, thereby protecting against free radical damage. Addressing lifestyle diseases is imperative due to their detrimental impact on life expectancy. Conventional therapies often carry undesirable side effects, underscoring the need for safer and more effective treatment options in modern drug discovery. Herbs and spices emerge as promising candidates in preventing and treating various ailments, including cancer, diabetes, arthritis, cardiovascular diseases, tuberculosis, malaria, liver disorders, kidney problems, and asthma. This comprehensive review delves into the therapeutic potential of 200 medicinal plants and 2258 bioactive components, elucidating their phytochemistry and pharmacognosy. Each plant showcases significant pharmacological potency against prevalent conditions, warranting further investigation into the mechanisms of action of their bioactive compounds.* ***Conclusion:*** *The passage outlines the medicinal benefits of numerous plants and bioactive compounds, with a focus on their secondary metabolites. Spices like turmeric, fenugreek, fennel, ginger, saffron, and garlic are highlighted for their diverse health benefits when consumed as part of the diet.*

Keywords: Medicinal Herbs, Spices, Bioactive Principles, Diseases

High Screen Time and Its Side Effects and The Energy of Yoga Nidra

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Abstract

In the world of modernization and advancement, back there in the era of notebooks, posts, letters, mails, etc., to today's digitalized world where we have e-books, e-notes, emails, and every other thing nowadays is done on E-platforms even Currency is now online and transacted via platforms like United Press International (UPI) and Net Banking, etc. Excessive screen time has become a prevalent concern for everyone no matter whether they are children, youngsters, or old age people, posing a threat to our physical and mental well-being. Our contemporary dependence on screens necessitates addressing the negative consequences of excessive screen time, for example nowadays instead of playing on fields children are playing mobile games, and people prefer Netflix and chill instead of traveling, having adventures, and meeting new people. This paper explores the detrimental effects of high screen exposure, which results in disrupted sleep cycles due to blue light interference with melatonin production and which decreases its quality, also bad sleep cycle results in increased headaches and makes a huge decline in the overall quality of daily life. Yoga Nidra, an ancient practice promoting deep relaxation while fully conscious, offers a potential solution. By inducing a state of profound mental and physical calmness, Yoga Nidra demonstrably improves sleep quality. Research suggests it effectively reduces stress-induced headaches and enhances cognitive function. Even though we can't reduce screen time drastically nevertheless we should still make efforts towards balancing its side effects by Yoga Nidra. Therefore, this concise analysis highlights the detrimental effects of high screen time on sleep, melatonin production, and overall well-being. It proposes Yoga Nidra as a viable tool to combat these negative consequences. Further research is crucial to delve deeper into the specific mechanisms by which Yoga Nidra counteracts the ill effects of excessive screen use and fosters a healthier lifestyle.

Keywords: Yoga, Yoga Nidra, Mental Well-being, Modernization, Advancement

Integrated Yogic Approach for Menstrual Disorder—A Narrative Review

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Abstract

Yoga is a practice that incorporates breathing exercises, physical postures, and meditation. There is evidence to suggest that yoga may be beneficial in managing menstrual disorders such as dysmenorrhea (painful periods) and premenstrual syndrome (PMS). One study found that a 12-week yoga intervention involving postures, breathing exercises, and relaxation techniques resulted in significant improvements in pain severity and disability among women with dysmenorrhea. Additionally, a systematic review of 14 randomized managed trials found that yoga may be effective in reducing the symptoms of PMS, including anxiety, depression, and physical symptoms such as cramps and bloating. Yoga may be beneficial in managing menstrual disorders due to its ability to reduce stress and improve emotional well-being. Stress and emotional distress have been linked to the development and severity of menstrual

disorders. Yoga's emphasis on relaxation and mindfulness may help to reduce stress levels and improve mood. In addition to its psychological benefits, yoga may also have a positive effect on menstrual disorders through its impact on the body. Certain yoga postures, such as those that open the hips and pelvis, may help to improve blood flow to the pelvic area and alleviate pain. However, it's necessary to note that more research is needed to fully understand the effects of yoga on menstrual disorders.

Keywords: Menstrual Disorders, Yogic Practices, Physical Benefits, Psychological Benefits

Integrating Karma Yoga and Hatha Yoga for Enhanced Well-being in Working Professionals: A Review of Physiological and Psychological Effects

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Abstract

In today's fast-paced professional environment, stress and burnout have become prevalent, adversely impacting the well-being of working professionals. This paper explores the integration of Karma Yoga and Hatha Yoga as a holistic approach to alleviate stress and enhance overall well-being in the workplace. Karma Yoga, emphasizing selfless service and mindfulness in action, synergizes with Hatha Yoga, a practice focusing on physical postures and breath control. This review examines the physiological and psychological effects of combining these two yogic disciplines, drawing from empirical studies and theoretical frameworks. Physiologically, the integration of Karma Yoga and Hatha Yoga has been associated with reduced levels of cortisol, decreased blood pressure, and improved cardiovascular health. Psychologically, it promotes greater emotional resilience, enhanced concentration, and heightened self-awareness. Moreover, the practice fosters a sense of interconnectedness and compassion, thereby nurturing positive workplace relationships and organizational culture. By integrating Karma Yoga's principles of service and mindfulness with Hatha Yoga's physical and breath-centric practices, working professionals can cultivate a balanced and sustainable approach to well-being amidst the demands of modern work life. This review underscores the potential of integrating these two yogic paths as a promising strategy for promoting holistic wellness in the workplace.

Keywords: Karma Yoga, Hatha Yoga, Physiological

Investigating Innovative Approaches to Vitiligo Management: A Comprehensive Analysis of New Treatment Techniques

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Abstract

Introduction: *Vitiligo is a non-congenital skin disorder caused by the loss of pigment-producing cells from the epidermal layer. This disorder is characterized by white patches that usually spread*

symmetrically. The lesional skin is more vulnerable to sunburn because it lacks melanin pigments. ***Objective:*** *The goal of this study is to present a thorough overview of the most recently taken vitiligo treatments, with a focus on integrative approaches that make use of the synergies between immunomodulators, conventional medications, and complementary therapies.* ***Methods:*** *A thorough examination of the literature was carried out, covering case studies, clinical trials, and current research on vitiligo therapies that had been published in reputable journals. The focus was on interventions such as dietary changes, supplements made from herbs, and mind-body therapies that combine traditional medical treatments with complementary methods.* ***Result:*** *Immunomodulation of Treg cells, TRM cells, and Janus Kinase (JAK) signaling has emerged as a potentially effective vitiligo treatment recently. As monotherapy or adjuvant therapy, systemic therapies are increasingly being demonstrated to have profound effects on the course of treatment of the disease. The most promising treatments included the use of oral Ginkgo biloba, extract as monotherapy, oral P. leucotomos with photochemotherapy or phototherapy, and oral phenylalanine as adjuvant therapy in conjunction with University of Virginia (UVA) therapy.* ***Conclusion:*** *An emphasis on integrative methods that blend complementary and traditional medicine. This comprehensive review shows the optimistic future for these developments and emphasizes the progress that has been made so far, the need for ongoing research, and the revolutionary potential of integrated methodologies in determining the direction of vitiligo therapy.*

Keywords: Vitiligo, Immunomodulation, Conventional Medication, Adjuvant Therapy

Irritable Bowel Syndrome: Yoga as Remedial Therapy

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Abstract

Irritable bowel syndrome is a cluster of symptoms of an upset gastrointestinal tract. In which a person goes through different kinds of digestive issues like loose stools, constipation, and bloating. This review investigates the current research on the efficacy of yoga in managing irritable bowel syndrome (IBS) symptoms. The research analyzes studies exploring how yoga impacts IBS severity, including its potential mechanisms of action. The review methodology details the search strategy used to identify relevant studies and the criteria for inclusion. Additionally, the review discusses potential limitations of the current research and explores avenues for future investigation. This review aims to provide a comprehensive overview of the evidence supporting the use of yoga as a complementary therapy for individuals with IBS. The main conclusions highlight how beneficial yoga is for reducing stress, improving gastrointestinal motility, and increasing body awareness in IBS patients when compared to conventional therapies. The review also addresses the research's possible shortcomings and suggests directions for further study. The goal of this study is to give a thorough summary of the data that supports the use of yoga as an additional form of treatment for people with IBS.

Keywords: Irritable Bowel Syndrome, Yoga, Digestion, Diet

Management of Gastrointestinal Disorder Using Yogic and Naturopathic Aspects

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Abstract

Worldwide, the management of gastrointestinal disease especially gastritis is a huge task in healthcare. The purpose of this article is to investigate how naturopathy and yoga offer alternative ways of treating these conditions by focusing on their holistic approach to health and wellness. Gastritis among other things, makes the lining of the stomach irritated or eroded and if not treated can lead to a lot of complications ranging from very mild discomfort to serious matters. Unlike conventional medicine whose main focus is on managing symptoms only without finding out their cause, this encompasses modifying dietary habits, making lifestyle changes, and trying natural interventions to reset balance within the digestive system for optimal functioning. Also recommended are dietary measures like avoiding foods that initiate flare-ups, taking more fiber-rich meals, and using probiotic sources that enhance colon function. Yoga therapy uses an integrative approach to address physical, mental, and emotional aspects of health using different practices such as asana, pranayama, and meditation. A previous study mentioned that patients having gastrointestinal disorders focused on the impacts of intervention using naturopathy and yoga over a period of 21 days. Criteria for assessment include improvement in symptoms like abdominal pain, indigestion, and nausea as well as broader life quality measures.

Keywords: Gastrointestinal Disorder, Naturopathic, Yogic

Mindfulness and Meditation: Ancient Practices for Modern Mental Health

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Abstract

A major shift has occurred as a result of the integration of mindfulness and meditation techniques from old Eastern traditions into modern mental health treatment. These practices are based on strong intellectual roots laid centuries ago and have their roots in the concepts of self-reflection, mindfulness, and inner peace. Research has shown the wide-ranging benefits of mindfulness-based therapies in both the psychological and physiological domains. These therapies have repeatedly demonstrated how well they work to lower stress, enhance emotional control, and promote general well-being. A better relationship with ideas, emotions, and life events encourages people to be present in the moment. Bringing mindfulness-based practices into the domains of mainstream psychology and healthcare indicates a significant advancement

toward overall well-being. These methods are effective in treating a variety of mental health conditions, such as anxiety, depression, and Post-Traumatic Stress Disorder (PTSD), and have become widely accepted in therapeutic settings. Furthermore, the value of mindfulness-based wellness programs in fostering self-care routines, and improving stress management skills is becoming more widely recognized. The integration of traditional knowledge with cutting-edge scientific data has made mindfulness and meditation techniques essential elements of modern mental health treatments. The understanding of their significant impact on enhancing psychological and emotional resilience, which ultimately leads to improved general well-being and quality of life, is reflected in their integration into mainstream situations. This convergence highlights the importance of a holistic approach to mental health that recognizes the relationship between the mind, body, and spirit in promoting the best possible well-being and thriving.

Keywords: Emotions, Well-being, Stress, Therapeutic, Psychology

Natural Plant-derived Matrix Metalloproteinase (MMP) Modulators: A Review

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Abstract

Matrix metalloproteinases (MMPs) are a family of zinc-dependent endopeptidases crucially involved in tissue remodeling, inflammation, and cancer progression. Dysregulation of MMP activity has been implicated in various pathological conditions, making them attractive therapeutic targets. In recent years, there has been a growing interest in exploring natural plant-derived compounds as modulators of MMP activity due to their potential therapeutic benefits and fewer side effects compared to synthetic inhibitors. This review aims to provide a comprehensive overview of natural compounds derived from plants that exhibit modulatory effects on MMP activity. The review begins by discussing the structural and functional characteristics of MMPs, highlighting their roles in physiological and pathological processes. It then delves into the mechanisms underlying MMP regulation and the significance of targeting MMPs for therapeutic intervention. Subsequently, the review systematically examines various classes of natural plant-derived compounds, including polyphenols, flavonoids, terpenoids, alkaloids, and peptides, that have been reported to modulate MMP activity. For each class of compounds, their sources, chemical structures, mechanisms of action, and experimental evidence supporting their MMP-modulating effects are discussed in detail. Furthermore, the review evaluates the potential therapeutic applications of natural plant-derived MMP modulators in various diseases, such as cancer, cardiovascular diseases, neurodegenerative disorders, and inflammatory conditions. Additionally, challenges and limitations associated with the development of natural MMP modulators, including issues related to bioavailability, potency, and specificity, are addressed. Overall, this comprehensive review provides valuable insights into the potential of natural plant-derived compounds as modulators of MMP activity, highlighting their therapeutic potential and paving the way for future research and development of novel MMP-targeted therapies derived from natural sources.

Keywords: Modulators, Matrix Metalloproteinases, Tissue Remodeling, Cancer

Natural Products and Drug Discovery

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Abstract

The foundation of modern pharmacy owes much to traditional scientific knowledge and ancient wisdom. This abstract delves into their complementary roles and explores their enduring role in modern drug development. Traditional scientific knowledge, personified in herbal medicine and alchemy, laid the groundwork for scientific pharmacy. These practices involved experimentation, observation, and the creation of standardized herbal remedies. Nature has served as a pharmacy for millennia, with traditional scientific knowledge and ancient wisdom guiding the discovery of medicinal plants. Traditional scientific practices, like herbal medicine, employed keen observation and experimentation to identify plants with therapeutic properties. Many ancient texts documented these findings, creating a rich storehouse of medicinal knowledge. Natural products, derived from plants, animals, and microorganisms, continue to inspire modern drug discovery. Many essential pharmaceuticals, like aspirin derived from willow bark, have natural origins. Even synthetic drugs often pretend the chemical structures of natural compounds. By combining traditional knowledge of bioactive compounds with modern scientific methods, researchers can unlock the vast potential of natural products. This collaborative approach holds the promise for developing novel medications, especially for emerging infectious diseases and complex conditions.

Keywords: Traditional Scientific Knowledge, Potential of Natural Products, Herbal Medicine, Drug Discovery

Role of Yoga on Immune Markers

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Abstract

Yoga, a centuries-old practice encompassing physical asanas, breathwork, and meditation/Dhyana, has been given attention for its potential impact on health and well-being. This systematic review explores the effects of yoga on immune system markers, aiming to elucidate its immunomodulatory mechanisms. A thorough search of electronic databases including PubMed, Scopus, and Web of Science was conducted up to January 2023 to identify pertinent studies. A synthesis of randomized controlled trials, observational studies, and systematic reviews examining the relationship between yoga practice and immune system markers was performed. Results indicate consistent evidence suggesting positive alterations in immune markers following engagement in yoga practice. Notably, yoga interventions were associated with significant changes in cytokine levels (e.g., interleukin-6, tumor necrosis factor-alpha), immune cell counts (e.g., lymphocytes, natural killer cells), and markers of immune cell activity (e.g., CD4+/CD8+ T cell ratio). Proposed mechanisms underlying the immunomodulatory effects of yoga include stress reduction, inflammation mitigation, and enhancement of physiological resilience. Moreover, yoga's emphasis on mindfulness, deep breathing, and physical postures may influence immune

function by regulating the autonomic nervous system and the hypothalamic-pituitary-adrenal axis. Despite these promising findings, methodological variations across studies, including diverse yoga interventions and outcome measures, present challenges in data interpretation. Future research should prioritize standardized protocols and larger sample sizes to address these limitations. In conclusion, this systematic review underscores the potential of yoga as a modulator of immune system markers.

Keywords: Immunomodulatory, Hypothalamic-Pituitary-Adrenal, Inflammation, Lymphocytes

Role of Yoga Practices and Traditional Treatment for Hypertension Management

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Abstract

Yoga is a conventional yogic practice that has been adapted for utilization in supportive and alternative medicine. It encompasses postures, breathing techniques, and meditation. The impact of yoga as an adjunctive intervention for high blood pressure has been investigated through various randomized controlled trials. The overall effects observed include a decrease in systolic blood pressure of approximately 10 mmHg and a reduction in diastolic blood pressure of 8 mmHg. Yoga has demonstrated its potential in aiding hypertension, but it does not appear to be effective for prehypertension. Breathing and meditation, along with physical activity, are recognized as active components of yoga interventions for patients with hypertension. This process can enhance and diminish parasympathetic and sympathetic activity, particularly through an increase in Gamma-Aminobutyric Acid (GABA) activity. As a result, it counteracts the excessive activity of the sympathetic nervous system associated with hypertension. While isolated case reports have linked yoga to serious adverse events, population-based surveys, and clinical studies indicate that yoga is no more likely to cause adverse events than other forms of physical activity. Therefore, it is regarded as a safe and beneficial intervention for managing hypertension. Considering the potential risk/benefit ratio, it is advised to prioritize gentle meditation and/or breathing techniques.

Keywords: Hypertension, Yogic Practices, Physical Benefits, Psychological Benefits

Technological Advancements in Glucose Monitoring and Artificial Pancreas Systems: Shaping Diabetes Care

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Abstract

The management of diabetes mellitus has witnessed significant advancements with the advent of new technologies in glucose monitoring and artificial pancreas systems. These innovations have

transformed the landscape of diabetes care, offering patients more precise and personalized management options. ***Objective:*** *This abstract aims to provide an overview of recent technological advancements in glucose monitoring and artificial pancreas systems and their impact on shaping diabetes care.* ***Methods:*** *A comprehensive review of the literature was conducted to explore recent developments in glucose monitoring devices, from minimally invasive including continuous glucose monitoring (CGM) systems, and flash glucose monitoring (FGM) systems to non-invasive glucose monitoring techniques such as optical, electrochemical, electro-mechanical. Additionally, advancements in closed-loop artificial pancreas systems, integrating CGM with insulin delivery, were examined.* ***Results:*** *Technological advancements have led to the development of CGM, and FGM systems with improved accuracy, longer sensor wear duration, and enhanced connectivity features. Moreover, recent development of non-invasive methods has shown the path to measure blood glucose levels without harming bodily tissues. Further, closed-loop artificial pancreas systems have shown promising results in optimizing glycemic control while minimizing the risk of hypoglycemia.* ***Conclusion:*** *Technological advancements in glucose monitoring and artificial pancreas systems have revolutionized diabetes care by providing patients with more convenient, accurate, and personalized management options. These innovations hold the potential to improve glycemic control, enhance quality of life, and reduce the burden of diabetes-related complications for individuals living with diabetes.*

Keywords: Diabetes Mellitus, Glucose Monitoring, Continuous Glucose Monitoring, Artificial Pancreas, Technological Advancements

Therapeutic Advancement of Culinary Advancement

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Abstract

Background: *In recent years, there has been a growing awareness of the medicinal potential of culinary spices. These spices are now seen as vital components in supporting human health, rather than just flavor enhancers. This abstract explores the medicinal developments linked to culinary spices, highlighting the variety of bioactive chemicals and processes that they possess. Spices used in cooking, such as cayenne pepper, cinnamon, ginger, garlic, and turmeric, are abundant in phytochemicals that have been shown to have antibacterial, anti-inflammatory, and antioxidant qualities. Numerous health advantages, such as immune system regulation, cardiovascular protection, and even possible anti-cancer effects, have been associated with these substances. These spices have a wide range of medicinal applications because of the way that their different bioactive ingredients work together. Studies have indicated that the key ingredient in turmeric, curcumin, has strong anti-inflammatory qualities and could be useful in treating chronic inflammatory diseases. Cinnamon is a useful addition to diabetes treatment since it has demonstrated promise in enhancing insulin sensitivity and glycemic control. Due to its anti-inflammatory and anti-nausea properties, ginger has been studied for its ability to reduce the symptoms of a number of gastrointestinal illnesses. Garlic's antibacterial qualities have also been well-researched, indicating that it may be useful in the fight against viral and bacterial illnesses. Because it contains capsaicin, cayenne pepper has shown analgesic properties and may be useful in the treatment of pain. These spices have been used in cooking to improve general health as well as the sensory appeal of meals.*

Keywords: Spices, Health, Anti-inflammatory, Anti-nausea, Sensory

Traditional Phytopharmaceuticals and Current Regulatory Framework of Phytopharmaceuticals in India, USA, and China

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Abstract

Phytopharmaceuticals, derived from plants for medicinal purposes, have gained global attention due to their perceived therapeutic benefits and cultural significance. In India, these products are deeply rooted in traditional medicine systems like Ayurveda, Siddha, and Unani, which have been practiced for centuries. The regulatory framework governing phytopharmaceuticals in India is overseen by the Ayurvedic, Siddha, and Unani Drugs Technical Advisory Board. This board ensures the safety, efficacy, and quality of these products through rigorous guidelines and registration processes, promoting their integration into modern healthcare practices while preserving their traditional heritage. In the United States (USA), phytopharmaceuticals are regulated by the Food and Drug Administration (FDA). The FDA categorizes these products as either dietary supplements or drugs based on their intended use and claims. This classification dictates the level of scrutiny and approval required before they can be marketed to consumers. The FDA's regulatory oversight aims to safeguard public health by evaluating the safety, efficacy, and quality. China boasts a rich history of herbal medicine, with phytopharmaceuticals playing a significant role in traditional healthcare practices. The Chinese Pharmacopoeia Commission is responsible for regulating these products in China and setting standards. Manufacturers and distributors must adhere to strict registration and approval processes outlined by the commission, ensuring that phytopharmaceuticals meet the required standards before reaching consumers. Overall, the regulatory frameworks in India, the USA, and China reflect a balance between promoting innovation and ensuring the safety and efficacy of phytopharmaceuticals, contributing to the global discourse on traditional medicine and modern healthcare integration.

Keywords: Traditional Medicine, Pharmacopoeia, Herbal, Regulations, FDA

Unlocking Inner Harmony: Exploring the Impact of Mantra Chanting—A Narrative Review

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Abstract

A mantra is a sacred syllable with a poetic feel, and emotional and spiritual factors linked to it. It is a practice deeply rooted in various spiritual traditions, known for its potential to promote well-being and

inner harmony. Previous studies stated the fact that mantra chanting is more effective than mere poem chanting. ***Objectives:*** *To examine the therapeutic benefits of mantra chanting on individuals' physiological, psychological, and spiritual well-being? To discuss the potential applications of mantra chanting as a tool for self-discovery, healing, and spiritual evolution in promoting holistic wellness.* ***Methods:*** *To find pertinent research already done, a thorough search of academic databases such as PubMed and Google Scholar were carried out, keywords linked to mantra and its effects were all part of the search approach. Predetermined inclusion criteria were used to choose studies, which included mental, physiological, and psychological well-being along with spiritual enhancement. Exclusion criteria involve review articles and if full text is not available.* ***Results:*** *The present review highlights the therapeutic benefits of mantra chanting, including stress reduction, emotional regulation, and enhanced spiritual connectedness. It also explores how chanting mantras cultivates mindfulness, promotes self-awareness, and facilitates personal transformation.* ***Conclusion:*** *This review shows how mantra chanting helps unlock inner harmony and foster holistic well-being. By combining scientific studies with personal stories, we learn a lot about how powerful mantra chanting can be. It helps us understand how chanting can change our lives for the better. So, this review gives us a complete picture of how mantra chanting can transform us and make us feel happier and healthier.*

Keywords: Mantra Chanting, Inner Harmony, Spirituality, Mental Health, Holistic Health, Meditation

Yoga—A Key to a Healthy Life

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Abstract

Background: *Yoga is a key to a healthy life; yoga, an ancient practice originating in India, has gained immense popularity in recent times due to its well-documented benefits for both physical and mental well-being. This review paper explores the multifaceted contributions of yoga to a healthy life. The paper delves into the physiological aspects of yoga, highlighting how it improves flexibility, strength, and balance. It examines research on how yoga postures (asanas) can alleviate back pain, manage arthritis symptoms, and even benefit cardiovascular health. Furthermore, the review explores the stress-reducing and mood-boosting effects of yoga. It discusses how yoga practices, including deep breathing techniques (pranayama), promote relaxation and better sleep, leading to increased energy levels and a more positive outlook. The paper also acknowledges the holistic approach of yoga, emphasizing how it fosters self-awareness and self care. The concept of yoga as a journey towards inner peace and well-being is explored. The review study concludes by making the case that yoga is a cornerstone to living a healthy life. Yoga provides a holistic approach to well-being that can be tailored to meet specific needs and objectives by treating both the physical and mental components of health.*

Keywords: Yoga, Healthy Life, Asana and Pranayama, Mood-boosting Effect

Yoga and Respiratory Health: A Comprehensive Review

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Abstract

Yoga's comprehensive approach, which includes breathing exercises, physical postures, and meditation, has drawn attention due to its potential health advantages, especially in improving lung function. The results of numerous studies evaluating yoga's effects on respiratory health in a range of demographics are summarized in this review study. The research indicates that yoga interventions, such as pranayama techniques, benefit lung function measures in both healthy individuals and particular populations, such as those with respiratory illnesses. These indicators include lung capacity and efficiency. The favorable effects of yoga on respiratory health are further supported by meta-analyses and systematic reviews, which highlight the importance of pranayama practices. Mechanistic research clarified the physiological processes, such as muscular conditioning, anti-inflammatory qualities, and mind-body awareness, that underlie these effects. One way this might impact clinical practice is by incorporating customized yoga therapies into respiratory rehabilitation programs to improve outcomes. However, further research is needed to elucidate long-term effects, compare yoga with traditional treatments, and understand underlying mechanisms comprehensively. Collaboration between healthcare providers and yoga practitioners is crucial for advancing evidence-based respiratory health interventions.

Keywords: Yoga, Pulmonary Function, Respiratory Health, Pranayama, Lung Capacity, Holistic Health

Yoga Therapy: A Multifaceted Approach to Managing Depression, Panic Attack, and Anxiety along with Weight Gain—A Case Report

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Abstract

Introduction: *This case study describes the use of a yoga therapy approach to manage depression, anxiety, panic attacks, and weight gain in a 25-year-old male student.* ***Aims:*** *The yoga therapy intervention aimed to improve the patient's mental and physical well-being by addressing the root causes of his condition.* ***Materials and Methods:*** *The Integrated Approach to Yoga Therapy (IAYT) model developed by Swami Vivekananda Yoga Anusandhana Samasthana (S-VYASA) was used. This model incorporates practices for the five sheaths (koshas) of existence: annamaya, pranamaya, manomaya, vijnanamaya, anandamaya. The patient participated in a one-week program that included a yogic diet, cleansing practices (kriyas), asanas with pranayama, chanting (japa), meditation, yogic counseling, and exposure to spiritual practices.* ***Results:*** *After one week of yoga therapy, the patient*

reported feeling lighter and experiencing reduced anxiety and depression. Additionally, his vital signs (blood pressure, respiratory rate, pulse rate) and weight showed improvement. ***Conclusion:*** *This case study suggests that the IAYT approach can be a beneficial intervention for managing psychiatric disorders by addressing the mind-body connection holistically.*

Keywords: Yoga Therapy, Depression, Anxiety, Panic Attacks, Weight Gain, IAYT Model, Pancha Kosha

Yoga as an Integrated Approach for Primary Dysmenorrhea

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Abstract

Among women who are menstruating now, dysmenorrhea—a condition marked by spasmodic uterine contractions and pain associated with inflammatory abnormalities—is the most common gynecological problem. A woman's menstrual cycle is a classic example of a cyclical physiological manifestation of her existence. The term for painful periods is dysmenorrhea. The word "primary dysmenorrhea" refers to periods that hurt so much that they interfere with day-to-day activities but are not caused by pelvic pathology. Numerous studies have shown that the ancient mind-body practice of yoga, which includes a variety of asanas, pranayamas, and dhyanas, can provide overall relief from menstruation discomfort. One non-pharmacological strategy for avoiding dysmenorrhea is yoga, as we have found. Yoga is a unique form of exercise that promotes physical development. We've found yoga is one non-pharmacological way to stop dysmenorrhea. Yoga is a unique form of exercise that promotes physical well-being and provides both physical and mental relaxation via breathing and meditation. Yoga enhances blood flow to every cell in the body, including the brain, by enhancing the function of the endocrine (hormonal) glands. This results in an increase in blood volume, which both increases the quantity and size of blood vessels that carry blood throughout the body and permits oxygen to enter blood vessels in the reproductive organs where vasoconstriction during dysmenorrhea occurs. Consequently, yoga poses can decrease the intensity of pain.

Keywords: Primary Dysmenorrhea, Yoga, Menstrual Pain

TRACK II

Stem Cells, Tissue Engineering and Pharmacology

Abstract

Unraveling the Role of MMP-3 on Cellular Aging: A Review

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Abstract

Aging results from cellular damage or genetic expression, causing progressive dysfunction in organs. Normal cells have finite lifespans, leading to eventual death and manifestations of aging in the body. Cellular aging involves continuous cell division despite insensitivity to external factors, leading to homeostatic imbalances, protein aggregation, oxidative stress, DNA damage, and organelle dysfunction, potentially accelerating organismal aging and disease development. Over the course of evolution, proteases have been implicated in a variety of biological functions. Proteases regulate extracellular matrix remodeling crucial for embryonic development and tissue balance. Dysregulation can impact aging due to extracellular matrix disruption. MMP-3, an exocrine protein released via exocytosis and extracellular vesicles, plays a pivotal role in cellular aging processes. In this review, we are going to highlight the involvement of MMP-3 in various disorders such as Hutchinson-Gilford progeria syndrome, Alzheimer's disease, Senescence-associated secretory phenotype, rat chondrocytes, dementia, aneurysmal coronary artery disease, type 2 diabetes, rheumatoid arthritis, etc.

Keywords: Matrix Metalloproteinases (MMPs), Hutchinson Gilford Progeria Syndrome (HGPS), extracellular Matrix (ECM), Senescence-associated Secretory Phenotype (SASP), Coronary Aneurysms (CAs), Systemic Lupus Erythematosus (SLE), Rheumatoid Arthritis Synovial Fibroblasts (RASFs), Gestational Diabetes Mellitus (GDM)

Anti-polycystic Ovary Syndrome (PCOS) Activity of Selected Antioxidants Using Polycystic Ovary Syndrome (PCOS) Animal Model

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Abstract

Background: *In the pathophysiology of Polycystic Ovary Syndrome (PCOS), oxidative stress has come to light as a key factor that influences the emergence and advancement of issues linked to the condition. Due to their ability to prevent oxidative damage, protective effects and neutralize the negative consequences of Polycystic Ovary Syndrome (PCOS), antioxidants have attracted a lot of interest. In this work, we used a letrozole-induced PCOS model to examine the effectiveness of antioxidants in reducing symptoms of PCOS.* ***Objectives:*** *Systemic review of literature related to antioxidants used for the treatment of PCOS in experimental models.* ***Method:*** *Literature was reviewed by using various platforms like PubMed, and Google Scholar by using keywords such as PCOS, Polycystic Ovary Syndrome, and Antioxidants.* ***Results:*** *We obtained 18 results in PubMed from which ten articles were*

selected based on their relevance and similarity. In Google Scholar 1930 results were found from the selected 50 articles, and from those 50 articles, we chose the most relevant ones. The results indicate that antioxidants help treat PCOS. Literature review-based results demonstrate the potential of antioxidants as effective therapeutic agents for the treatment of PCOS. ***Conclusion:*** *Antioxidant therapy had substantial therapeutic benefits that reduced the pathology of PCOS in a number of ways. The treatment of vitamin E, vitamin C, and N-Acetylcysteine (NAC) improved ovarian cyst formation prevention, ameliorated hyperandrogenism, and enhanced estrous cyclicity. Additionally, antioxidants showed positive effects on insulin sensitivity, lipid profiles, and glucose homeostasis, suggesting that they may be able to lessen metabolic abnormalities linked to PCOS. To confirm their effectiveness and safety profiles, more research into their mechanisms of action and clinical trials involving human subjects is necessary. This will open up new possibilities for focused therapies in the management of PCOS.*

Keywords: PCOS, Polycystic Ovary Syndrome, and Antioxidants

Brief Insight into Polycystic Ovarian Syndrome

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Abstract

PCOS or polycystic ovarian syndrome is a common hormonal disorder in women of reproductive age. Symptoms include polycystic ovaries on ultrasound, hirsutism, acne, and irregular menstrual cycles. The exact cause of PCOS is not yet known, but environmental and genetic factors are believed to play a role. The condition typically presents in adolescence or early adulthood and can lead to fertility issues and hormonal imbalances. Other potential complications include diabetes type 2, insulin resistance, and dyslipidemia. Clinical criteria, such as the Rotterdam criteria, are the main basis for PCOS diagnosis. The detection of polycystic ovaries can be aided by transvaginal ultrasound. Pharmacological therapies, surgical options, and lifestyle changes are all part of PCOS management. Lifestyle changes that lower testosterone and increase insulin sensitivity include losing weight and exercising frequently. Metformin, oral contraceptives, and anti-androgens are all part of pharmacological therapy. Metformin is especially useful in lowering the risk of metabolic problems and enhancing insulin resistance. For women who have severe symptoms or who do not improve with medication, surgical options like laparoscopic ovarian drilling may be taken into consideration. In summary, PCOS is a complicated and multidimensional illness that necessitates an all-encompassing management strategy. For women with PCOS optimizing outcomes requires an understanding of the underlying pathophysiology and the application of evidence-based treatment strategies. Transvaginal ultrasonography is a useful tool for diagnosing polycystic ovaries. PCOS management includes lifestyle modifications, medication therapies, and surgical procedures. Changes in lifestyle, such as regular exercise and weight loss, can lower testosterone levels and improve insulin sensitivity, e.g., metformin, and oral contraceptives.

Keywords: Polycystic Ovarian Disease (PCOD), Obesity, Cardiovascular Disease, Lifestyle, Laparoscopic Surgery

Cardiovascular Adverse Events Associated with the Use of Tyrosine Kinase Inhibitors in Hepatocellular Carcinoma

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Abstract

Tyrosine kinase inhibitors (TKIs) have emerged as promising therapeutic agents in the management of hepatocellular carcinoma (HCC). Meanwhile, concerns have been raised regarding cardiovascular adverse events (AE) in HCC patients associated with TKI treatment. As a result, a comprehensive evaluation of the risk-benefit profile of TKIs in patients with HCC was conducted utilizing the existing literature. Objectives: The objective of studying cardiovascular AE is to assess and understand the potential cardiovascular AE associated with sorafenib, lenvatinib, regorafenib, and cabozantinib in HCC patients. Methods: Articles published from 2013 to 2024 were searched using PubMed and Google Scholar. Eligible studies were selected based on inclusion criteria, encompassing randomized controlled trials, cohort studies, and case-control studies reporting on cardiovascular AE following TKIs treatment in HCC patients. Results: Four TKIs were selected based on evidence of cardiovascular AEs in patients with HCC: cabozantinib, lenvatinib, regorafenib, and sorafenib. Based on the order of probability of cardiac toxicity, sorafenib was found to have the highest risk of cardiotoxicity among all the TKIs that were studied. Regorafenib, on the other hand, did not indicate an increased risk of cardiac injury. Lenvatinib was shown to have the greatest substantial likelihood of inducing hypertension and cardiovascular events of all levels, with cabozantinib, sorafenib, and regorafenib following closely behind. Conclusion: The survey reveals that patients with HCC should have their cardiovascular adverse events closely monitored. Further investigation is necessary to clarify the fundamental mechanisms and risk-reduction tactics in order to maximize the therapeutic management of HCC with TKIs.

Keywords: Cardiovascular Adverse Events, TKIs, HCC, Cardiotoxicity, Hypertension

Comparative Assessment and Evaluation of Different Marketed Formulations Used for the Treatment of Striae Distensae

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Abstract

Introduction: *Comparative assessment and evaluation of different marketed formulations used for the treatment of striae distensae.* ***Objective:*** *The intricate nature of striae distensae (stretch marks) is*

illuminated through a comprehensive examination of commercially marketed formulations intended for the management of this dermatological condition. Stretch marks, characterized by dermal and epidermal alterations involving reduced levels of collagen, elastin, and extracellular matrix constituents, manifest in distinct phases from raised, erythematous lesions (striae rubrae) to flattened, depigmented scars (striae alba). These manifestations commonly arise from events such as pregnancy, puberty, or rapid fluctuations in body weight. Etiological factors encompass diminished fibronectin and collagen expression, suggesting a genetic predisposition, particularly among adolescents. ***Conclusion:*** *Treatment objectives emphasize the improvement in skin appearance, elasticity, and collagen synthesis. Various commercially available formulations, including Mederma Stretch Mark Therapy, Bio-Oil, and Palmer's Cocoa Butter Formula, incorporate components such as tretinoin, glycolic acid, hyaluronic acid, almond oil, cocoa butter, and olive oil, each purporting distinct mechanisms of action against stretch marks. Recent investigations underscore the efficacy of azelaic acid in ameliorating stretch marks. Additionally, emerging modalities like fractional CO_2 laser and microneedling in combination with vitamin C exhibit promise in enhancing collagen production, augmenting patient satisfaction, and reducing stretch mark visibility. This comprehensive evaluation underscores the diverse array of treatment options available, each targeting striae distensae through unique therapeutic pathways.*

Keywords: Striae Distensae, Collagen, Elastin, Extracellular Matrix, Stretch Marks, Tretinoin, Glycolic Acid, Hyaluronic Acid, Azelaic Acid, Fractional CO_2 Laser

Epigenetic-metabolic Interplay in Cancer Development Associated with Metastatic Brain Tumor

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Abstract

Background: *Research indicates that metabolic reprogramming can promote tumor growth and survival under adverse conditions which lead to epigenetic changes. Many epigenetic change factors contribute to the malignant phenotype, including DNA methylation patterns, histone modifications, and regulating non-coding Ribonucleic Acids (RNAs), while metabolic by-products influence epigenetic states. A brain tumor microenvironment also increases the complexity of therapeutic intervention by contributing to metabolic and epigenetic dysregulations. A special focus is placed on metastatic brain tumors in this study, which discusses epigenetic and metabolic instability in tumorigenesis.* ***Objectives:*** *With a particular focus on brain tumors, a comprehensive review will reveal all the mechanisms contributing to cancer metastasis, including metabolic alterations and epigenetic changes. As we synthesize findings from numerous studies, we hope to identify potential targets for cancer treatment strategies by highlighting metabolism and epigenetics.* ***Methods:*** *PubMed and Google Scholar were utilized for targeted searches, and a systematic approach was used through clear objectives. A critical analysis was conducted to identify patterns and gaps to provide a concise overview of the interplay of*

epigenetics and metabolism. Results: Cancer cells can colonize brain tissue when the blood–brain barrier breaches. Understanding these mechanisms focuses on metabolic and epigenetic pathways that can be targeted synergistically to combat brain metastasis. ***Conclusion:*** *Epigenetic and metabolic reprogramming play prominent roles in the pathogenesis of metastatic brain cancer. To develop targeted therapies, it is crucial to identify key elements within this nexus. Disrupting the interplay between metabolic and epigenetic modifications of cancer cells could revolutionize the management of metastatic brain cancer.*

Keywords: Metabolic Reprogramming, Brain Tumor, Epigenetic Alteration, Reversal Strategies

Evaluating the Beneficial Role of Capsaicin as Neuroprotectant Through In Vitro and In Vivo Approaches in Huntington's Disease

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Abstract

Huntington's disease (HD) is a rare, inherited fatal neurological disorder that largely affects the caudate. Capsaicin, a TRPV1 receptor agonist, and activation of TRPV1 have a significant role in neurodegenerative disorders. ***Objective:*** *The aim is to investigate the neuroprotective effect of capsaicin on glutamate and lipopolysaccharide (LPS)-induced neurotoxicity in N2a cells as well as the potential role of 3-nitropropanoic acid in Huntington's disease.* ***Material and Methods:*** *The effect of capsaicin on glutamate and LPS-induced toxicity was performed in N2a cells. After the administration of 3-NP (20 mg/kg, i.p.), capsaicin (5, 10, and 20 mg/kg, p.o.) was given for seven consecutive days. Physiological and behavioral studies were performed on the rodents. Moreover, pro-inflammatory levels, biochemical and oxidative stress parameters, mitochondrial enzyme complex activities with mitochondrial permeability, and histopathological parameters were also studied.* ***Results:*** *Corrective Action Plan (CAP) at various doses (5, 10, 25, and 50 µM) altered the changes induced by glutamate and LPS in cell morphology and restored the oxidative and cytokine levels and the loss of mitochondrial membrane integrity. All doses of capsaicin (5, 10, and 25 mg/kg, p.o.) upturned the cognitive impairment and motor incoordination effects induced by 3-NP. 3-NP-injected mice demonstrated substantially increased cytokine levels, oxidative stress, and defective mitochondrial complex activity. However, capsaicin at different doses restored the effects induced by 3-NP. Cell morphology was found to be normal after the treatment with capsaicin in histological studies.* ***Conclusion:*** *These findings suggested capsaicin can be considered a novel treatment for the management of neurodegenerative disorders by restoring the antioxidant enzyme activity, cytokine level, and mitochondrial functions.*

Keywords: Huntington's disease, Capsaicin, Mitochondrial dysfunction, N2a cell line, MTT assay

Exploring Diverse Stem Cell Therapies for Spinal Cord Injuries: Challenges, Progress, and the Path Forward

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Abstract

Background: *Spinal cord injury (SCI) leads to the loss of nervous tissue, causing motor and sensory function deficits. Stem cells, possessing self-renewal and totipotency, offer the potential to prevent immune rejection and foster neuroprotection and axon regeneration. Examined therapies encompass various spinal cord injury (SCI) stem cell types, such as bone marrow mesenchymal, umbilical mesenchymal, adipose-derived mesenchymal stem cells, neural stem cells, neural progenitor cells, embryonic stem cells, induced pluripotent stem cells, and extracellular vesicles.* ***Objective:*** *To evaluate the progress of stem cell treatment for spinal cord injuries (SCI).* ***Methods:*** *After SCI, endogenous regenerative events occur, which are hindered by a surge in the proliferation of local stem cells and growth inhibitors. Newborn stem cells fail to integrate into the injured spinal cord tissue. Growth factors and embryonic stem cells (ESCs) aid in obtaining neurons and glial cells. Mouse trials demonstrate ESC efficacy. Human neural progenitor cells elongate axons and protect against excitotoxicity. Bone marrow stromal cells and mesenchymal stem cells show neuroprotective and therapeutic effects, respectively.* ***Result:*** *Human ESCs have been proposed for spinal cord repair, and autologous bone marrow-derived stem cells have been transplanted in Ecuador, supported by Prime Cell Therapeutics. However, single-cell treatments show limited benefits in clinical trials. Ethical and social concerns impede research, and choosing the most suitable stem cell type remains challenging.* ***Conclusion:*** *Despite preclinical and clinical findings, a combined treatment approach is necessary due to the multifaceted nature of SCI damage. Early-stage stem cell therapies pose unclear risks and persistent challenges, and further research is essential for meaningful clinical translation.*

Keywords: Totipotency, Newborns, Neural Stem Cells, Umbilical Mesenchymal

Exploring the Mechanisms Associated with the Development of Drug-resistant Epilepsy

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Abstract

Background: *Epilepsy is a highly prevalent chronic neurological disorder estimated to affect about 50 million people worldwide. Of all the epileptic patients, 30% develop drug-resistant epilepsy (DRE).*

Delays in identifying an effective treatment can cause an increased risk of cognitive disability, other comorbidities, and premature mortality. ***Objectives:*** *The objective of this review article is to explore mechanisms associated with DRE because of various neuroinflammatory targets like cytokines and chemokines, CAMP response element-binding (CREB) protein, Purinergic (P2) receptors, Cannabinoid (CB2) receptors, and blood–brain barrier (BBB) dysfunction were studied. The present review also focuses on the generation of free radicals and the consequences of oxidative stress, such as DNA or mitochondrial damage leading to neurodegeneration.* ***Methods:*** *Data were collected from Medline, PubMed, MDPI, and Science Direct through searching.* ***Results:*** *There is a mutual promotion between inflammation and epilepsy. Neuroinflammation damages the glial cells as well as upregulates CREB protein, leading to neuronal damage and ultimately seizures. Upregulation of CREB and COX-2 was seen in patients with DRE. PGE2 is involved in the activation of CREB via the Brain-derived Neurotrophic Factor (BDNF)/TrkB pathway. BDNF promotes granule cell hypertrophy and mossy fiber branching. Also, it was seen that seizures increase BBB permeability which causes extravasation of leukocytes and inflammatory molecules from blood vessels in the brain parenchyma, causing neuroinflammation.* ***Conclusion:*** *In this review, we discuss the pathogenesis of DRE and various neuroinflammatory targets and the pathways they follow for the development of DRE.*

Keywords: Epilepsy Hypothesis, Refractory Epilepsy, Drug-resistant Epilepsy

Exploring the Role of Vitamin E Conjugation with Hydrophilic Moiety in Delivery of Bioactive Compounds and Vitamin E Itself

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Abstract

Background: *Vitamin E, categorized into various forms, possesses notable antioxidant properties and therapeutic potential in managing chronic disorders associated with oxidative stress. However, its hydrophobic nature presents challenges in solubility and bioavailability, limiting its effectiveness in therapeutic interventions. Similarly, many bioactive compounds encounter delivery obstacles due to hydrophobicity.* ***Objective:*** *The objective of this study is to explore the efficacy of conjugating vitamin E with hydrophilic moieties as a strategy to enhance the delivery of both vitamin E itself and associated bioactive compounds. This approach aims to improve stability, solubility, and targeted delivery, thereby overcoming challenges related to hydrophobicity in drug delivery systems.* ***Methods:*** *The study employs conjugation techniques to link vitamin E with hydrophilic moieties and formulation development of the same, thereby enhancing its hydrophilicity and addressing solubility and bioavailability issues. Characterization, stability, solubility, and oxidation of the resulting conjugates are assessed through appropriate analytical methods. Additionally, the study investigates the impact of conjugation on the hydrophilicity and site-specific delivery of vitamin E.* ***Results:*** *Conjugation of vitamin E with hydrophilic moieties is expected to enhance its stability, solubility, and oxidation resistance. The resulting conjugates demonstrated would improve hydrophilicity and exhibit enhanced site-specific delivery capabilities. This poster will highlight that the conjugation*

strategy effectively addresses challenges associated with hydrophobicity, thereby facilitating more efficient delivery of vitamin E and associated bioactive compounds.

Keywords: Antioxidants, Conjugates, Hydrophobicity, Bioavailability

Hematopoietic Stem Cell-based Gene Therapy for the Treatment of HIV/AIDS

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Abstract

Introduction: *Human immunodeficiency virus (HIV), a lentivirus, infects humans and leads to acquired immunodeficiency syndrome (AIDS), causing millions of deaths worldwide. HIV progression to AIDS involves immune system deterioration, notably T-helper cell loss. Despite advances in antiretroviral therapy (ART), AIDS remains a significant global health issue.* ***Objective:*** *This study explores hematopoietic stem cell-based gene therapy for HIV/AIDS treatment and its mechanism of action.* ***Method:*** *The treatment known as combination antiretroviral therapy (cART), while effective in reducing HIV viremia, is unable to eliminate the virus. This treatment can pose various challenges, including drug interactions, toxicities, costs, viral resistance, and patient adherence. Due to these obstacles, researchers are exploring alternative therapies for chronic HIV infection, with gene therapy showing great promise. One such innovative approach is hematopoietic stem cell-based anti-HIV gene therapy, which aims to enhance the immune system through the transplantation of genetically modified stem cells containing anti-HIV genes. This technique involves high-dose chemoradiotherapy followed by the infusion of blood stem cells (CD34+ cells). Previously, bone marrow was the primary source of stem cells, but stem cell growth factors now allow for the collection of peripheral blood stem cells, which are commonly used in hematopoietic stem cell transplants (HSCTs). Combining entry inhibitors with antiretroviral treatments may help lower the risk of reinfection after transplantation. Furthermore, infusing HIV-specific T cells from the donor could improve HIV treatment for transplant recipients.* ***Result:*** *Hematopoietic stem cell-based gene therapy holds potential for HIV/AIDS treatment, offering a lifelong solution alongside ART. Challenges persist despite ART advancements, necessitating innovative approaches like gene therapy, which aims to rejuvenate the immune system through stem cell transplantation.* ***Conclusion:*** *Hematopoietic stem cell-based gene therapy shows promise as an innovative way to treat HIV/AIDS, in addition to the current antiretroviral therapy. This therapy rejuvenates the immune system through the transplantation of genetically modified stem cells. Further research and clinical trials are required to fully explore the safety and effectiveness of this approach. The ultimate goal is to provide a lifelong solution for HIV/AIDS management.*

Keywords: Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome, Hematopoietic Stem Cell, Gene therapy, Gene Transplantation

Immunotherapies in Early Stages of Alzheimer: Challenges and Opportunities

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Abstract

Alzheimer's disease (AD) remains an intractable global health challenge with limited therapeutic options. This article reviews the emerging role of immunotherapies in the early stages of AD, shedding light on recent breakthroughs and clinical progress. Immunotherapeutic strategies, including monoclonal antibodies, active vaccination, and passive immunization, have been developed to target hallmark AD pathology, such as amyloid-beta aggregation. Early diagnosis, enabled by biomarkers and neuroimaging, is pivotal for optimizing treatment outcomes. We summarize key findings from clinical trials, emphasizing the safety and efficacy of immunotherapies in attenuating amyloid-beta burden and potentially slowing cognitive decline in early-stage AD patients. Challenges, including treatment response variability and safety concerns, are discussed alongside evolving approaches, such as personalized immunotherapy and combinatorial treatments. This concise review underscores the promise of immunotherapies as a transformative approach to AD intervention, offering hope for a brighter future in the quest to combat this devastating neurodegenerative disease. One challenge lies in identifying patients in the earliest stages of AD when the disease is not yet clinically apparent. Biomarkers, such as cerebrospinal fluid Aß and tau levels or amyloid and tau positron emission tomography (PET) imaging, are crucial for early detection. However, widespread adoption and accessibility of these diagnostic tools remain issues. The cost of immunotherapies, combined with the need for long-term treatment, presents economic challenges for healthcare systems and patients. Innovative reimbursement models and cost-effective approaches are needed to make these treatments accessible to a wider population. Despite these challenges, immunotherapies offer exciting opportunities for early-stage AD. Advancements in precision medicine and the development of more targeted and safer immunotherapies are on the horizon. Combinations of immunotherapies with other therapeutic approaches, such as anti-tau therapies or lifestyle interventions, may hold even greater promise.

Keywords: Alzheimer's Disease, Dementia, Immunotherapies, Amyloid-beta, Clinical Trials

Implications of Neurotrophins in Neurodegeneration

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Abstract

An increasing number of findings point out the key role of neurotrophins in the physiological function of neuronal survival, neurite outgrowth, and synaptic connectivity throughout development and adulthood. ***Objective:*** *In this review, we will mainly concentrate on the following issues: (i) synthesis and release of neurotrophins; (ii) actions of neurotrophins; (iii) types of neurotrophins; and (iv) various receptors of neurotrophins.* ***Methodology:*** *The methodology involves a comprehensive search of relevant literature using academic databases such as PubMed, Google Scholar, etc. Selection criteria include studies published within the last two decades, focusing on the topic's key themes.* ***Result:*** *There is mounting proof demonstrating that there is involvement of neurotrophins and their receptors in the*

pathophysiology of neurodegenerative illnesses like Parkinson's disease (PD), Alzheimer's disease (AD), and Huntington's disease (HD). ***Conclusion:*** *In this review, we went over the composition and actions of neurotrophins, including NT-3/4/5, brain-derived neurotrophic factor, and nerve growth factor, as well as their tyrosine kinase (Trk) receptors. Various signaling cascades are triggered by the dimerization of Trk receptors and the intracellular kinase domain's ensuing transphosphorylation and this plays a major role in the pathophysiology of various neurodegenerative diseases.*

Keywords: Neurotrophins, Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, Tyrosine Kinase Receptors

In Vitro Activity of Urolithiasis

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Abstract

Background: *Calculi, or stones, occur in the urinary tract as a medical disorder known as urolithiasis. Anywhere in the urinary system, such as the kidneys, ureters, bladder, or urethra, is susceptible to the development of these stones. When minerals like calcium, oxalate, uric acid, or cystine precipitate out of the urine and form solid deposits or crystals, the condition is known as urolithiasis.* ***Objective:*** *The findings from in vitro trials on several medications meant to dissolve or prevent bladder stones. It is evaluated if artificial compounds, like pharmaceutical drugs and nanoparticles, and natural substances, like plant extracts and dietary supplements, can stop crystallization, promote stone dissolving, and change crucial pathways that lead to the development of stones.* ***Method:*** *The methodological approach used is in vitro experiments, highlighting the benefits and drawbacks of each approach for figuring out antiurolithic activity.* ***Result:*** *Anti-urolithiasis drugs are normally tested for their in vitro activity in a laboratory environment to determine how well they work in preventing or dissolving urinary stones, or urolithiasis, outside of the body. Several parameters include crystal inhibition, antibacterial activity, and stone dissolution measurement.* ***Conclusion:*** *In this work, we used crystal inhibition, cytotoxicity, antibacterial activity, and mechanism of action to assess the in vitro efficacy of name the specific anti-urolithiasis medicines examined.*

Keywords: Urolithiasis, In Vitro, Mechanism Action of Urolithiasis Condition

Navigating Drug–Drug Interactions in Cancer Care: A Focus on Elderly Patients

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Abstract

Background: *Cancer patients face an increased risk of drug–drug interactions (DDIs) due to complex treatment regimens including hormone therapy, cytotoxic drugs, and supportive care medications. Hormone therapy, vital in treating hormone-sensitive cancers, can interact with other medications,*

especially those metabolized by the liver. Additionally, many patients use complementary and alternative medicine (CAM), often undisclosed to healthcare providers, complicating risk assessment. Lack of communication regarding CAM can lead to ineffective treatment and safety concerns. To mitigate DDIs, healthcare providers must thoroughly assess patients' medication regimens, including CAM, and foster open dialogue with patients. This approach can enhance treatment effectiveness and safety in cancer care. ***Objective:*** *The objective of this article is to study the significant risk of drug-drug interactions (DDIs) in patients with cancer.* ***Methods****: Data for the study was collected from sources like PubMed, ScienceDirect, and Google Scholar.* ***Results:*** *Elderly cancer patients, due to aging-related changes in metabolism and co-existing conditions, are at higher risk for drug-drug interactions (DDIs). Physiological changes like reduced hepatic blood flow can hinder drug clearance, raising toxicity risks. Physicians must be aware of the patient's complete drug history, including supplements, to manage DDIs effectively. Obtaining up-to-date guidelines and local prescription information is crucial. With proactive management, healthcare professionals can enhance treatment outcomes and patient safety in this vulnerable group.* ***Conclusion:*** *In conclusion, elderly cancer patients are particularly vulnerable to DDIs due to age-related physiological changes and co-existing medical conditions. Healthcare professionals can mitigate these risks by obtaining comprehensive drug histories, staying updated with guidelines, and implementing proactive management strategies, thereby improving treatment outcomes and patient safety.*

Keywords: Complementary and Alternative Medicine, Drug–Drug Interactions, Hormone Therapy, Cancer Patients

Network Pharmacology Analysis and Molecular Docking Studies of Colchicine for the Treatment of Cancer

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Abstract

Background: *Antimicrobial resistance is a serious global health threat, reducing antibiotic effectiveness. Researchers are developing innovative strategies to combat it. One approach involves designing hybrid compounds by combining two effective pharmacophores. These hybrids exhibit synergistic effects and target multiple mechanisms, reducing the risk of resistance.* ***Objectives:*** *To design a compound that can act as a potent antifungal and anti-inflammatory compound that minimizes the risk of resistance development. To determine the docking analysis of the drug with the target protein.* ***Methods:*** *Rational Drug Design and Molecular Docking studies were used in the study. Two active pharmacophore entities combined into a single molecular framework using molecular hybridization.* ***Results****: Several molecular hybrids were designed and their affinity towards the target enzyme cytochrome P450 14 alpha sterol demethylase(1EA1) and Cyclooxygenase II (5KIR) were compared to the reference drug. The binding structure of hybrids and reference drugs shows the common amino acids at the binding site i.e., ASP158, PRO154, PRO156, GLY135, ASP157, TYR134, TYR136, GLN327, ASN34. The binding affinity of the compound 4A (-7.3) is more than the affinity of the reference drug (-6.1). In addition to evaluating binding affinity, ADMET studies were also done using computational methods to assess the pharmacokinetic and toxicological properties of compounds.* ***Conclusion:*** *By targeting multiple pathways and reducing the likelihood of resistance development, these compounds have the potential to address the growing threat of AMR and improve the treatment of bacterial infections in the future.*

Keywords: Antibiotic Effectiveness, Pharmacophores, Cyclooxygenase II, Pharmacokinetics, Toxicokinetics

Neuroprotective Activity of Capric Acid in Glutamate-exposed N2a Cells and Sodium-Valproate-induced Model of Autism

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Abstract

Background: *Autism is a set of heterogeneous neurodevelopmental disorders having very complex etiology with an urgent need for an optimized pharmacological treatment. Capric acid (CA) is a medium-chain fatty acid present in goat milk, coconut oil, and seed oils, and exerts beneficial effects on various neuropsychiatric disorders. However, there is a lack of scientific evidence for its effect on the underlying pathophysiology of autism.* ***Objective:*** *The purpose of the study is to determine the neuroprotective effect of capric acid by in vitro cell line study in N2a cells and valproic acid-induced autism model.* ***Methods:*** *The effect of capric acid was assessed in glutamate-induced toxicity (10 mM) in the N2a cell line. In vivo effect of capric acid was explored with sodium valproate (600 mg/kg, i.p.). After the establishment of developmental impairment in pups, a battery of behavioral and biochemical tests was performed along with histopathological analysis.* ***Results:*** *In vitro study demonstrated the toxic effects of glutamate with capric acid producing significant effects from 5 µM to 50 µM. Valproic acid in vivo successfully produced autism-like symptoms from post-natal day 7 and demonstrated a multi-symptomatic behavior correlated by its effect on the hippocampus, prefrontal cortex, and cerebellum. Brain tissues also demonstrated altered biochemical levels which were attenuated by capric acid (400 mg/kg, p.o.).* ***Conclusion:*** *The current study concluded that capric acid has a neuroprotective effect against glutamate toxicity in the N2a cell line and could act as a likely candidate for the treatment and management of autism via significant modulation of neurobehavioral parameters, oxidative stress, mitochondrial dysfunction, and inflammatory markers.*

Keywords: Capric acid, Glutamate, Valproic acid, Autistic disorder, Oxidative stress, Cytokines

Novel Drug Regimen and Molecular Pathways for the Treatment of Breast Cancer

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Abstract

Introduction: *Breast cancer is a multifaceted disease that is characterized by the uncontrolled development of abnormal cells inside the breast tissue as well as the proliferation of abnormal cells in an uncontrolled manner. It is a disease that is triggered via a wide variety of molecular subtypes, each of which is controlled by a distinctive set of molecular pathways. Nanoemulsion gel reduces systemic side effects, improves bioavailability, and enables targeted therapy. These targeted therapies are most effective in breast cancers that express specific molecular targets.* ***Objectives:*** *This study provides an overview of the novel drug regimens and the current state of knowledge about the molecular mechanisms underlying the origin, development, and metastasis of breast cancer throughout the course*

of breast cancer progression. It aims to highlight the importance of targeted therapies and personalized medicine approaches in improving treatment outcomes and addressing the complexities of breast cancer heterogeneity. ***Materials:*** *Breast cancer subtypes are promoted by a variety of hormonal receptors, including the estrogen receptor (ER), the progesterone receptor (PR), and the human epidermal growth factor receptor 2 (HER2). These receptors also play a role in selecting therapy approaches. Controlling cell proliferation, survival, and invasion are all controlled to a large extent by complex signaling pathways, such as PI3K/AKT/mTOR, MAPK, STAT3, and the P53 pathway. Evaluating and developing the effectiveness of novel drug regimens and novel drug combinations and exploring immunotherapy approaches in treating breast cancer.* ***Results:*** *A correlation has been shown between breast cancer and the dysregulation of these signaling pathways, which have the potential to transform normal stem cells into cancer stem cells. Nanoemulsion gels show promise as effective delivery systems for therapeutic agents.* ***Conclusions:*** *It is essential for both the advancement of our understanding of the pathophysiology of breast cancer and the improvement of patient outcomes to have a solid grasp on the intricate interaction that exists between these pathways.*

Keywords: Breast Cancer, Pathophysiology, Nanoemulsions, Heterogeneity, Metastasis, Progesterone Receptor

Pathophysiological Implications of Neuregulins in Neurodevelopment

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Abstract

Research suggests that the brain has an ideal level of neuregulin (NRG)/ErbB signaling and that deviating from this level affects brain function. The development of neuronal circuitry, myelination, neurotransmission, synaptic plasticity, neuron migration and survival, axon guidance, and glial development are all regulated by neuregulin signaling pathways, as shown by recent investigations. ***Objective:*** *The presented review aims to provide a clearer picture of the therapeutic potential and possible hazards associated with Neuregulins by clarifying their functional role and processes in neurodevelopment.* ***Methodology:*** *A systematic approach was employed with clear objectives defined and databases utilized for a targeted search including PubMed and Google Scholar. The critical evaluation was conducted to identify patterns and gaps, providing a concise overview of the current understanding of neuregulins in neurobiology and related fields.* ***Result:*** *NRG is a crucial gene for the growth and operation of the nervous system and is involved in neurodevelopmental disorders. In addition, NRG has a strong correlation with the development of cancer, Hirschsprung disease, and a few other illnesses.* ***Conclusion:*** *The review explores the structure and functions of neuregulins, emphasizing their significance in neurodevelopment. The relationship between NRGs, including isoforms like NRG1, and the ErbB receptor family is investigated. The importance of NRGs is emphasized in neurodevelopment, illuminating their pivotal functions in procedures such as neuronal proliferation, differentiation, and synaptogenesis. By comprehending the influence of NRGs on neurodevelopment, we can gain knowledge about their possible consequences in diverse neurological disorders like schizophrenia and ADHD.*

Keywords: Neuregulins, Schizophrenia, Hirschsprung Disease, ErbB Receptors, Neuron Migration, Synaptogenesis

Pharmacological Targeting of Different Signaling Pathways of Non-alcoholic Fatty Liver Disease (NAFLD)

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Abstract

Non-alcoholic fatty liver disease (NAFLD) is a prevalent liver disease associated with obesity, type 2 diabetes, and metabolic syndrome. Recent studies have identified several promising targets for pharmacological interventions that aim at different signaling pathways involved in NAFLD development and progression. The receptors involved in NAFLD signaling pathways are Liver X receptors, farnesoid X receptors, nuclear factor erythroid 2-related factor 2, AMPK receptors, PI3K/AKT/SREBP-1c receptors, LILRB4/SH-P1/TRAF6/NF-B/MAPK receptors, TAZ/IHH receptor. The receptors involved in NrF2/FXR/LXRa/RXR/SREBP-1c and PI3K/AKT/SREBP-1c signaling pathways have similar functions as both downregulated the effect of SREBP-1c. Signaling pathways are among the potential therapeutic targets for NAFLD. Pharmacological agents such as puerarin, curcumin, maresin 1 (MAR1), GW3965, and many others targeting these pathways have shown promising effects in preclinical models and early-phase clinical trials, including lessening of hepatic steatosis, inflammation, fibrosis, and improvement in insulin sensitivity. In conclusion, pharmacological targeting of different signaling pathways offers a highly promising therapeutic strategy for NAFLD. The identified pathways represent potential targets for drug development and have the potential to address the multifactorial nature of NAFLD pathogenesis.

Keywords: NAFLD, Receptors, Signaling Pathways, Pharmacological Interventions

Piperine's Targeted Defense: Safeguarding Against Pharmacoresistant Epilepsy Triggered by Pilocarpine

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Abstract

This study investigated the potential neuroprotective effects of piperine against pilocarpine-induced Pharmacoresistant epilepsy in rats. Following pilocarpine administration, epileptic and non-epileptic groups were established. Epileptic rats received phenytoin (25 mg/kg) alone or co-administered with

piperine (25 mg/kg) or verapamil (20 mg/kg). A control group of naive animals received phenytoin only for 30 days. After 30 days of treatment, all animals were sacrificed for blood and brain tissue collection for biochemical and histopathological analysis. Co-administration of verapamil or piperine with phenytoin significantly increased ($p<0.05$) the brain-to-plasma phenytoin ratio. Notably, the combination of verapamil and piperine with phenytoin resulted in decreased lipid peroxidation, increased catalase activity, and enhanced glutathione activity compared to the phenytoin-only group. Histopathological examination revealed a significant increase ($p<0.05$) in the percentage of viable neurons in the group receiving combined verapamil and piperine treatment. These findings suggest that piperine may offer neuroprotective benefits against pilocarpine-induced status epilepticus in rats. This potential neuroprotective effect could be attributed to piperine's known abilities to inhibit P-glycoprotein, block calcium channels, and inhibit CYP3A4 enzyme activity.

Keywords: Pharmacoresistant, Piperine, Pilocarpine, Phenytoin

Plexin: Role in Neuronal Health and Diseases

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Abstract

The array of conditions known as neurodevelopmental disorders are marked by challenges in how individuals interact socially, control motor functions, and process cognitive information. Within the realm of neurodevelopmental science, Plexins stand out as a crucial group of transmembrane receptors. They are integral in directing nerve growth, guiding neurons to their proper locations, initiating connections between neurons, and crafting the networks that underpin our neural functions. ***Objective:*** *In this exploration, we delve into the significant roles played by plexins and their potential as targets for innovative treatments. We aim to cast a spotlight on how these receptors are intricately linked with a variety of neurodevelopmental disorders, offering new perspectives on their multifunctional nature.* ***Methodology:*** *A systematic approach was employed with clear objectives defined and databases utilized for a targeted search including PubMed and Google Scholar. Critical evaluation was conducted to identify patterns and gaps, providing a concise overview of the current understanding of plexin in neurobiology and related fields.* ***Results:*** *The mismanagement of plexin pathways is increasingly being recognized as a contributing factor to a broad spectrum of neurodevelopmental issues, including but not limited to autism, schizophrenia, Huntington's disease, ADHD, and intellectual disabilities. Recent studies further emphasize plexins' pivotal role in regulating the plasticity of synapses and managing the release of neurotransmitters.* ***Conclusion:*** *Additionally, this investigation touches upon the field of therapeutic interventions aimed at modulating plexin signaling pathways, a promising strategy for combating these neurological conditions. Understanding the complex dance between plexin and the process of neurodevelopment opens up potential pathways for the creation of therapies.*

Keywords: Plexin, Neuronal Signaling, Receptors, Neurodevelopment

Progress in Treating Parkinson's Disease: Harnessing the Potential of Stem Cell Therapy

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Abstract

Parkinson's disease is the second most prevalent neurodegenerative brain disorder. It is characterized by the gradual and widespread depletion of dopaminergic neurons in the Nigrostriatal pathway and neurons in the substantia nigra, leading to symptoms such as Bradykinesia, Rigidity, Resting Tremors, Depression, and anxiety. ***Objective:*** *The present study endeavors to probe the potential of stem cell therapy as an intervention for Parkinson's disease. Various types of, including embryonic pluripotential stem cells, Mesenchymal stem cells, and induced pluripotential stem cells, have been extensively investigated in fundamental and experimental Parkinson's disease research. Stem cell therapy has emerged as a promising Parkinson's disease treatment, outperforming conventional therapies such as Levodopa and deep brain stimulation.* ***Methods:*** *Stem cell therapy, a facet of regenerative medicine, prompt tissue repair in diseased or injured areas. Clinical experiments suggest their potential in Parkinson's disease treatment. However, current Parkinson's disease therapies primarily focus on symptomatic relief through deep brain stimulation, enzyme inhibitors, and Levodopa administration, failing to halt disease progression or effectively address non-motor symptoms.* ***Results:*** *Current Parkinson's disease therapies only provide symptomatic relief and do not reverse disease progression. Therefore, exploring alternative treatments like regenerative medicine and stem cell therapy is crucial for better Parkinson's disease management in the future.* ***Conclusion:*** *Mesenchymal stem cells have demonstrated tremendous potential in the treatment of Parkinson's disease. However, their efficacy is yet to be determined, and further research is necessary to ascertain their effectiveness. With the significant progress that has been made in stem cell research in recent years, exploring the potential of mesenchymal stem cells in Parkinson's disease treatment is a promising avenue for future investigation.*

Keywords: Nigrostriatal Pathway, Stem Cell Therapy, Deep Brain Stimulation, Mesenchymal Stem Cells (MSCs), Symptomatic Relief

Recent Advancements in Drug Repurposing and Repositioning for Bullous Pemphigoid

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Abstract

Bullous Pemphigoid is an autoimmune blistering condition. It is characterized by the development of autoantibodies that target BP180 and BP230 elements of the basement membrane. Although corticosteroids and immunosuppressive medications have historically been the backbone of treatment,

they frequently have serious adverse effects with low success rates. New developments in medication repositioning and repurposing provide intriguing solutions for controlling bullous pemphigoid. ***Objective:*** *Exhaustive review of the innovative approaches towards treatments of bullous pemphigoid by utilizing medications already licensed for use in treating other illnesses.* ***Method:*** *Examination of databases of Food and Drug Administration (FDA)-approved medications, investigating their mechanisms of action, and evaluating their potential use in bullous pemphigoid.* ***Result:*** *Tildrakizumab, Nomacopan, Bertilimumab, and Mepolizumab which were initially developed for various autoimmune diseases are candidates with immunomodulatory qualities that have been identified in several trials as promising candidates for providing therapeutic benefits in bullous pemphigoid.* ***Conclusion:*** *For the treatment of bullous pemphigoid, current advances in medication repositioning and repurposing show considerable promise. These methods overcome the limited availability of treatment options for rare diseases that could enhance patient outcomes and quality of life. However, more studies and clinical trials are required to confirm the effectiveness and safety of these repurposed medications and prove their function in the treatment of high bullous pemphigoid.*

Keywords: Autoimmune disorders, Tildrakizumab, Nomacopan, Bertilimumab, Mepolizumab

Recent Advances in Stem Cell and Systems Biology Research: A Multidisciplinary Perspective

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Abstract

Background: *Stem cell research and systems biology have emerged as dynamic fields with the potential to revolutionize regenerative medicine and our understanding of complex biological systems. Recent technological advancements have enabled unprecedented insights into stem cell biology and the intricate networks governing cellular behavior.* ***Objective:*** *This study aims to provide a comprehensive overview of recent advances in stem cell and systems biology research, highlighting key findings, methodologies, and implications for regenerative medicine and beyond.* ***Methodology:*** *A systematic review of the literature was conducted to identify seminal studies and breakthroughs in stem cell biology and systems biology research. The focus was on innovative methodologies, including omics technologies, single-cell analysis, and computational modeling.* ***Result:*** *Recent years have witnessed significant progress in stem cell research, including the development of induced pluripotent stem cells (iPSCs), organoid technology, and lineage reprogramming techniques. Integration of multi-omics data and computational modeling has facilitated the construction of predictive models and the identification of novel therapeutic targets. The convergence of stem cell biology and systems biology holds immense promise for regenerative medicine, disease modeling, and drug discovery.* ***Conclusion:*** *By unraveling the molecular mechanisms governing stem cell behavior, researchers are poised to develop innovative therapies for a wide range of diseases and injuries. However, challenges such as reproducibility, and ethical considerations remain to be addressed. This abstract provides insights into recent advancements in stem cell and systems biology research, highlighting their transformative impact on regenerative medicine and biomedical science.*

Keywords: Stem Cells, Systems Biology, Regenerative Medicine, Omics Technologies, Tissue Engineering

Regenerative Medicine Products and Orphan Drug Designation: Regulatory Implications and Benefits

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Abstract

Background: *Regenerative medicine products (RMPs) ensure the treatment of various diseases by repairing or replacing damaged cells, tissues, and organs. Orphan drug designation offers incentives for developing drugs targeting rare diseases, including RMPs, to mitigate high costs and risks associated with their development.* ***Objective:*** *This review aims to explore the regulatory implications and benefits of orphan drug designation for RMPs, highlighting the complexities and potential advantages of this regulatory framework.* ***Method:*** *The study analyzes the criteria for orphan drug designation, the regulatory pathways involved, and the unique challenges faced by RMPs in obtaining this designation. It also examines the benefits provided, such as tax credits, market exclusivity, and expedited review processes.* ***Conclusion:*** *Orphan drug designation for RMPs presents a complex regulatory landscape with unique considerations compared to traditional pharmaceuticals. While challenges exist, the potential benefits for patients with rare diseases and companies investing in RMP research are substantial. By incentivizing the development of RMPs for unmet medical needs, orphan drug designation can propel advancements in regenerative medicine and enhance patient outcomes.*

Keywords: Exclusivity Period, Rare Disease, Expedited Review

Regulatory Horizons: Mapping the Way Forward for Stem Cell Innovations in Pharmacology and Tissue Engineering

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Abstract

Background: *Innovative advancements in healing wounds and treating medical conditions are on the horizon thanks to stem cell-based tissue engineering and pharmacology. Regulatory scrutiny is crucial to ensure the safety, effectiveness, and ethical standards of these breakthroughs as they transition from lab to bedside. This study offers a thorough examination of the regulatory framework governing stem cell therapies and pharmacological interventions, focusing on preclinical testing, clinical trial design, manufacturing, and post-market monitoring. Various regulatory bodies, including the Pharmaceuticals and Medical Devices Agency (PMDA) of Japan, EMA, and FDA, play pivotal roles in evaluating and validating stem cell products. Meeting standards for cell source, characterization, differentiation methods, and quality control poses challenges due to therapy complexity. Concerns about tumorigenicity, immunogenicity, and long-term safety necessitate rigorous risk assessment throughout product*

development. As stem cell treatments merge with pharmaceuticals, regulatory assessments become more complex, requiring in-depth analysis of drug-cell interactions, dosing, and off-target effects. Strong preclinical evidence and well-designed trials are essential for agencies to balance treatment benefits and risks. Initiatives like the US Food and Drug Administration's Regenerative Medicine Advanced Therapy (RMAT) designation aim to expedite the evaluation of potential therapies for serious diseases. International collaboration seeks to streamline regulatory processes, foster innovation, and maintain public trust and patient safety. Understanding scientific principles, ethics, and regulatory mandates is crucial in stem cell-based tissue engineering and pharmacology. Collaboration among researchers, physicians, industry, and regulators is vital for progress and ensuring new treatments reach patients in need.

Keywords: Stem Cells, Tissue Engineering, EMA, RMAT, Clinical Trials

RNA Epitranscriptomic Landscape Uncovered: Consequences for Cancer Treatment

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Abstract

A variety of downstream signaling pathways are impacted by the specific chemical alterations of biological components, such as DNA and proteins, which are an effective means of controlling molecular function. Several enzymes that control alterations to DNA and proteins are targets of contemporary cancer treatments. The latest development in this field is the study of RNA modifications or RNA epitranscriptomics. Although eukaryotic RNA modifications have been known since the 1970s, they were primarily found on transfer RNA and ribosomal RNA until the last ten years, at which point they were found and defined on mRNA and a variety of non-coding ribonucleic acids. A growing body of evidence indicates that human tumors also exhibit dysregulation of RNA modification pathways, which makes them potential targets for cancer treatment. The RNA epitranscriptomic pathways linked to cancer are highlighted, along with an explanation of their biological roles and relationships to the illness.

Keywords: DNA Modifications, Protein Modifications, Enzyme Targets, Epitranscriptomics, Eukaryotic RNA Modifications

Role of CRISPR Gene Editing in Alzheimer's Disease

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Abstract

This study seeks to offer a comprehensive analysis of the latest advancements in CRISPR/Cas9-mediated genome editing with a special focus on Alzheimer's disease (AD). The pathogenesis of Alzheimer's disease

(AD) is associated with certain gene alterations, namely presenilin (PSEN) and amyloid-beta precursor protein (APP). Nevertheless, genetic-focused clinical studies failed to achieve the anticipated degree of efficiency. The CRISPR/Cas9 genome editing tool is a very potent technology utilized for rectifying inconsistent genetic markers and is currently widely employed in the management of Alzheimer's disease (AD). It has substantial promise for rectifying unwanted gene changes linked to AD. The utilization of this technology has facilitated the advancement of empirical AD models, treatment strategies, and diagnostic methodologies to enhance our comprehension of the nervous system, encompassing both in vitro and in vivo models. ***Objective:*** *Cognitive impairments, amyloid-beta (Ab) plaques, and neurofibrillary tangles are the hallmarks of Alzheimer's disease (AD), a neurodegenerative illness that is subtle, irreversible, and progressing over time. Worldwide, the number of people impacted by AD is quickly rising, and it currently affects almost 50 million people.* ***Method:*** *Thorough literature search and various scientific journals.* ***Result and Conclusion:*** *The CRISPR/Cas9 gene editing technique shows great promise in its capacity to cure Alzheimer's disease, the most prevalent form of dementia among the global old population. An aberrant Aß metabolism is frequently observed in both familial Alzheimer's disease (FAD) and sporadic Alzheimer's disease (SAD), irrespective of the hereditary causes. Hence, utilizing CRISPR/Cas9 technology to rectify heightened Aß synthesis can prove to be a potent therapeutic approach. In addition, CRISPR/Cas9 can be employed to rectify abnormalities in APP, PSEN1, and PSEN2, which are often altered in FAD.*

Keywords: Alzheimer's Disease, PSEN, APP, Genome Editing, CRISPR-Cas9

Role of Gene Therapy in the Treatment of Neurological Disorders

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Abstract

Background: *Neurological disorders encompass a broad spectrum of conditions characterized by the dysfunction or degeneration of neurons, leading to cognitive decline, motor impairments, and other neurological deficits. Traditional treatment approaches often focus on managing symptoms rather than targeting the underlying causes of these disorders. Gene therapy, however, offers a paradigm shift by addressing the genetic abnormalities that contribute to disease pathogenesis. By delivering therapeutic genes to target cells, gene therapy has the potential to correct or compensate for dysfunctional genes, offering the possibility of disease modification rather than mere symptom control. This paper explores the evolution and advancements in gene therapy for neurological disorders, with a focus on Alzheimer's disease (AD), Parkinson's disease (PD), and epilepsy.* ***Objective:*** *This paper aims to review the literature on gene therapy approaches for neurological disorders, highlighting advancements, challenges, and potential applications.* ***Method:*** *A comprehensive literature review was conducted in scientific databases such as PubMed, ScienceDirect, Scopus, Google Scholar, etc. to identify relevant studies on gene therapy for AD, PD, and epilepsy.* ***Result:*** *Gene therapy strategies for AD target neurotrophic factors and enzymes involved in Aß degradation. In PD, therapeutic genes aim to restore dopaminergic pathways or halt neurodegeneration. Epilepsy gene therapy focuses on modulating key pathways involved in epileptogenesis. Challenges include delivery optimization and long-term safety.* ***Conclusion:*** *Gene therapy holds promise for treating neurological disorders by addressing underlying genetic abnormalities. While advancements have been made, challenges remain in translation to clinical practice. Further research is needed to optimize delivery methods and ensure long-term efficacy and safety.*

Keywords: Gene Therapy, Alzheimer's Disease, Parkinson's Disease, Epilepsy, Neurological Disorders

Role of Phytoconstituents in Ischemic Reperfusion Brain Injury

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Abstract

Ischemic Reperfusion Injury (IRI) is a catastrophic consequence that arises when blood flow is restored to brain tissue. Reperfusion exacerbates the total effects of the ischemia event by causing further neuronal damage and cell death. Cell death occurs due to the generation of reactive oxygen species (ROS) by reperfusion and results in cellular damage. Furthermore, glutamate's excitotoxic effects and the inflammatory reaction brought on by immune cell infiltration. Damage is worsened by disruption of the blood–brain barrier (BBB), which permits dangerous chemicals and cells to penetrate the brain tissue. There is a need to explore the various treatments such as the possibilities of using several naturally occurring substances with neuroprotective qualities. Flavonoids such as luteolin, baicalein, apigenin, etc. with anti-inflammatory and antioxidant qualities, and stilbenes such as curcumin and resveratrol have shown potential effects in the IRI treatment. This review summarizes the understanding of the molecular and cellular processes that lead to IRI and targeting of the several pathways that underlie IRI and phytoconstituents which improve outcomes for patients following ischemic stroke and other related disorders in a promising way.

Keywords: Ischemic Reperfusion Injury, Neuroprotection, Flavonoids, Stilbenes, Reactive Oxygen Species, Anti-inflammatory

Role of Toll-like Receptor in Mediating Immunological Toxicity of Microplastics

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Abstract

Background: *Microplastics, which are tiny plastic particles smaller than five millimeters, are becoming a major environmental contaminant that may have an impact on human health. According to recent studies, microplastics may interact with cellular receptors, particularly toll-like receptors (TLRs), to cause immune reactions in living things. TLRs are also capable of identifying and reacting to particles, such as microplastics, as danger-associated molecular patterns (DAMPs), which trigger inflammation and the immune system. To study possible health risks associated with microplastics and create mitigation strategies, it is essential to comprehend how immune toxicity is caused by microplastics activating TLRs.* ***Objectives:*** *To extensively examine the literature to elucidate the mechanisms by which microplastics interact with TLRs and cause immunotoxicity mediated through numerous downstream signaling cascades.* ***Methods:*** *Exhaustive literature survey of recent research papers to demonstrate the effect of TLR-mediated immunotoxicity of microplastics on various organs.* ***Results:*** *Majorly two different TLR signaling pathways depending on the adaptor molecule recruited have been reported. The*

MyD88-dependent pathway is responsible for the transcription of NF-kB which induces inflammatory cytokines including interleukin-1b (IL-1b), Tumor Necrosis Factor a (TNFa), and IL-6, whereas MyD88 independent/ TIR-domain-containing adapter-inducing interferon-β (TRIF) dependent pathways activate IFN-ß promotor. ***Conclusion:*** *TLRs are responsible for mediating immune response by various signaling pathways. Both the MyD88-dependent pathway and the MyD88-independent pathway play an important role in microplastic-induced immunotoxicity which results in detrimental effects on cells, tissues, and organs. The downstream signaling regulators of these pathways can serve as novel targets for mitigating microplastic-induced immunotoxicity and thus reducing its detrimental effects on vital organs.*

Keywords: Microplastics, Immunotoxicity, Toll-like Receptor, Signaling Cascade

Semantic Exploration of Antimicrobial Resistance in India: A Comprehensive Analysis Through Natural Language Processing and Named Entity Recognition

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Abstract

During the last two decades, antimicrobial resistance (AMR) has emerged as a significant global health challenge. Antimicrobial Resistance in India presents a complex public health issue, demanding holistic approaches for control and reduction. Antimicrobial resistance occurs in the human body when a pathogen develops a defense mechanism against a drug designed to eliminate it inside the host. Increasing evidence suggests the extensive presence of AMR throughout India. By exploring its epidemiology, and causative factors, this research aims to contribute to global efforts in tackling antimicrobial resistance, safeguarding the effectiveness of antimicrobial agents in India. The main focus was to explore antimicrobial resistance susceptibility in gut microbiome along with its genomic surveillance and environmental impacts in India. Our study involved Natural Language Processing algorithms to perform Text mining for extraction of relevant literature and research data from PubMed based on the specific combination of keywords using the easyPubMed and kablExtra libraries in R. Further, Named Entity Recognition analysis was performed on the corpus of literature to extract biologically significant keywords based on the BioNER model using the Flair library in Python. Additionally, to understand deeper insights, correlation calculation was done between keywords with comparable counts, and a nodal network was generated and visualized in Cytoscape. Using the Cytohubba plugin, we identified the key nodes based on scoring and ranking strategy. A total of 53 key nodes representing biological entities that are majorly responsible for antimicrobial resistance were identified, which includes 11 species like Enterobacter and Bacillus anthracis, 21 associated diseases like neonatal sepsis and keratitis, 11 genes like tlrC and ompT, 10 chemicals like ß-lactam and 4,5-dimethyl-2-propylsilyl-1H-imidazole. In conclusion, this study provides comprehensive analysis and thorough insights into the current state of AMR in India, underlining its complex nature and the pressing need for far-reaching interventions. Understanding the drivers of AMR in India is vital for formulating effective strategies to mitigate its impact on public health.

Keywords: Antimicrobial Resistance, Gut Microbiome, Genomic Surveillance, Tuberculosis, NLP, NER, Text Mining

Stem Cell Therapy in the Treatment of Parkinson's Disease

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Abstract

Parkinson's disease (PD) is a neurodegenerative disorder characterized by progressive loss of dopaminergic neurons in the substantia nigra, leading to motor and non-motor symptoms. Current treatments alleviate symptoms but do not halt disease progression. Stem cell therapy has emerged as a promising approach for PD treatment due to its potential to replace lost neurons, provide neuroprotection, and modulate the disease microenvironment. This review article provides a comprehensive overview of recent advancements and challenges in stem cell-based therapies for PD. It explores various sources of stem cells, including embryonic, induced pluripotent, and adult stem cells, highlighting their differentiation potential and safety profiles. Additionally, it discusses different transplantation strategies, such as direct cell implantation, exosome-based therapy, and gene editing approaches. The review examines preclinical and clinical studies investigating the efficacy and safety of stem cell therapies in PD models and patients. It evaluates key outcomes, including motor function improvement, dopaminergic neuron survival, and adverse effects, to assess the therapeutic potential and limitations of different stem cell-based interventions. Moreover, the article discusses critical factors influencing the success of stem cell therapy in PD, including patient selection, cell source optimization, transplantation methods, and immune response modulation. It also addresses regulatory challenges and ethical considerations associated with translating stem cell therapies from the laboratory to clinical practice. Overall, this review underscores the significant strides made in stem cell-based approaches for PD treatment and highlights avenues for future research and clinical development in this rapidly evolving field.

Keywords: Stem cell therapy, Parkinson's Disease, Dopaminergic Neurons, Stem Cells, Pluripotent Cells, Embryonic Cells Rejuvenation

Target-based Approach to Prevent Arsenic Induce Cerebrovascular Disorder

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Abstract

Background: *Human health issues and the development of cerebrovascular disorders have been linked to long-term exposure to arsenic (As). These heavy metals bioaccumulate and have a wide range of harmful effects on different body tissues and organs. The primary source of arsenic exposure is grounded drinking water. Since arsenic can pass through the blood–brain barrier (BBB), the brain is one area where long-term harmful consequences of this metalloid may manifest.* ***Objective:*** *Numerous*

pathways of As neurotoxicity have been identified, including mitochondrial malfunction, oxidative stress, inflammation, and DNA damage. These mechanisms can combine to cause cellular dysfunction, cell death, and long-term negative effects. The absence of suitable treatments for arsenic-mediated illnesses makes treatment difficult. ***Methods:*** *Chelation therapy became the most popular approach for arsenic detoxification. It can protect biological targets from harmful ions, lowering local toxicity. Plant-based medications show a safe, effective, and progressive reduction from arsenic-mediated damage with no negative side effects.* ***Results:*** *It has been seen that various phytoconstituents such as Phytic acid, Allicin, and Emblica officinalis showed significant arsenic chelation effects. These phytochemicals prevent arsenic toxicity by preventing the production of reactive oxygen species, also known as ROS, and shield cells from oxidative damage. Through a decrease in cellular iron buildup, IP6 prevents ferroptosis. Preventing the formation of Aß is the blocking of BACE1 activity and superoxide ions are scavenged by allicin.* ***Conclusion:*** *The present study focuses on the chelation properties of various phytochemicals and herbal medications against arsenic with maximum therapeutic benefit and lesser toxicity. It will also help to prevent cerebrovascular disorder.*

Keywords: Arsenic, Phytoconstituents, Alzheimer's Disease, Cognitive Effects, Dementia, Chelation

Target-based Approach Using Phytochemicals in Treatment of Inflammatory Bowel Disease

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Abstract

Background: *Inflammatory Bowel disease (IBD) is a gastric inflammatory disorder that arises in the lower gastrointestinal tract including the rectum and colon. It is categorized in two different forms ulcerative colitis and Crohn's disease. There are various signaling pathways associated with its development which are utilized in determining various biological targets. According to recent studies, phytochemicals are used as an effective means of treating IBD through a target-specific mechanism. The review focuses on determining and evaluating the therapeutic potential of phytochemicals by using a target-based approach.* ***Objective:*** *In this study, we explore the specific targets associated with the signaling pathways underlying the development of the disease and determine the mechanisms that are involved with the numerous phytochemicals.* ***Methods:*** *PubMed and Google Scholar databases were used for targeted searches with a systematic approach based on objectives.* ***Result:*** *NF-kß, MAPK, P13/AKT, NOTCH, TGF-SMAD, NLRP3, and MYD88 are all explored in the pathophysiological aspect, including signaling pathways. There is an interaction between innate immune function and adaptive immunity that determines a wide range of biological targets based on its progression and gut microbial dysbiosis. Curcumin, Psyllium, Glycyrrhizin, Morus alba, Aloe vera, Boswellia serrata, and others are used as assets as treatment approaches for the disease.* ***Conclusion:*** *Phytochemicals bind to certain targets and regulate or modify signaling pathways, reducing the release of inflammatory mediators, and reducing the progression of IBD.*

Keywords: Inflammatory Bowel Disease, Microbial Dysbiosis, NF-kß, MAPK, P13/AKT, NOTCH, TGF-SMAD, NLRP3, and MYD88

Unraveling the Intricate Pathophysiological Pathways: Exploring the Therapeutic Potential of Natural Antioxidants in Alleviating Oxidative Stress Burden in Psychiatric Disorders

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Abstract

Background: *Psychiatric disorders, including depression, anxiety, schizophrenia, and bipolar disorder, pose significant challenges to global public health. These conditions are characterized by complex interactions of genetic, environmental, and neurobiological factors, leading to dysregulation of neurotransmitter systems, oxidative stress, and inflammation. Traditional treatments often exhibit limited efficacy and adverse side effects, necessitating the exploration of alternative therapeutic strategies. This review aims to evaluate the potential of antioxidants as adjunctive or alternative treatments for psychiatric disorders.* ***Objective:*** *This review aims to evaluate the potential of antioxidants as adjunctive or alternative treatments for psychiatric disorders.* ***Method:*** *A comprehensive literature search was conducted using electronic databases such as PubMed, PsycINFO, and Google Scholar.* ***Result:*** *Antioxidants, including vitamins (e.g., C, E), minerals (e.g., zinc, selenium), and plant-derived compounds (e.g., flavonoids, polyphenols), have demonstrated neuroprotective properties by scavenging free radicals, modulating oxidative stress pathways, and enhancing endogenous antioxidant defenses. Clinical studies have shown promising effects of antioxidants in alleviating symptoms and improving outcomes in various psychiatric conditions.* ***Conclusion:*** *Antioxidants represent a promising avenue for the treatment of psychiatric disorders, offering a potential adjunctive or alternative approach to conventional therapies. Further research by identifying biomarkers of treatment response and explore synergistic effects with existing pharmacotherapies.*

Keywords: Psychiatric Disorders, Pathological Pathways, Natural Antioxidants

TRACK III

Drug Discovery and Biologicals

Abstract

Pet Wellness Supplements

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Abstract

Pet wellness supplements also termed nutraceuticals play a crucial role in enhancing the health and well-being of companion animals. They offer a wide range of benefits in addressing common issues faced by pets, such as obesity, dental diseases, aging-related cognitive dysfunction, liver shunt, flea infestations, and skin-related diseases. However, the pet supplement industry faces many challenges in ensuring product quality, efficacy, and regulatory compliance. The study aims to explore the benefits of pet supplements (vitamins, minerals, omega-3 fatty acid, prebiotics, and probiotics) in addressing various health concerns in pets and to examine the challenges faced by the pet supplement industry. A comprehensive review of scientific literature, clinical studies, and industry reports was conducted to analyze the effectiveness of pet wellness supplements in managing health problems like obesity, dental diseases, aging-related cognitive dysfunction, liver shunt, flea infestations, and skin-related diseases. The research also investigated the regulatory landscape, quality control measures, and marketing practices within the pet supplement industry. challenges such as inconsistent product quality, lack of standardized regulations, misleading marketing claims, and consumer confusion pose obstacles to the pet supplement industry's growth and credibility. By addressing these challenges through improved standards, transparency in labeling, and evidence-based marketing practices, the industry can enhance its credibility and better serve the health needs of companion animals.

Keywords: Pet Health, Veterinary, Longevity, Pet Supplement Industry

A Comparative Study of the Effects on the Healthcare Industry of Different International Regulations Pertaining to Refurbished Medical Devices

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Abstract

The refurbishment of medical devices is a burgeoning sector within healthcare, driven by the need for cost-effective solutions and the extension of equipment lifespan. However, ensuring the safety and quality of refurbished devices is imperative to prevent potential harm to patients or users. Regulatory

bodies such as the World Health Organization (WHO) are instrumental in developing global guidelines to govern the refurbishment process, including processes, labeling, and importation requirements. Standards like IEC 63077:2019 and ISO 13485:2016 provide essential frameworks for quality management in refurbishment. Despite acceptance in major markets like the EU and the USA, regulations vary across countries, necessitating a comparative analysis. Objectives: The primary objective is to evaluate the regulatory landscape surrounding refurbished medical devices globally, identifying variations across countries and regions. Specifically, the study aims to assess existing guidelines and standards, their implementation, and their impact on patient safety and device quality. Methods: This study makes use of an extensive analysis of published works and legal documentation about refurbished medical equipment. Data collection involves gathering information on regulations, standards, and guidelines from reputable sources such as WHO publications, national regulatory bodies, and academic literature. This approach is utilized to identify likenesses and variations in regulatory structure. Results: Regulatory approaches to refurbished medical devices vary globally. While major markets like the EU and the USA accept refurbished devices, regulations differ in defining refurbishment and outlining standards for refurbishment processes, labeling, and importation. Standards such as IEC 63077:2019 and ISO 13485:2016 provide foundational guidelines but are not uniformly implemented across all regions. National variations exist, with some countries, like Malaysia and Pakistan, implementing specific guidelines and regulations for refurbished devices. Conclusion: The regulatory landscape surrounding refurbished medical devices is complex and varies significantly across countries and regions. While major markets like the EU and the USA have established frameworks, variations exist in defining refurbishment and implementing standards. National regulations, such as Malaysia's Good Refurbishment Practice and Pakistan's amended Medical Device Rules, demonstrate efforts to address refurbishment-specific concerns. However, harmonization of standards is vital to ensure constant quality across all such medical devices.

Keywords: Complexity, Global Standards, Consistency, Patient Benefits, Harmonization

A Comprehensive Review of Pharmacological Factors in Schizophrenia

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Abstract

Pharmacological treatments for schizophrenia have evolved significantly, with a focus on both efficacy and minimizing adverse effects. Antipsychotic medications, the cornerstone of pharmacotherapy for schizophrenia, can be categorized into first-generation (typical) and second-generation (atypical) antipsychotics. First-generation antipsychotics such as haloperidol and chlorpromazine primarily target positive symptoms by blocking dopamine D2 receptors. While effective in reducing hallucinations and delusions, they are associated with a higher risk of extrapyramidal symptoms (EPS) like tremors, rigidity, and tardive dyskinesia. These adverse effects can significantly impact patient adherence and quality of life. Second-generation antipsychotics like clozapine, olanzapine, risperidone, and quetiapine offer a broader spectrum of efficacy by targeting both positive and negative symptoms. They also have a

lower risk of EPS but are associated with metabolic side effects such as weight gain, dyslipidemia, and glucose intolerance. Clozapine, although highly effective especially in treatment-resistant cases, requires close monitoring due to its potential for agranulocytosis. Recent developments in pharmacotherapy include long-acting injectable formulations of antipsychotics, which improve medication adherence and reduce relapse rates compared to oral medications. Newer agents like brexpiprazole and cariprazine offer improved tolerability profiles and may benefit patients who have not responded adequately to other antipsychotics. Despite these advancements, challenges remain in managing schizophrenia pharmacologically. Adverse effects, particularly metabolic and cardiovascular risks, underscore the need for personalized treatment approaches that consider individual risk factors and monitor for potential complications. Additionally, addressing treatment-resistant symptoms and optimizing long-term outcomes require ongoing research and collaboration between clinicians, researchers, and patients to improve the efficacy and safety of pharmacological interventions for schizophrenia.

Keywords: Schizophrenia, Antipsychotic, Dyskinesia

Advanced Lipid-based Nanoparticles for Brain Targeting of Therapeutics

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Abstract

Background: *The delivery of therapeutics to the brain remains a formidable challenge due to the blood–brain barrier's restrictive nature. Advanced lipid-based nanoparticles offer a promising solution to this challenge. These nanoparticles, engineered with precise control over size, surface properties, and drug-loading capacity, can effectively traverse the blood–brain barrier, delivering therapeutics to their target sites within the brain.* ***Objectives:*** *This study aims to investigate the efficacy of advanced lipid-based nanoparticles for targeted delivery of therapeutics to the brain. Specifically, we seek to evaluate their ability to overcome the blood–brain barrier and deliver therapeutic payloads to the desired brain regions.* ***Methods:*** *Lipid-based nanoparticles were synthesized using a modified nanoprecipitation method. The nanoparticles were characterized for size, morphology, and surface properties using dynamic light scattering, transmission electron microscopy, and zeta potential analysis. In vitro studies were conducted to assess the nanoparticles' cytotoxicity, cellular uptake, and blood–brain barrier penetration. In vivo experiments were performed to evaluate the nanoparticles' ability to deliver therapeutics to the brain in a murine model.* ***Results:*** *The lipid-based nanoparticles demonstrated excellent biocompatibility, efficient cellular uptake, and enhanced blood–brain barrier penetration both in vitro and in vivo. Furthermore, in vivo studies revealed a significant accumulation of therapeutics in the brain following nanoparticle administration.* ***Conclusion:*** *Advanced lipid-based nanoparticles hold great promise for targeted delivery of therapeutics to the brain. Their ability to overcome the blood–brain barrier and deliver therapeutic payloads to specific brain regions marks a*

significant advancement in neurotherapeutics. This study underscores the potential of lipid-based nanoparticles as a versatile platform for brain-targeted drug delivery, offering new avenues for the treatment of neurological disorders.

Keywords: Nanoparticles, BBB

Advancements and Trends in Drug Discovery and Biological Therapeutics

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Abstract

Biological therapeutics is the interdisciplinary field dedicated to identifying, designing, and developing novel therapeutic agents primarily biologicals to treat diseases. Biological drugs also known as biopharmaceutical drugs are derived from living organisms that can be used as an alternative to conventional synthetic drugs. Biological drugs have been used since 1980s and recently there have been advancements to make these drugs more accessible. The study aims to explore the recent advancements employed in the development of biological therapeutics. It also encompasses the current trends, challenges, and potential future in this field. Biological therapeutics offer greater pharmacodynamic specificity and therapeutic efficacy. Biological therapeutics are developed using biological processes instead of chemical synthesis due to their structural complexity. Various computational methods are emerging for the development of biological therapeutics. Another favorable method includes the co-formulation of therapeutics. Protein engineering is an expanding segment in accordance with the Food and Drug Administration-approved drugs that have the potential to give a new dimension to biological therapeutics. These advancements in the development of biological therapeutics hold a potential future in drug discovery. Research and development of biotherapeutics drugs has made tremendous progress. Even though there are new technologies that are emerging, however, there are some challenges such as the identification and validation of new drug targets, and oral delivery of biotherapeutic drugs that need to be addressed. Despite the challenges, the ongoing research is promising for the development of effective therapy. This approach holds the potential for meeting unmet medical needs in the future.

Keywords: Drug Discovery, Biological Therapeutics, Pharmacodynamic, Protein Engineering Chem-Biology Research, Translational Implications, Personalized Medicine, Interdisciplinary Collaboration, Precision Medicine

Advancing Pharmaceutical Research with Bioinformatics and Chemoinformatics: A New Era of Drug Development

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Abstract

In the rapidly evolving fields of in silico biology, bioinformatics and chemoinformatics play a major role in advancing drug discovery and genomic research. These in silico methods enable the precise elucidation of potential lead compounds from extensive ligand databases, effectively narrowing down potential drug candidates for specific targets. The current study presents a comparative analysis of the latest tools and techniques, emphasizing their contributions to pharmaceutical innovation and precision medicine. Through a meticulous review of current literature and databases, we have identified various open-source in silico tools used in drug discovery. The search was carried out on Science Direct and Google Scholar using the keywords Open Source, Chemoinformatics, Bioinformatics, and ADME to identify the most used open-source tools and databases. As a result of this study, key open-source tools and platforms were identified. The database management is carried out using tools like Instant JChem, AMBIT, and LOTUS. Subsequently, targeted combinatorial synthesis for novel compounds is performed using a combination of software such as ChemSketch, Pymol, and Rasmol. Virtual screening including in silico ADME testing analysis is conducted to identify lead compounds using SwissADME, DruLiTo, ADMET Lab2.0, AutoDock Vina, and Maestro. QSAR modeling of lead molecules is performed using software like RDKit, QSAR Toolbox, and DPubChem. Docking and MD simulation techniques are executed using Pymol, Rasmol, UCSF Chimera, and PyRx to simulate the drug-ligand interactions. Our findings highlight the critical role of bioinformatics and chemoinformatics. The open-source platforms empower researchers to analyze large datasets of chemical compounds and biological sequences, enabling the design of personalized drugs based on individual genetic profiles. With the help of these, the drug development process will be more precise and cost-effective.

Keywords: Chemoinformatics, Bioinformatics, Drug Discovery, In Silico

An Update on Oral Cavity Cancer: Epidemiological Trends, Prevention Strategies and Novel Approaches in Diagnosis and Prognosis

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Abstract

Background: *The prevalence of oral cancer continues to be significant leading to numerous fatalities in both Western and Asian nations. Oral cancer is known to be predisposed to several known risk*

factors, including alcoholism, smoking, and using smokeless tobacco products. Although certain cases suggest a genetic susceptibility to oral cancer, the precise components of this susceptibility are still unknown. Most cases of oral cancer occur in people 40 years of age and older, and men are more likely than women to be affected by the disease. Most mouth cancers are caused primarily by drinking alcohol, using tobacco products, or a combination of the two. Furthermore, there is a connection between the human papillomavirus (HPV) and most throat cancers. The tongue and the floor of the mouth are the most affected areas when it comes to symptoms, with pain being the most common manifestation. An erythroleukoplakic area may exist in the early stages of oral squamous cell carcinoma (OSCC) without any obvious symptoms. But in more advanced stages, lumps and ulcers with uneven margins show up, and these areas can feel hard to the touch. The present review attempts to illustrate the information regarding the malignant lesion, prognostic and diagnostic approaches, and clinical trials that are carried out to elucidate the efficacy of new therapy.

Keywords: Oral Cancer, Conventional Therapy, Novel Therapy

Artificial Intelligence Revolutionizing Drug Product Development

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Abstract

Background: *Artificial intelligence is transforming the pharmaceutical sector, offering solutions to complex challenges such as rising R&D expenses and drug development costs. With the integration of artificial intelligence (AI), drug discovery, development, manufacturing, and market positioning processes are becoming more efficient and cost-effective.* ***Objective:*** *This study aims to explore the multifaceted role of AI in the pharmaceutical industry, from drug discovery to market positioning. It investigates the methods and tools used in AI applications and examines the challenges and limitations faced in adopting AI technologies in the pharmaceutical sector.* ***Methods:*** *A thorough review of literature and industry developments was conducted to analyze the diverse applications of AI in pharmaceutical drug development, manufacturing, clinical trial design, and market analysis. Results: AI is employed across different stages of the drug development process, including target identification, compound screening, clinical trial design, and quality assurance. It enables the prediction of physicochemical characteristics, bioactivity, etc. leading to more efficient drug design and development. Pharmaceutical companies such as Pfizer, Janssen Pharmaceuticals, and Novartis are leveraging AI to innovate and accelerate drug discovery and development processes.* ***Conclusion:*** *Artificial intelligence holds immense potential to revolutionize the pharmaceutical industry by optimizing drug development processes, improving patient outcomes, and reducing costs. Despite challenges such as the shortage of qualified personnel and concerns about job displacement, the widespread adoption of AI in pharmaceuticals is expected to continue, paving the way for personalized medicine and enhanced healthcare delivery.*

Keywords: Artificial Intelligence, Pharmaceutical Industry, Drug Development, Machine Learning

Beyond Nature: Pioneering Novel Frontiers in Personalized Medicine with AI-optimized 3D Bioprinting and Organ-on-a-chip (OoC) Technologies

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Abstract

In addressing the critical disconnect between the burgeoning potential of 3D bioprinting and microfluidics-based organ-on-a-chip (OoC) technologies and their practical application in simulating human physiology for drug testing, this study innovates upon a sophisticated artificial intelligence (AI)-guided framework to construct biomimetic, patient-specific in vitro models. Despite considerable advances in this interdisciplinary domain, a substantial gap persists in the replication of human organ behaviors for accurate pharmacological analysis, a challenge this research ambitiously undertakes. By integrating AI to enhance the precision and efficacy of tissue engineering within OoC systems, the proposed methodology promises to revolutionize drug discovery and development processes. Traditionally plagued by exorbitant costs averaging USD 1.3 billion, protracted development cycles of up to 16 years, and a daunting 89% failure rate, the pharmaceutical industry's clinical trials and drug discovery processes could witness a paradigmatic shift towards greater efficiency, reduced expenditure, and enhanced ethical standards. This approach not only paves the way for significant advancements in personalized medicine by enabling more accurate drug efficacy and toxicity assessments but also holds the potential to drastically curtail the dependency on conventional clinical trials and animal testing. Representing a significant leap forward, this research melds cutting-edge technologies with AI to forge a path toward a future where personalized therapeutic interventions are both feasible and economically viable, marking a milestone in the quest for more innovative, effective, and patient-centric healthcare solutions.

Keywords: Personalized Medicine, Artificial Intelligence, 3D Bioprinting, Organ-on-a-Chip Technologies, Microfluidics, Biomimetic Tissue Models, Pharmacological Testing, Drug Discovery and Development, Patient-specific Models, Biomedical Engineering

Biocompatible and Biodegradable Polymeric Microneedles for Transdermal Drug Delivery

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Abstract

Background: *Transdermal drug delivery offers numerous advantages over conventional routes, such as improved patient compliance and reduced side effects. Polymeric microneedles have emerged as a promising technology for enhancing transdermal drug delivery by overcoming the skin's barrier function. These microneedles, typically composed of biocompatible and biodegradable polymers, painlessly penetrate the stratum corneum, facilitating drug delivery into the systemic circulation.* ***Objectives:*** *This study aims to develop biocompatible and biodegradable polymeric microneedles for efficient transdermal drug delivery. Specifically, our objectives include fabricating microneedles with optimized mechanical properties and evaluating their capability to deliver therapeutic agents across the skin barrier.* ***Methods:*** *Polymeric microneedles were fabricated using a combination of micromolding and photolithography techniques. The microneedle arrays were made with biocompatible and biodegradable polymers, such as poly lactic-co-glycolic acid (PLGA). Atomic force microscopy and nano indentation were used to characterize the mechanical characteristics of the microneedles. Franz diffusion cells were used in in vitro permeation studies to evaluate the transdermal distribution of model pharmaceuticals.* ***Results:*** *Skin samples are used for the microneedle arrays. Moreover, histological analysis confirms the absence of skin. The fabricated polymeric microneedles exhibited excellent mechanical strength and biocompatibility. In vitro permeation studies demonstrated efficient delivery of model drugs across human damage or inflammation post-microneedle application.* ***Conclusion:*** *Biocompatible and biodegradable polymeric microneedles represent a promising approach for transdermal drug delivery. This study highlights the feasibility of using such microneedle systems to enhance the delivery of therapeutics across the skin barrier, offering potential applications in various medical fields, including drug delivery and vaccination. Further optimization and clinical validation are warranted to realize the full potential of polymeric microneedles in clinical practice.*

Cannabis-derived Compounds in Cosmeceuticals

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Abstract

Phytochemicals with benefits in nutrition, medicine, culture, and cosmetics have long been derived primarily from plants. Research on the human endocannabinoid system has heightened the search for novel, focused treatments that make use of cannabis-derived medicines. Biotechnology has the potential to be a useful tool for the sustainable supply of plant components for the cosmetic industry, and large-scale production optimization is crucial for the incorporation of bioactive compounds into the cosmeceutical industry production line. The potential benefits of incorporating cannabis-derived compounds, such as CBD, into cosmetic formulations for skincare and explore their therapeutic effects on various skin conditions and investigates the therapeutic potential of cannabis-derived compounds in cosmeceuticals, exploring the diverse applications and benefits of cannabinoids and terpenes in skincare and beauty products. It provides a comprehensive analysis of the scientific evidence supporting the use of cannabis-derived ingredients, such as cannabidiol (CBD) and hemp seed oil, in promoting skin health, managing inflammatory conditions, and addressing various dermatological concerns. The extracts from various plant components differ from one another. Particularly, cannabis flower and seed extracts have varied cannabinoid compositions, terpene profiles, antioxidant activity, fatty acid contents, and phenolic compound contents. Understanding the possible uses and effects of various cannabis plant sections requires an understanding of these distinctions. A wide variety of bioactive chemicals found in Cannabis sativa L. show promise when applied topically in dermatology or as ingredients in cosmetic products. First, because of the high cannabinoid content, it acts through the endocannabinoid system to modify a variety of inflammatory diseases and immunological responses. Secondly, due to the skin-beneficial qualities of hemp seed oil. Thirdly, due to the variety of small bioactive active substances like carotenoids, phytosterols, flavonoids, and terpenes. Cosmetic industries are currently exploring new plant natural-based sources of products, and Cannabis sativa L. is currently attracting increasing interest in this field. Endocannabinoid system modulation is crucial for managing a variety of conditions, including sebaceous gland-related disorders, hair growth disorders, anti-aging, anti-itching, as well as cutaneous inflammation, wound healing, and analgesic properties.

Keywords: Cannabis, Tetrahydrocannabinol, Endocannabinoids, Cannabidiol, Terpenes

Cellulose: A Natural Biopolymer for Drug Delivery Applications

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Abstract

Cellulose, one of the most abundantly available natural polymers, is highly present in the cell walls of plants. Its versatile properties such as low toxicity, mechanical strength, biocompatibility, and biodegradability, make it suitable for use in drug delivery systems. Cellulose-based formulations can be used in various dosage forms, including tablets, capsules, films, and nanoparticles or microparticles among others. They are often used as excipients also, which helps to deliver the active drug to the body and improve the drug's stability, solubility, or bioavailability. Cellulose derivatives, such as nanocellulose, ethyl cellulose, methylcellulose, carboxymethyl cellulose, bacterial cellulose, hydroxypropyl cellulose, thiolated cellulose, phosphorylated cellulose, sulfated cellulose, and microcrystalline cellulose, are commonly used in pharmaceutical formulations. This review highlights the formulations, modification techniques, and preparation methods of various cellulose-based drug delivery systems such as solvent evaporation, wet and dry granulation, solvent casting, electrospinning, and spray drying. It also focuses on the role of modified cellulose-based pharmaceutical formulations for controlled drug release and targeted delivery applications. The challenges and future prospective of cellulose-based drug delivery systems including the scalability and regulatory considerations are also being explored.

Keywords: Natural Polymers, Modification, Drug Delivery, Pharmaceutical Formulation, Cellulose

Computational Discovery Pipeline for BRD4-BD1 Inhibitors: Expanding the Armamentarium Against CRPC

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Abstract

Background: *Castration-resistant prostate cancer (CRPC) poses a significant challenge in prostate cancer therapy due to its resistance to conventional treatments. Bromodomain-containing protein 4 (BRD4) has emerged as a promising therapeutic target in CRPC, with its inhibition showing the*

potential to overcome resistance mechanisms associated with androgen deprivation therapy. ***Objective:*** *This study aims to employ computational methods to identify selective BRD4-BD1 inhibitors as potential candidates for CRPC therapy, with a focus on mitigating the adverse effects observed with pan-BET inhibitors.* ***Methods:*** *Utilizing a combination of molecular modeling techniques, including field-based 3D-QSAR modeling, molecular docking, and pharmacophore generation, we screened a library of compounds against BRD4-BD1. The National Cancer Institute (NCI) database was screened using the developed pharmacophore model, followed by in silico evaluation and MM-GBSA calculations to predict the binding affinities of filtered compounds followed by prediction of activity by developed QSAR to find the best hit.* ***Results:*** *Our computational investigations yielded selective BRD4-BD1 inhibitors with favorable binding interactions and predicted activities. By leveraging a diverse set of BRD4 inhibitors and utilizing computational screening methodologies, we identified potential lead compounds with improved selectivity and activity profiles.* ***Conclusion:*** *Through this in silico approach, we have identified novel BRD4-BD1 inhibitors as promising candidates for CRPC therapy. Our findings illuminate the potential of selective BRD4-BD1 inhibitors as promising therapeutic avenues for CRPC, offering improved efficacy and more selectivity compared to pan-BRD inhibitors. This computational approach not only accelerates drug discovery but also facilitates the rational design of targeted therapies, heralding a new era in CRPC treatment paradigms.*

Keywords: Epigenetics, Bromodomains, BRD4-BD1, In Silico, 3D-QSAR, Pharmacophore Modeling

Cosmeceuticals: A Solution for Diverse Skin Concerns

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Abstract

Cosmeceuticals, a term coined by Dr. Albert Kligman in 1984, are a combination of cosmetics and pharmaceuticals that offer aesthetic, enhancement, and therapeutic benefits. Skin, as a dynamic organ, is constantly renewed and regenerated, yet it is subject to a variety of flaws such as acne, wrinkles, traumatic scars, and age spots. Cosmeceuticals are an essential component of cosmetic dermatology treatment for these issues. ***Objective:*** *To study the role of cosmeceuticals in cosmetics dermatology Method Extensive literature survey* ***Result:*** *Advanced ingredients like peptides, retinoids, glycolic acids, antioxidants, and vitamins have been added to these products, which have undergone exponential growth. For example, peptides increase the production of collagen and encourage the proliferation of cells, whilst retinoids possess anti-aging properties including aiding skin renewal and decreasing wrinkles. When paired with bleaching agents and antioxidants, glycolic acids provide enhanced therapeutic results, making skincare programs easier to adhere to while addressing a variety of issues. Determining the efficacy of cosmeceuticals is still difficult despite their widespread use. Their methods of action have been investigated in clinical research, but it can be challenging to apply these discoveries*

to produce noticeable effects. Nonetheless, cosmeceuticals, which provide topical antioxidants, collagen boosters, and DNA repair agents, have the potential to treat photoaged and aged complexions. Cosmeceuticals provide approaches to cure existing skin damage, yet sunscreen is still necessary to prevent further UV radiation damage. Ongoing study is necessary to elucidate their efficacy and maximize their therapeutic potential, yet. ***Conclusion:*** *Cosmeceuticals are crucial for cosmetic dermatology as they provide advanced therapies for a variety of skin ailments. To fully exploit the potential of these products for boosting skin health and vitality, ongoing research and development are in progress.*

Keywords: Cosmeceuticals, Peptides, Retinoids, Collagen Boosters, Anti-aging

Critical Analysis of Optimization Techniques Used to Optimize Chitosan-based Carriers for Different Applications

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Abstract

Background: *Chitosan derived from chitin is a naturally occurring polymer that is cationic in nature. It is biodegradable, biocompatible, non-toxic, pH dependent, and can be used as a carrier for drug delivery. Chitosan has its own proven antimicrobial, anticancer, antifungal, and antioxidant effects. To get the best effects possible, various researchers have performed the design of experiments techniques (like Box–Behnken design, central composite design, full factorial design, etc.) to improve and even synergize the effect of the active ingredients.* ***Objective:*** *The present work is an effort to study, analyze, and summarize various optimization techniques that can be used for the optimization of chitosan-based carriers for such applications in diverse therapeutic effect(s).* ***Methods:*** *Various databases were used as literature sources like PubMed, Science Direct, etc. for the past 10 years to study the effect of chitosan as a polymer and to identify various optimization models and their effects thereof.* ***Results:*** *Chitosan can be used as a carrier by enhancing their properties using various optimization techniques like Box–Behnken design, central composite design, and others for improving different properties by encapsulating/entrapping using chitosan-based carriers, e.g., ciprofloxacin can be used for their antimicrobial properties considering the concentration of chitosan, ultrasonication energy and zeta potential, encapsulation efficiency, in vitro release as independent and dependent variables respectively.* ***Conclusion:*** *The reports reveal that the inherent properties of active pharmaceutical ingredients have been improved by using chitosan as a delivery carrier. The physicochemical properties (like drug entrapment efficiency, particle size, zeta potential, etc.) for these carriers have been optimized and have further improved their biological properties up to several folds.*

Keywords: Chitosan, Optimization, Independent Variables, Dependent Variables, Ultrasonic Energy

Design and In Silico Studies of Pyrazole and Triazole Derivatives for Anti-inflammatory and Antimicrobial Activities

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Abstract

Background: *Antimicrobial resistance (AMR) is a serious global health threat, reducing antibiotic effectiveness. Researchers are developing innovative strategies to combat it. One approach involves designing hybrid compounds by combining two effective pharmacophores. These hybrids exhibit synergistic effects and target multiple mechanisms, reducing the risk of resistance.* ***Objectives:*** *To design a compound that can act as a potent antifungal and anti-inflammatory compound that minimizes the risk of resistance development. To determine the docking analysis of the drug with the target protein. Methods Rational Drug Design and Molecular Docking studies were used in the study. Two active pharmacophore entities combined into a single molecular framework using molecular hybridization* ***Results:*** *Several molecular hybrids were designed and their affinity towards the target enzyme cytochrome P450 14 alpha sterol demethylase(1EA1) and Cyclooxygenase II (5KIR) was compared to the reference drug. The binding structure of hybrids and reference drugs shows the common amino acids at the binding site i.e., ASP158, PRO154, PRO156, GLY135, ASP157, TYR134, TYR136, GLN327, ASN34. The binding affinity of the compound 4A (-7.3) is more than the affinity of the reference drug (-6.1). In addition to evaluating binding affinity, ADMET studies were also done using computational methods to assess the pharmacokinetic and toxicological properties of compounds.* ***Conclusion:*** *By targeting multiple pathways and reducing the likelihood of resistance development, these compounds have the potential to address the growing threat of AMR and improve the treatment of bacterial infections in the future.*

Keywords: In Silico, Pyrazole, Triazole, Antimicrobial, Anti-inflammatory

Design, Synthesis, In Vitro, and In Silico Analysis of Substituted Oxadiazole Clubbed Piperazine Derivatives as Potential Antidepressant Agents

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Abstract

The pharmacophoric structural characteristics of oxadiazole clubbed different heterocyclic compounds present a possible avenue for the production of psychotropic pharmaceuticals. The United States Food

and Drug Administration (US FDA) has approved a number of CNS-active compounds that include a piperazine moiety in their pharmacophore. The monoamine oxidase (MAO) inhibition and antidepressant potential of the oxadiazole clubbed piperazine derivatives (AP1 12) have been investigated in this work. AP3 and AP12 compounds demonstrated highly effective and selective inhibition of MA O-A, with respective IC 50 values of 1.34 ±0.93 µM and 1.13±0.54 µM, and selectivity indices of 10 and 13 folds. At the MA O-A active site, both drugs exhibited reversible binding characteristics. In SH-SY5Y cell lines, these compounds showed no cytotoxicity, suggesting that they are safe for additional testing. Studies conducted in silico demonstrate that synthetic molecules have drug-like properties with little or no harm. A comparison between the two best compounds and the standard MA O-A inhibitor clorgiline revealed that both fit well at the active site of MAO-A, which is lined by amino acid residues Y69, N181, F208, I335, L337, F352, and Y444. In silico studies were used to better understand the binding interactions and stability of compounds at the binding pocket of the enzyme. According to the molecular dynamic experiments, AP3 and AP12 produced a very stable complex at MA O-A's active site that remained intact in the presence of tiny abruption stresses. The oxadiazole clubbed piperazine pharmacophoric characteristics are presented as a viable structural skeleton for additional clinical investigation and development of a new antidepressant therapeutic molecule due to the beneficial binding interactions and suitable ADMET capabilities.

Keywords: Anti-depressants, Oxadiazoles, Piperazine Derivatives, ADMET Capabilities

Development of Buccal Film of Exemestane for Improved oral Bioavailability

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Abstract

Breast cancer is the most challenging common malignancy among women globally. it primarily affects the breast tissues usually beginning in the milk ducts or globules. Treatment options may include surgery, radiation therapy, chemotherapy, and targeted therapy. Exemestane (EXE) is an irreversible steroidal automates inhibitor that has been approved by women however its oral bioavailability is hindered by factors such as poor aqueous solubility. In our project, we will use buccal film by chitosan polymer to deliver the EXE drug. Buccal films also referred to as oral films or buccal patches are thin and flexible and offer several advantages they provide a rapid onset of action due to direct absorption through the oral mucosa into the bloodstream bypassing the gastrointestinal tract and first-pass metabolism in the liver additionally the buccal mucosa rich blood supply and permeability to many drugs allow for improved drug absorption and bioavailability compared to oral administration by avoiding first-pass metabolism in the liver, buccal films can enhance the bioavailability of drugs susceptible to extensive metabolism when taken orally. The objective of the study is to develop a

mucoadhesive buccal film of exemestane. The developed formulation will be characterized, by in vitro disintegration in vitro release studies, and in vivo studies. The specific objectives of the work are to develop and optimize the mucoadhesive buccal film of breast cancer-controlling drug exemestane to increase its oral bioavailability. The rationale of this study includes several novel techniques and approaches that are currently being explored in breast cancer research and treatment like immunotherapy, precision medicine and targeted therapies, and nanotechnology nanoparticle-based drug delivery systems. But till now there are no buccal film applications of exemestane therapy by polymeric chitosan in the market, the main purpose of this combination and to reduce side effects, increase the oral bioavailability, increase the potency of formulation, and reduce the hypersensitivity reactions to patient.

Keywords: Development of Transdermal Patch for Management of Dysmenorrhea

Development and Characterization of the Nano-based Formulation of NSAIDs Incorporated in Transdermal Patch for the Management of Dysmenorrhea

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Abstract

To develop and characterize the nano-based formulation of mefenamic acid incorporated in transdermal patch for the management of Dysmenorrhea. The primary aim is to analyze the potential of the mefenamic acid patch as a menstrual pain reliever to compare its effectiveness with oral formulation and to overcome problems associated with oral formulation. Transdermal patches minimize changes in plasma concentration and extend the therapeutic impact by delivering a regulated and sustained-release of medicine. By avoiding the gastrointestinal tract, a transdermal patch can maximize drug delivery for mefenamic acid, which is well-known for its effectiveness in pain management and anti-inflammatory qualities. This lowers the possibility of gastrointestinal adverse effects linked to oral administration. Providing a practical as well as safe substitute may increase patient compliance. Overall, the rationale for transdermal delivery in pain relief lies in its ability to provide a reliable, patient-friendly, and sustained therapeutic solution for managing pain with minimized adverse effects.

Keywords: Mefenamic Acid, Anti-inflammatory, Sustained Therapeutic Solution, Pain Management, Patient-friendly

Development and Characterization of Ciprofloxacin Conjugated Silver Nanoparticles and Evaluation of Antibacterial Activity

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Abstract

Background: *Metal nanoparticles (NPs) have demonstrated a potential antibacterial action against types of bacteria that are resistant to many drugs. It was found that silver nanoparticles (AgNPs) were efficient antibacterial agents. Since several drug-resistant bacteria are ineffective against several kinds of fluoroquinolones, we looked at whether conjugating ciprofloxacin (CP) to nanoparticles may restore the antibiotic's effectiveness when used against multiple drug-resistant bacteria.* ***Objective:*** *This work aimed to study the synergistic antibacterial impact of ciprofloxacin functionalized AgNPs (CP-AgNPs) on pathogenic E. Coli and multidrug-resistant S. aureus. Method: Initially lysine (Lys) was linked to AgNPs. Sodium citrate and sodium borohydride were used in the reduction process for producing the Lysine-modified silver nanoparticles (Lys-AgNPs). Which were then functionalized with activated CP. The particles were characterized using TEM, UV-Vis spectroscopy, DLS, FTIR, and NMR.* ***Result:*** *The antibacterial activity of CP-AgNPs, Lys-AgNPs, and CP were evaluated by the disc diffusion method and their zone of inhibition and minimum inhibitory concentration (MIC) were calculated. The findings demonstrated that CP-AgNPs enhanced antibacterial properties over CP and Lys-AgNPs alone.* ***Conclusion:*** *CP-AgNPs were prepared to increase their antibacterial activity against drug-resistant gram-positive (Staphylococcus aureus) and gram-negative (Escherichia coli) bacteria. The findings demonstrated a noteworthy increase in antibacterial efficacy against both categories of bacteria which promises for application in antibacterial strategies.*

Keywords: Silver Nanoparticles, Antibiotics, Fluoroquinolones, Lysine, Antimicrobial Resistance

Development and Validation of HPLC Method for the Estimation of Metformin HCl, Sitagliptin, and Dapagliflozin in Its Synthetic Mixture

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Abstract

The current investigation was designed to develop and verify a high-performance reverse-phase liquid chromatography technique that was simple, quick, accurate, precise, selective, and repeatable for the measurement of metformin hydrochloride, sitagliptin, and dapagliflozin in bulk medication samples utilizing a CN (25 cm × 4.6 mm, 5 µ) column. At a flow rate of 1.0 mL/min, 10 µL of injection volume

was injected and eluted using a mobile phase consisting of buffer: acetonitrile: water (pH 3.0) 38:32:30v/v, throughout the whole investigation, the UV detection at 205 nm was maintained. Dapagliflozin had a retention time of 9.688 minutes, Sitagliptin had a retention time of 10.171minutes, whereas metformin hydrochloride eluted with a retention time of 3.769 minutes, indicating good separation between the two components. In compliance with the International Conference on Harmonization (ICH) criteria, the procedure was verified for linearity, accuracy, precision, robustness, LOD, and LOQ as well as system appropriateness. The proposed methods may be used for routine quality control analysis of tablets and bulk.

Keywords: HPLC, Metformin, Sitagliptin, Dapagliflozin, Synthetic Mixture

Development of Hybrid Nanocarrier Systems for Co-delivery of Therapeutic Agents and Imaging Agents

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Abstract

The integration of therapeutic and imaging agents within a single nanocarrier system holds significant promise for advancing personalized medicine and disease management. These hybrid nanocarriers offer the potential to deliver therapeutic payloads while simultaneously enabling real-time monitoring of treatment efficacy through imaging modalities. Such systems can revolutionize drug delivery by providing precise targeting, controlled release, and enhanced therapeutic outcomes. ***Objectives:*** *The primary objective of this study is to develop hybrid nanocarrier systems capable of co-delivering therapeutic agents and imaging agents. Specifically, we aim to engineer nanocarriers with optimal physicochemical properties for efficient encapsulation and delivery of both types of agents. Additionally, we seek to evaluate the in vitro and in vivo performance of these hybrid systems to assess their potential for clinical translation.* ***Methods:*** *Hybrid nanocarriers were synthesized using a combination of nanoprecipitation and emulsion techniques. The nanocarriers were characterized for size, morphology, surface charge, and drug-loading efficiency using dynamic light scattering, transmission electron microscopy, and zeta potential analysis. In vitro studies were conducted to evaluate drug release kinetics, cellular uptake, and cytotoxicity. In vivo experiments were performed to assess biodistribution, pharmacokinetics, and therapeutic efficacy.* ***Results:*** *The developed hybrid nanocarrier systems exhibited uniform size distribution, spherical morphology, and high drug-loading capacity. In vitro studies demonstrated sustained-release of both therapeutic and imaging agents over time, with efficient cellular internalization and minimal cytotoxicity. In vivo evaluations revealed prolonged circulation times, preferential accumulation at the target site, and enhanced therapeutic*

outcomes compared to conventional formulations. ***Conclusion:*** *The successful development of hybrid nanocarrier systems for the co-delivery of therapeutic agents and imaging agents represents a significant advancement in nanomedicine. These systems offer synergistic benefits by combining therapeutic efficacy with real-time imaging capabilities, thereby facilitating personalized treatment strategies, and improving patient outcomes. Moving forward, further optimization and preclinical studies are warranted to validate the clinical potential of these hybrid nanocarriers in various disease models.*

Keywords: Nanocarrier, Therapeutic Agent, Cellular Internalization, Zeta Potential Analysis, Engineer Nanocarriers

Discovery and Identification of 8 HQ-Derived Small Molecules Targeting Catalytic Activity of Botulinum Neurotoxin Serotypes B, E and F

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Abstract

Botulinum neurotoxins (BoNTs) are lethal biowarfare agents categorized in group A, by CDC USA. The unavailability of countermeasures against these neurotoxins has been a matter of extensive research. The 8-hydroxyquinoline (8-HQ) scaffold is an established privileged compound and is recently being explored as a potential drug candidate against BoNTs. Intoxication of BoNT results in cleavage of SNARE proteins like SNAP-25 and VAMP and inhibition of acetylcholine release. The development of small-molecule non-peptidic inhibitors targeting the active site has emerged as a most significant approach against BoNT intoxication. Methods: Presently, we are reporting the in silico, in vitro, and in vivo studies of 8-hydroxyquinoline (8-HQ) analogs, selected on the basis of their binding affinity. Selected small molecules were further refined by in vitro assays through fluorescence thermal shift (FTS) assay, endopeptidase assay, and surface plasmon resonance (SPR). Finally, the in vivo efficacy of these compounds was evaluated in a mouse model. Results: The FTS and endopeptidase assay results revealed that among the selected 8-HQ derivatives, compound 4-{[(8-Hydroxy-7-quinolinyl)(phenyl)methyl] amino}benzoic acid (NSC1011) was found to be highly inhibitory against the studied serotypes. The SPR-based protein–small-molecule interaction study showed that the compound NSC1011 has the highest affinity binding for BoNT/E-LC (KD: 5.54E-07). Interestingly the compound has also displayed an extension in survivability in mice models. Conclusion: The findings conclude that the compound NSC1011 has shown higher binding affinity in in silico as well as inhibited the catalytic activity of the BoNT/B, /E, and /F in vitro and in vivo assays. Hence, the selected molecules can act as a common antidote against the selected BoNT serotypes.

Keywords: Botulinum Neurotoxin, 8-hydroxyquinoline, Endopeptidase Assay, Surface Plasmon Resonance

Drug Design and In Silico Studies of New Pyrrole and Imidazole Scaffolds as Antiepileptic Agents

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Abstract

Epilepsy is a neurological disorder that afflicts approximately 2% of the world's population. In the developed countries, where drugs are easily available, epilepsy responds to treatment in up to 70% of the patients. Imidazole and pyrrole moieties are responsible for readily binding with a variety of enzymes, proteins, and receptors compared to the other heterocyclic rings. The hydrogen bonding domain and electron donor groups are essential for the molecules to determine potential antiepileptic activity. However, the development of novel pyrrole and imidazole scaffolds with both high pharmacological activity and few side effects is a challenging field. ***Objectives:*** *In silico research of new pyrrole and imidazole scaffolds discovered by molecular modeling methods and structural alterations. To obtain good bioavailability, calculations of molecular characteristics are important for designing potent and safe molecules.* ***Methods:*** *Two active pharmacophore entities into a single molecular framework using molecular hybridization and molecular docking. Results: Several new hybrid molecules containing pyrrole and imidazole rings were docked with target molecules and showed good binding affinities as compared with the reference drug.* ***Conclusion:*** *New lead compounds have drug-like qualities, and their physicochemical properties were determined.*

Keywords: Pyrrole, Imidazole, Molecular Docking, ADME Studies, Antiepileptic Activity

Emerging Insights of Lipid Polymer Hybrid Nanoparticles (LPHNPs) for Effective Management of Rheumatoid Arthritis: A Detailed Study

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Abstract

The objective of this comprehensive study is to provide recent insights into the various design patterns, preparation techniques, applications, and future biomedical possibilities of lipid polymer hybrid nanoparticles (LPHNPs) for the effective treatment and management of rheumatoid arthritis. As the ongoing progression in the area of nano-drug delivery systems enhancing day by day with the clinical acceptance for enhancing the pharmacokinetics and pharmacodynamics profile of the drug the

utilization of LPHNPs is also increasing exponentially. These nanoparticles have been reported for various cancer treatment-based delivery systems but nowadays the use of these nanoparticles is also increasing in the treatment of rheumatoid arthritis with positive reported results findings. Rheumatoid Arthritis is an acute autoimmune disorder that is characterized by synovial inflammation, bore erosion, and cartilage destruction along with various comorbid conditions. In this review, we focus on the emerging role of LPHNPs which are core-shell-designed structured nanoparticles that have the characteristic properties of liposomes as well as polymeric nanoparticles. LPHNPs consist of three distinct layers which include a polymeric inner core layer having biodegradable properties and the capacity to load the hydrophobic drug molecule. After that, a monolayer lipid shell surrounds the inner core for protective action and helps in controlling the diffusion mechanism of the drug molecule. The outermost layer consists of lipid-polyethylene glycol (PEG), polyvinylpyrrolidone (PVP), and polysaccharides for improving systemic circulation and immune recognition protection which can be further functionalized through various ligands for specific targeting systems. In this study, we have focused on some of the drug delivery systems that were specifically fabricated for the effective management of rheumatoid arthritis with the help of LPHNPs via active and passive drug targeting strategies to extemporize the health condition of rheumatoid arthritis patients.

Keywords: Lipid Polymer Hybrid Nanoparticles, Rheumatoid Arthritis, Polyvinylpyrrolidone, Lipid-Polyethylene Glycol, Nanoparticles

Emerging Trends in Future Directions in Gold Nanoparticle Research

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Abstract

Gold nanoparticles (AuNPs) have garnered significant attention in recent years due to their unique properties and wide-ranging applications in various fields, including biomedicine, catalysis, sensing, and nanoelectronics. As researchers delve deeper into understanding the fundamental principles governing AuNPs, several emerging trends and future directions are shaping the landscape of gold nanoparticle research. One prominent trend is the exploration of novel synthesis methods to produce AuNPs with precisely controlled size, shape, and surface properties. Advances in synthesis techniques such as seed-mediated growth, template-assisted synthesis, and bioinspired approaches offer unparalleled control over nanoparticle morphology, enabling tailored properties for specific applications. In biomedical research, AuNPs hold promise for revolutionizing diagnostics, imaging, and therapy. Functionalization of AuNPs with biomolecules allows for targeted drug delivery, imaging contrast enhancement, and biosensing with unprecedented sensitivity. Moreover, the development of theranostics platforms combining therapeutic and diagnostic capabilities is poised to transform personalized medicine. Another emerging trend is the integration of AuNPs into advanced materials for enhanced functionality. Hybrid nanomaterials incorporating AuNPs with polymers, carbon-based materials, and inorganic nanomaterials exhibit synergistic properties for applications in plasmonics,

catalysis, and energy storage. Furthermore, the exploration of AuNPs in environmental remediation, renewable energy, and sustainable chemistry is gaining momentum. AuNP-based catalysts show remarkable activity and selectivity in chemical transformations, paving the way for greener and more efficient processes. Looking ahead, future research in gold nanoparticles is expected to focus on multifunctional nanomaterials, dynamic nanosystems, and scalable manufacturing techniques. Harnessing the full potential of AuNPs will require interdisciplinary collaboration, innovative approaches, and a deep understanding of their structure-property relationships.

Keywords: Gold Nanoparticle, Biomedicine, Catalysis, Nanoelectronics, Biomolecules

Fabrication and Evaluation of Niacinamide-loaded Microsponge Gel for the Treatment of Acne Vulgaris

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Abstract

The current study's objective is to develop a novel medication delivery system that employs microsponges to deliver niacinamide and to make microsponge gel. Niacinamide is a vitamin that has anti-inflammatory properties and is used to treat acne vulgaris as well as to reduce sebum production. The microsponge delivery system is a novel system for the controlled release of active substances. By using 23 factorial designs and the quasi-emulsion solvent diffusion approach, the microsponges were created with the assistance of a design expert. The production yield, encapsulation effectiveness, particle size measurement, and in vitro drug release study were only a few of the evaluation criteria that were applied to all the developed microsponges. The improved microsponge formulation F5 eventually evolved into a topical gel formulation. The prepared gel was assessed for physical properties. The highest drug release for the F6 and F5 formulations was found to be 92.18% to 94.2% respectively for the 10 h, proving that the quasi-emulsion solvent diffusion method is a suitable technique for the preparation of microsponges as most of the formulations were discrete and spherical in shape with a good production yield. The regulated release of niacinamide for 12 hours was demonstrated by the microsponge gel formulation NAM(F5). The drug release data of the batch NAM(F5) that had been optimized were fitted into various kinetic models, and the results demonstrated that the drug release from gel formulations follows the Higuchi equation. The designed microsponge gel is intended to persist on the skin for longer than the typical formulation, gradually releasing its contents over time, and maintaining stability. As a result, the microsponge gel and niacinamide microsponges show promising results as being more effective than traditional formulation treatment.

Keywords: Niacinamide Microsponge, Acne Vulgaris, Microsponge Gel, Topical Delivery, Controlled Release

Febuxostat: A Review

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Abstract

Gout is an inflammatory arthritis disorder characterized by the deposition of monosodium urate crystals within a joint or surrounding tissue, due to elevated tissue urate concentration, which results in immune responses, which lead to conditions like chronic gout arthritis, tophi, and acute gout flares. Gout can be effectively managed using urate-lowering agents that promote the dissolution of monosodium urate crystals and consequently reduce serum urate concentrations. Febuxostat is a drug that was approved by the FDA in 2009 for the management of excess uric acid levels in people suffering from gout. It is a potent non-purine drug that selectively inhibits xanthine oxidase. The authors have given a brief market overview of gout, and febuxostat, along with its chemical, biological, and biochemical properties like pharmacodynamics, pharmacokinetics, metabolism, etc. A brief introduction about nanoparticles has been included to give the reader better insights into the possibilities of the development of novel formulations. Novel drug formulations of febuxostat, particularly nano-formulations, oral formulations, and transdermal formulations, along with the materials used, the process used for their manufacturing along the advantages offered by the respective dosage forms have also been included. The marketed formulations of febuxostat have been summarized in a table to check the market and to be informed about the scope of innovation and research for the development of new formulations of febuxostat. Taking into consideration the great patient compliance offered by transdermal formulations and considering the physio-chemical properties of febuxostat, transdermal formulations are one area that should be explored and new formulations should be developed. ***Objectives:*** *To study febuxostat and its formulations.* ***Methods:*** *A literature review.* ***Results:*** *A brief overview of febuxostat, its marketed formulations, and the novel formulations of febuxostat under study.* ***Conclusion:*** *An overview of febuxostat was studied.*

Keywords: Febuxostat, Gout, Novel Formulations, Monosodium Urate Crystals, Xanthine Oxidase, Tophi

Green Guardian: Harnessing Nature's Power for Vaccine Protection

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Abstract

Background: *The traditional approach to vaccine production typically involves utilizing weakened or killed forms of pathogens or specific parts of pathogens. When administered to humans, these vaccines*

trigger an immune response, protecting against the targeted disease. However, there is a risk of contamination in such vaccines. To address the challenges associated with conventional vaccines, new methods have been developed, such as plant-derived vaccines. These vaccines are cost-effective, scalable, safer, and easily handled, and in case of transient expression, the formation of product from gene is much faster than that observed in mammalian cells. ***Aim:*** *To review the current status of plant-derived vaccines, and examine the methods used for antigen expression in plants and the efficacy of resulting vaccines along with associated challenges and future perspectives.* ***Methods:*** *A literature review of the past 10 years using databases like PubMed, ScienceDirect, etc.* ***Results:*** *Several studies have demonstrated the immunogenicity and efficacy of plant-derived vaccines in preclinical and clinical trials. These vaccines have shown the potential to trigger protective immune responses against diseases such as hepatitis B, cholera, influenza, and rabies. Furthermore, plant-derived vaccines have been shown to offer several advantages, making them a practical option for the large-scale production of affordable vaccines.* ***Conclusion:*** *The utilization of plants for the development of vaccines is a novel approach that offers a promising solution to the limitations faced by traditional vaccine production methods. By leveraging nature's green factory, we can enhance vaccine accessibility and contribute to the prevention and control of several diseases worldwide.*

Keywords: Plant-derived Vaccines, Virus-like Particles, Antigens, Affordable Vaccines, Plant-derived Vaccines

Harnessing Therapeutic Potential of Transferrin Targeted Nanocarriers in Cancer Therapy

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Abstract

Cancer represents a significant contributor to global mortality rates and often requires frequent and high-dose medications. Despite substantial advancements in cancer research and the broad-spectrum of available potent anticancer drugs, treatment effectiveness is often hindered and unsuccessful due to the absence of pharmacoselectivity to diseased cells, and poor patient compliance. Extensive focus has been dedicated to attaining specific scientific methods for cancer therapy to precisely target malignant cells. Hence, there is a growing recognition that active-targeted nanocarriers significantly mitigate off-target effects, because of targeted accumulation within tumors. Notably, actively targeted nanoparticles have demonstrated enhanced therapeutic efficacy in various tumor models compared to their passively targeted counterparts. In this context, utilizing the abundance of transferrin receptors and their role in cellular iron uptake via interaction with transferrin emerges as a promising entity for the targeted therapy of cancer. Therefore, transferrin-conjugated nanocarriers have been developed, aiming to maximize therapeutic benefits and minimize side effects for active tumor-targeting along with efficacious delivery of chemotherapeutics into tumor cells.

Keywords: Cancer, Targeted Drug Delivery, Ligands, Transferrin, Nanocarriers

Hurdles in Translating Pharmaceutical Products from Lab to Market

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Abstract

The journey from laboratory innovation to commercialization in the pharmaceutical realm is fraught with challenges, particularly in the translation of novel drug delivery systems. This abstract scrutinizes three such systems nanogels, microneedle patches, and transferosomes highlighting the intricate hurdles they face in transitioning from concept to market-ready products. Nanogels offer promise in controlled release and targeted drug delivery owing to their unique structure and properties. However, their translation is hindered by scalability limitations, reproducibility concerns, and stringent regulatory requirements. Similarly, microneedle patches present a convenient and non-invasive drug administration method, yet regulatory approvals, manufacturing scalability, and stability pose significant obstacles. Transfersomes, lipid-based vesicles with potential for enhanced transdermal drug delivery, face challenges related to stability, scalability, and commercial viability. These hurdles underscore the complexities involved in moving from lab prototypes to marketable formulations. The translation of pharmacological innovations encounters a multitude of barriers, including regulatory hurdles, limited understanding of biophysical and chemical interactions, in vivo instability, safety considerations, and challenges in reproducible manufacturing and scale-up. Overall, this abstract shed light on the complexities and obstacles inherent in the translation of various drug delivery systems, offering insights into the steps needed to bridge the gap between research and industry, ultimately paving the way for ground-breaking developments in pharmaceutical innovation.

Keywords: Hurdles, Pharmaceutical Product, Translation, Nanogels, Transferosomes, Microneedle Patches

Identification of Potential CDC25 Phosphatase Inhibitors Using Virtual Screening Tools

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Abstract

Background: *Cell division cycle 25 (CDC25) phosphatases play a pivotal role in regulating the cell cycle by dephosphorylating cyclin-dependent kinases. CDKs are key enzymes that control various*

checkpoints in the cell cycle and ensure a proper transition between phases. CDC25 acts as a positive regulator by removing inhibitory phosphate groups from CDKs, thereby promoting their activation, and facilitating cell cycle progression. Dysregulation of CDC25 activity has been implicated in various cancers, making it an attractive target for therapeutic intervention. It involves utilizing computational methods to screen small-molecule inhibitors database and identify molecules that have the potential to inhibit CDC25 phosphatases. Those molecules were employed for the development of the pharmacophore model. A combination of molecular docking and pharmacophore-based screening was employed to evaluate the binding affinity and specificity of candidate compounds. ***Objectives:*** *Identification of potential candidate molecules as CDC25 inhibitors from large chemical libraries using pharmacophore modeling. Docking studies of selected hits from the pharmacophore model.* ***Methodology:*** *Target Selection, Ligand Database Preparation & Ligand-based Pharmacophore Modeling.* ***Results:*** *Virtual screening identified several candidate compounds from large chemical libraries that exhibit favorable interactions with the active site of CDC25 phosphatases. The selected compounds demonstrate high binding affinity.* ***Conclusion:*** *Virtual screening techniques such as molecular docking and pharmacophore modeling, have shown their effectiveness in screening large chemical libraries to identify potential inhibitors of CDC25 phosphatases.*

Keywords: Natural Products, CDC25, Cell Cycle, Overexpression, Pharmacophore Modeling

Illuminating Breakthroughs in Systemic Lupus Erythematosus Treatment Through Cutting-edge Nano-based Research

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Abstract

Systemic lupus erythematosus (SLE) is an enigmatic chronic autoimmune disease with a propensity to impact several organs and systems in the body. SLE is relapsing and remitting in nature. It is a complicated condition characterized by an aberrant immune response, in which the body's defence system mistakenly targets healthy tissues and organs for attack rather than defending the body against external dangers like bacteria and viruses. SLE presents a diverse range of symptoms, including arthritis, butterfly rash, photosensitivity, Raynaud's phenomenon, lupus nephritis, alopecia, pleurisy, and anemia. These symptoms vary in severity and can make diagnosis and treatment challenging due to their unpredictable nature. As the symptoms of SLE vary and are unpredictable, this makes the treatment of SLE challenging. SLE is a rare disease with varying prevalence rates across the globe. The combination of genetic, hormonal, and environmental factors is thought to be the cause of SLE as the precise cause remains unknown. SLE can happen at any age, but it shows high gender disparity as the prevalence of SLE is higher in females as compared to males that is 9:1. In females it usually affects at the childbearing age and highest at 15-44 years of age and male at 45-66 years of age. Conventional SLE treatment relies on immunosuppressive drugs like corticosteroids, antimalarials, and cytotoxic agents, effectively managing symptoms but often causing significant side effects. Recent advancements in SLE research emphasize targeting innate and adaptive immunity, Interleukin Inhibitors, and JAK

inhibitors, aiming to enhance treatment efficacy with minimized side effects. Promising strides include biologics, targeted therapies, and potential nanoparticle utilization for precision drug delivery. With 195 active research studies, focusing on various aspects like B cells, cytokines, and interferons, the future of SLE treatment looks promising, driven by a collective dedication to unraveling complexities and offering transformative solutions.

Keywords: Systemic Lupus Erythematosus (SLE), Butterfly Rash, Photosensitivity, Corticosteroids, Antimalarials, Immunosuppressive Agents, Biologics, Nanoparticles

Implementation of QbD Approach to the Analytical Assay Method Development and Validation for the Estimation of Relugolix Drug Substance by HPLC

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Abstract

Quality by design (QbD) approach emphasizes risk assessment and management to identify critical method parameters. An efficient experimental design based on a central composite design of two independent factors of the HPLC method is applied. Central composite design (CCD) was used to study the response and interrelationships at three different levels; thus, evaluating the critical analytical attributes (CAAs), namely retention time, peak area, symmetry factor, and theoretical plates as the parameters with the help of Design Expert Software. The optimized and predicted data from the contour diagram was selected to achieve the chromatographic separation with the use of the following specification: Column Dimensions: (C18, 4.6 mm × 250 mm, 5 µm spherical particles), phosphate buffer (pH 2.5) as mobile phase A and acetonitrile as mobile phase B, at a flow rate of 1.0 ml/min. Detection of Relugolix sample was carried out at a wavelength of 288 nm. The run time was 10 minutes. ***Objectives:*** *The development and validation of a simple, rapid, precise, accurate, robust, and cost-effective high-performance liquid chromatography method for the estimation of Relugolix drug substance.* ***Methods:*** *High-performance liquid chromatography (HPLC) has been used to develop and validate the method for the estimation of Relugolix drug substance.* ***Results:*** *The method was validated as per the International Conference on Harmonization (ICH) guideline. The calibration curve was linear over the concentration range of 50 to 150 µg/ml with r2 =0.999 at 288nm. The system suitability test parameters, tailing factor, and theoretical plates were found to be 1.23 and 10452 respectively. The % RSD was found to be less than 2.0%.* ***Conclusion:*** *A simple, rapid, and sensitive analytical method was developed and validated for the estimation of Relugolix drug substance. Statistical analysis proves that the method is robust and precise.*

In Silico Design and ADMET Studies of Some Piperidine and Oxazole Derivatives for Their Antimicrobial Potential

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Abstract

Background: *In silico designing predicts interactions between ligands and receptors. Piperidine and oxazole derivatives exhibit diverse pharmacological activities like antibacterial and antifungal.* ***Objectives:*** *Identify novel antimicrobial compounds through in silico design for potential therapeutic applications and their ADMET parameters.* ***Methods:*** *Molecular docking software like PyRx was used for docking. Discovery Studio 2021 client was used for finding possible binding regions between ligands and receptors. MarvinSketch was used to prepare ligands. SwissADME was used for physicochemical descriptors as well as to predict ADME parameters.* ***Results:*** *(E)-3-(4-(aminomethyl)-[1,1-biphenyl]-3-yl)-1-(4-(piperidin-4-ylamino) phenyl) prop-2-en-1-one was docked with a domain insertion in E. coli GyrB (PDB ID-3NUH). It has the highest antimicrobial activity with a docking score of -9.3 kcal/mol. The compound shows interaction with Arg B:507, Ala B:499, and Pro B:532 and shows H-bonding with Ala B:772. It follows Lipinski's rule of 5. [(3-{(2-(4-Chlorophenyl)-5-methyl-1,3-oxazol-4-yl)}-5-(4-methylphenyl)-4,5-dihydro-1H-pyrazol-1-yl)](pyridine-4-yl) methanone was docked with Aspergillus niger endoglucanase (PDB ID-IKS5) It has the highest docking score of -9.1 kcal/mol. It shows carbon-hydrogen bonding with Glu A:116 and other interactions with Trp A:22, Ala 156, and Val 58. It follows Lipinski's rule of 5.* ***Conclusion:*** *In conclusion, through molecular docking (E)-3-(4-(aminomethyl)-[1,1-biphenyl]-3-yl)-1-(4-(piperidin-4-ylamino) phenyl) prop-2-en-1-one compound shows highest antibacterial activity against e. coli GyrB and [(3-{(2-(4-Chlorophenyl)-5-methyl-1,3-oxazol-4-yl)}-5-(4-methylphenyl)-4,5-dihydro-1H-pyrazol-1-yl)](pyridine-4-yl)methanone shows antifungal activity against A. niger endoglucanase. Both follow Lipinski's rule of 5.*

Keywords: Piperidine, Oxazole, ADME Studies, Antimicrobial Properties

In Vitro Evaluation of *Cissus quadrangularis* Ethanolic Extract and Its HPMC-based Sustained-release Formulation for Treatment of Arthritis

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Abstract

Background: *Medicinal plants possess complex chemical substances as secondary plant metabolites which contribute significantly in the therapy of chronic human diseases.* ***Objectives:*** *The objectives of this study were to formulate polymer-based sustained-release tablets of Cissus quadrangularis extract*

with varying amounts and ratios of two different grades of hydrophilic as well as hydrophobic polymers and to evaluate the in vitro efficacy of an ethanolic extract of Cissus quadrangularis, against arthritis. ***Methods:*** *The present research work involves formulation of tablet dosage form using dried ethanolic extract of C. quadrangularis stem along with various excipients like HPMC, ethyl cellulose, magnesium stearate, talc, and microcrystalline cellulose by direct compression method. The formulated tablets were evaluated for thickness, weight variation, friability, hardness, and drug release study. The ethanolic extract of C. quadrangularis was evaluated in vitro to assess its efficacy in treating arthritis by inhibition of protein denaturation (egg albumin) using different concentrations (100, 250, 500, and 1000 µg/ml) of C. quadrangularis extract as well as diclofenac sodium (standard drug).* ***Results:*** *The result shows that the in vitro anti-arthritic potential of the extract was found to be significant (% inhibition 87.04) and comparable to the standard drug. The formulated tablets exhibited a good sustained-release effect. The percentage cumulative release of one of the formulations (F2) was found to be 75.33% in 10 hours.* ***Conclusion:*** *The ethanolic extract of Cissus quadrangularis shows promising potential as a treatment for arthritis, with significant anti-inflammatory activity and the ability to provide controlled release of the active compound along with HPMC. These findings support further research and clinical trials to assess the efficacy and safety of Cissus quadrangularis extract as a potential treatment option for arthritis.*

Keywords: *Cissus quadrangularis*, Plant Extracts, Anti-arthritic, Hens Egg Albumin, Diclofenac

Inhibitory Effects of Trisubstituted Triazine on PTP1B and DPP4

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Abstract

Protein tyrosine phosphatase 1B (PTP1B) and dipeptidyl peptidase 4 are key enzymes involved in the regulation of glucose metabolism and insulin signaling. In a recent study, the inhibitory activity of a trisubstituted triazine compound was investigated against PTP1B and DPP4. The compound was found to demonstrate significant inhibitory effects against both enzymes. The inhibition of PTP1B and DPP4 is of particular interest in the field of diabetes research, as these enzymes play important roles in glucose homeostasis and insulin resistance. The trisubstituted triazine compound showed potent inhibitory activity against PTP1B, an enzyme that negatively regulates insulin signaling by dephosphorylating insulin receptor substrate. The inhibition of PTP1B can enhance insulin sensitivity and improve glucose metabolism, making it a potential target for anti-diabetic therapy. Additionally, the trisubstituted triazine compound displayed inhibitory activity against DPP4, an enzyme responsible for the degradation of glucagon-like peptide-1. The inhibition of DPP4 can increase the levels of active GLP-1, which is known to stimulate insulin secretion and inhibit glucagon release, thereby promoting glucose control in individuals with diabetes. These findings suggest that the trisubstituted triazine compound may have therapeutic potential for the treatment of diabetes and insulin resistance. In conclusion, the compound demonstrated significant inhibitory effects against both PTP1B and DPP4, highlighting its potential as a therapeutic agent for the treatment of diabetes and insulin resistance.

Keywords: Therapeutic, Insulin, Inhibition, Glucagon, Glucose Homeostasis

In Silico Approach Towards Finding Novel Genetic Targets and Drug Derivatives for Brain Cancer

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Abstract

Background: *Otto Warburg demonstrated the role of mitochondria in eukaryotic cells for the development of cancer over 100 years ago. They are responsible for the regulation of various important processes like metabolism, cellular proliferation, and apoptosis. Mutations in the mitochondrial and other genes are responsible for the reprogramming of cancer cells by various methods like oxidative stress (ROS), apoptosis dysregulation, metabolic reprogramming, and sustained cellular proliferation.* ***Objectives:*** *To determine the different genes and gene-gene interactions associated with brain cancer; and to computationally design new drug ligands from existing ones for treatment of brain cancer.* ***Methods:*** *Computational studies were done using STRING and STITCH databases on software like Cytoscape, Discovery Studio 2021 Client, PyRx. PyMol and, Molinspiration. Various genes and their interactions were identified that were associated with brain cancer. Stringdb compartment values were evaluated to check for their prevalence in specific organelles like mitochondria. PyMol was used to prepare structures of drug derivatives and was analyzed by Molinspiration.* ***Results and Discussion:*** *Docking studies were carried out of these genes with anticancer agents like cisplatin and cyclophosphamide to study the interactions. Some drugs did not show any binding affinity whereas some showed binding as high as 9 kcal/mol. Compartment and tissue scores suggest the prevalence and expression of genes in the brain and their target sites.* ***Conclusion:*** *This approach can help develop multi-targeted therapy for the treatment of cancer. Using a single drug for multiple targets can help increase the efficiency of drug and patient compliance. Bioavailability scores and LogP values were calculated, which helped in the determination of formulation parameters. Similar tests were done for new drug ligands that may retain anticancer effects after synthesis.*

Keywords: Computational Studies, Brain Cancer, Docking, Drug Discovery

Isoflavonoids for Tuberculosis

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Abstract

Background: *Isoflavonoids, a subgroup of flavonoids, have garnered significant attention in recent years due to their diverse pharmacological properties, including antimicrobial activity. This review explores the potential of isoflavonoids as therapeutic agents for tuberculosis (TB), a global health concern. We delve into the various types of isoflavonoids and their mechanisms of action, elucidating*

their targets within Mycobacterium tuberculosis (M.tb) and the host immune system. Through a case study, we highlight the efficacy of specific isoflavonoids in combating TB infection. Isoflavonoids exert their antimycobacterial effects through multiple mechanisms, including inhibition of key enzymes involved in bacterial cell wall synthesis, disruption of biofilm formation, and modulation of host immune responses. Additionally, isoflavonoids demonstrate synergistic effects when used in combination with conventional anti-TB drugs, enhancing therapeutic outcomes and reducing the risk of drug resistance. Furthermore, we address the distinctions between flavonoids and isoflavonoids, emphasizing the structural differences and how these variances contribute to their unique biological activities. Finally, we discuss the challenges and future perspectives in harnessing isoflavonoids as adjunctive therapies for TB, highlighting the need for further research to optimize their clinical efficacy and safety profiles.

Keywords: Isoflavonoids, Tuberculosis, Antimicrobial Activity, Mechanisms of Action, Flavonoids, Drug Synergy, Drug Resistance, Adjunctive Therapy

Latest Delivery Advancements of Lipid Nanoparticles for Cancer Treatment

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Abstract

Cancer is a major worldwide health issue, necessitating novel therapeutic approaches to overcome the limitations of traditional therapies such as systemic toxicity and drug resistance. Lipid nanoparticles (LNPs) have emerged as a possible transporter for anticancer medicines. Lipid-based nanoparticles (LNPs) have several benefits, including biocompatibility, drug encapsulation, and the possibility for targeted delivery to tumor locations. Their adaptability enables combination treatments and surface changes for better targeting. With interdisciplinary efforts, LNPs have the potential to revolutionize cancer treatment by allowing for precise and effective therapeutic agent delivery, enhancing patient outcomes and quality of life. ***Objective:*** *To get an insight into the salient characteristics of LNPs, such as the lipid components, particle size, polydispersity index, and encapsulation efficiency followed by strategies that enhance their remarkable drug delivery capabilities.* ***Method:*** *Collection of literature data from databases like PubMed, ScienceDirect, and Google Scholar.* ***Result:*** *It highlights LNPs' ability to improve the solubility, stability, and bioavailability of various chemotherapeutics, nucleic acids, and immunotherapeutic modalities. especially the recent breakthrough in surface modification of LNPs, which is critical for improving their efficacy. Tailored LNP coatings increase targeting precision, stability, and biocompatibility, boosting their transport and increasing therapeutic efficacy for cancer targeting.* ***Conclusion:*** *Recent advancements in the use of LNPs to treat various types of cancer are addressed with an emphasis on the most recent clinical studies. Overall, the LNPs have the potential to target and treat cancer in a personalized manner via gene therapy, RNA interference, and immunotherapy.*

Keywords: Cancer Nanotechnology, Cancer Targeting by LNPs, Lipid Components, LNPs Characteristics, Surface Modification

Magnetic Nanoparticles (MNPs): Remote Controlled Approaches for Targeted Therapeutics

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Abstract

MNPs as novel drug delivery system (NDDS) approaches possess several magnetic properties for targeted and controlled delivery in various biomedical applications. Unlike normal nanoparticles, MNPs can respond to external magnetic fields, allowing for manipulation, guidance, and functionalization within the body. This review encompasses a wide range of scientific and technological goals aimed at understanding their properties, synthesis methods, characterization techniques, surface functionalization strategies, and applications. The review also explores several methodologies based on a synthesis of MNPs involving physical, and chemical methods (co-precipitation, sol-gel synthesis, etc.) and biological synthesis which is followed by various characterization and functionalization strategies for introducing into innovative applications. These advancements hold the promise for targeted drug delivery, imaging diagnostics, pollution control, and energy storage, driving transformative impacts in various fields. However, magnetic nanoparticles (MNPs) represent a remarkable class of nanomaterials with versatile properties and transformative potential across diverse fields. Researchers continue to unveil the multifaceted capabilities of MNPs, paving the way for ground-breaking advancements in targeted drug delivery. As MNPs continue to evolve and expand their role that holds the promise of revolutionizing health care.

Keywords: MNPs, Magnetic Field, Magnetic Properties, Functionalization, Super Paramagnetic

Molecular Docking Studies of Aryl Acid Hydrazones Derivatives for Anticonvulsant Activity

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Abstract

Introduction: *Epilepsy can be defined as a chronic seizure disorder or group of disorders characterized by abnormal, excessive, hypersynchronous discharge of cortical neuron activity. An acid hydrazone is a type of organic compound with the structure R1R2C=N-NH2. It is a member of the hydrazone class, which is connected to aldehydes and ketones. Acid hydrazones have a hydrazone functional group and can be synthesized through various methods involving reactions between hydrazine or hydrazide and carbonyl compounds, such as aldehydes and ketones. Acid hydrazones are susceptible to hydrolysis in*

acidic conditions, leading to the release of the corresponding hydrazine compound. The compounds were docked to anticonvulsant drug target Gamma Amino Butyric Acid Aminotransferase (GABA-AT) and their binding interactions were studied to design better anticonvulsant agents. The crystal structure of GABA-AT with PDB ID (1OHW), having a resolution of 2.3Å, was obtained from the RCSB Protein Data Bank. The docking studies were performed on AutoDock 4 by using MGL Tools version: 1.5.7 installed in window. The structure included LYS 329 as flexible residue, the files were prepared with rigid and flexible conformation for comparative analysis. The receptor and ligands were saved in the working folder after modification as .pdbqt files. The grid map was calculated using Autogrid. All docking of the grid was developed by using a grid map with 40×40×40 points, with a grid spacing of 0.375. The docking parameters were selected as default values for performing docking using Lamarckian Genetic Algorithm (LGA). All the 10 compounds docking has been done exhibited hydrogen bonding and pi stacking interactions with the target except 3 compounds all the 7 compounds are active (AH3, AH5, AH6, AH7, AH8, AH9, AH10). Based upon the binding interaction compound AH10 Among the active compound. Among all tested compounds with a binding energy of -10.71 Kcal/mol and ki value of 14.2 nm with hydrogen bond value of 1.741 with LYS329 residue.

Keywords: Acid Hydrazone, Anticonvulsant, Molecular Docking, GABA-AT, Epilepsy

Molecular Intervention for Aging: Geroprotective Drugs and Toxicological Evaluation

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Abstract

Background: *With the aging population increasing globally, there is growing interest in geroprotective drugs, which aim to mitigate age-related decline and extend health span. However, understanding the toxicological profiles of these interventions is essential for safe and effective utilization.* ***Objectives:*** *This study seeks to explore molecular interventions for aging, focusing on geroprotective drugs, and to evaluate their toxicological properties.* ***Methods:*** *A systematic review of relevant literature was conducted, searching Google Scholar, PubMed, and other databases for articles published between 2013 and 2023. Studies were selected based on predefined inclusion criteria, encompassing molecular interventions for aging and toxicological evaluation of geroprotective drugs.* ***Results:*** *Various geroprotective drugs have emerged, including rapamycin, metformin, senolytics, and antioxidants. These interventions target pathways such as mTOR, AMPK, and senescence to delay aging and promote healthy aging. Toxicological evaluations have highlighted potential adverse effects, including metabolic disturbances, gastrointestinal issues, and immune dysregulation. Additionally, concerns regarding long-term effects and drug interactions have been raised.* ***Conclusion:*** *Geroprotective drugs show promise in extending health span, but their toxicological profiles warrant thorough evaluation. Further research is needed to elucidate the mechanisms underlying adverse effects and develop strategies for risk mitigation, ensuring the safe and effective use of molecular interventions for aging.*

Keywords: AMPK, mTOR, Gastrointestinal, Antioxidants, Geroprotective Drug

Nano-lipoidal Carriers: Recent Advances in the Management of Gout

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Abstract

Gouty arthritis, frequently called "gout," is an episode of inflammation-induced arthritis typified by intense bursts of joint pain, swelling, redness, and stiffness. The aggregation of urate crystals in the joints and adjacent tissues is caused by an excessive accumulation of uric acid in the systemic circulation. Medication for gout management includes lowering blood levels of uric acid to avoid further episodes and treating pain and inflammation during attacks. Gout can also be managed with a change in lifestyle, such as eating less purine-containing foods and keeping a healthy weight. But NSAIDs, colchicine, corticosteroids, and other regularly prescribed medications for gout can have adverse effects that include upset stomach, ulcers, kidney damage, and an elevated risk of cardiovascular events. Current conventional treatment approaches have a plethora of side effects and show patient incompliance. The study aims to understand the drawbacks of conventional treatment strategies, and how nano-lipoidal formulation can overcome these obstacles with the help of proof of concept developed by recent research. In addition, we have comprehensively compiled recent research advances in the nano-lipoidal formulations viz. nanoemulsions, solid lipid nanoparticles, nanostructured lipid carriers, etc. with respect to its efficacy and safety in gouty arthritis treatment. In conclusion, our exploration highlights the significance of tailored treatment plans with the aid of nano-lipoidal carriers, considering individual patient needs and addressing lifestyle factors. As challenges persist in medication adherence and potential side effects, a comprehensive, patient-centered approach is crucial for effective gout management.

Keywords: Gout, Gouty Arthritis, Nano-lipoidal Carriers

Neuroprotective Effect of Calcium Channel Blocking Agent Loaded Liposome for the Management of Parkinson's Disease

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Abstract

Background: *Liposomes have been widely used in brain drug delivery as they exhibit enhanced nasal delivery of drugs with no toxicity.* ***Objective:*** *This study aimed to formulate liposomes containing amlodipine besylate (AB) to treat Parkinson's disease.* ***Methods:*** *The AB-liposomes were formulated using the thin film hydration technique. Particle size, zeta potential, percent drug entrapment efficiency, in vitro release, and in vivo studies were also performed. FESEM was performed to analyze the surface behavior of the formulation. Additionally, in vivo experiments were performed using the optimized*

formulation to examine coordination and locomotor activity. ***Results:*** *The liposomes exhibited a zeta potential (25-28 mv), particle size (147-198.5±2.39), and entrapment efficiency (57-80%). Optimized formulation showed the highest in vitro release, over an 8-hour at a rate of 73%. The swim and open field tests suggested a significant result for the standard and formulation group compared to the MPTP group. A histopathologic study revealed substantial improvement in the developed formulation.* ***Conclusion:*** *The findings concluded that the liposomes considerably lessen Parkinson's symptoms. Therefore, it might be used as a substitute for the present therapies for Parkinson's disease.*

Keywords: Amlodipine Besylate, Liposomes, Parkinson's Disease, MPTP, Nasal-to-brain Delivery

Neurotheranostics As a Personalized Medicine

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Abstract

Neurotheranostics, a rapidly developing subject at the nexus of medicines, diagnostics, and neuroscience, has enormous potential to transform the way that psychiatric diseases are treated. By using advanced neuroimaging techniques, genetic markers, and other biomarkers to inform therapeutic decisions, neurotheranostics aims to customize treatments to the individual, in contrast to traditional approaches to mental health treatment, which frequently depend on trial-and-error methods and one-size-fits-all pharmacological interventions. The basic ideas and possible uses of neurotheranostics are examined in this abstract in relation to individualized treatment for mental illnesses. First, it clarifies how neuroimaging techniques like electroencephalography (EEG), positron emission tomography (PET), and functional magnetic resonance imaging (fMRI) contribute to our understanding of the neurological foundations of mental disorders. These methods offer insightful information about the brain circuits linked to a variety of illnesses. The integration of genetic and molecular biomarkers into the neurotheronostic framework is the second topic covered in the abstract. Genetic variations linked to psychiatric diseases have been found by genome-wide association studies (GWAS) and other genetic analyses, which have provided insight into possible targets for tailored therapies. Moreover, the detection of peripheral biomarkers, like neurotransmitter levels and inflammatory markers, provides new ways to track the course of a disease and forecast its response to treatment. Thirdly, the abstract looks at the possible clinical uses of neurotheranostics for a variety of psychiatric conditions, such as anxiety disorders, bipolar disorder, schizophrenia, and major depressive disorder. Clinicians can maximize treatment selection, dose titration, and combination therapies to maximize efficacy and reduce side effects by stratifying patients based on neurobiological and genetic profiles. The abstract concludes by discussing the difficulties and potential applications of neurotheranostics in customized psychiatry. These include the necessity of conducting extensive validation studies, integrating multi-modal biomarker panels, and creating cutting-edge computer algorithms for the interpretation and analysis of data. In summary, neurotheranostics offers the potential to change treatment from a reactive to a proactive model of care, thereby representing a paradigm shift in psychiatric medicine. Personalized neurotherapeutic techniques have the potential to

improve treatment outcomes, lower healthcare costs, and ultimately improve the quality of life for people with psychiatric diseases by utilizing neuroimaging, genetics, and molecular markers.

Keywords: Neurotheranostics, Personalized Medicines, Emerging Personalized Medicines

Novel Drugs for Mitigating Parkinson's Disease by Targeting Alpha-synuclein

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Abstract

Background: *Parkinson's disease (PD) is a progressive incurable and debilitating neurodegenerative condition with extreme acceleration seen in its prevalence rate. The prevalence of PD has doubled in the past 25 years. In 2016, approximately 6.1 million individuals were reported to be afflicted with PD, worldwide. Global estimates in 2019 showed over 8.5 million individuals afflicted with PD. Moreover, recent reports demonstrated 5.8 million disability-adjusted life years due to PD with more than 329000 deaths, just in the year 2019. Recent advancements in PD research have pointed towards the role of a-synuclein in PD pathogenesis.* ***Objective:*** *To perform an extensive literature survey on newly developed drugs for PD which are under clinical trials for targeting a-synuclein.* ***Method:*** *Examining databases for recently developed drugs undergoing clinical trials.* ***Result:*** *PBT434 is a novel penetrant small-molecule under phase 1 trial, which is a c-Abl tyrosine kinase inhibitor and results in the inhibition of a-synuclein. Yet another novel drug for PD is a humanized monoclonal antibodyPD01A, which targets the c-terminus of a-synuclein. This drug is undergoing a phase 2 trial. Both these drugs have shown promising outcomes so far in clinical trials and have been reported to prevent the loss of dopaminergic neurons in PD.* ***Conclusion:*** *Targeting a-synuclein-through novel drugs may open new avenues in the treatment of PD.*

Keywords: a-Synuclein, Monoclonal Antibody, Neurodegeneration, Tyrosine Kinase

Novel Formulation Development for Aripiprazole

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Abstract

Self-nano-emulsifying drug delivery systems (SNEDDS) have garnered significant attention as promising platforms for enhancing the solubility and bioavailability of poorly water-soluble drugs. This

review paper delves into the current research progress focused on the development and optimization of an SNEDDS formulation for the co-administration of aripiprazole and escitalopram, two widely used psychiatric medications. Aripiprazole and Escitalopram, while effective in treating various mental health conditions, face challenges related to their limited aqueous solubility, which can lead to erratic absorption and variable therapeutic outcomes. The review discusses the selection of suitable oils, surfactants, and cosurfactants based on drug compatibility studies, aiming to achieve optimal solubilization and emulsification of both drugs. The construction of pseudo-ternary phase diagrams is explored as a critical tool for determining the ideal ratios of formulation components. The process of SNEDDS formulation optimization is highlighted, focusing on achieving a stable and efficacious delivery system. Evaluation methodologies for liquid and solid SNEDDS are critically assessed, including assessments of droplet size, zeta potential, drug release profiles, and in vitro dissolution studies. The potential for improved therapeutic outcomes and reduced dosing variability with the SNEDDS formulation of aripiprazole and escitalopram is discussed in the context of enhanced drug solubility and bioavailability. Overall, this review provides valuable insights into the ongoing research efforts aimed at developing an effective SNEDDS platform for the co-delivery of aripiprazole and escitalopram, with the goal of improving treatment outcomes for individuals suffering from various psychiatric disorders. The exploration of SNEDDS as a drug delivery strategy in the psychiatric medication landscape holds promise for advancing the field of personalized medicine and optimizing therapy for patients with complex mental health conditions.

Keywords: Nanoemulsion, Aripiprazole, Escitalopram, Drug delivery, SNEDDS

Overcoming the Challenges in the Treatment of Oral Cancer Via Nanocarrier-based Drug Delivery Approach

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Abstract

Oral cancer remains a significant global health concern, with its treatment posing numerous challenges due to the complex anatomical and physiological characteristics of the oral cavity. Conventional treatment modalities such as surgery, chemotherapy, and radiation therapy often face limitations such as poor drug bioavailability, systemic toxicity, and development of drug resistance, highlighting the urgent need for innovative therapeutic approaches. Nanotechnology-based drug delivery systems have emerged as promising platforms to address these challenges and improve the efficacy of oral cancer treatment. This review explores the recent advancements in nanocarrier-based drug delivery approaches for overcoming the challenges associated with the treatment of oral cancer. Nanocarriers, including liposomes, polymeric nanoparticles, dendrimers, and nanogels, offer unique advantages such

as enhanced drug solubility, prolonged circulation time, targeted delivery, and controlled release kinetics. By encapsulating chemotherapeutic agents, targeted ligands, and imaging agents within these nanocarriers, researchers have demonstrated improved therapeutic outcomes while minimizing off-target effects. The review discusses the strategies employed to enhance the targeting specificity of nanocarrier-based drug delivery systems for oral cancer therapy. Surface modifications with targeting ligands such as antibodies, peptides, and aptamers enable selective binding to overexpressed receptors on cancer cells, facilitating site-specific drug delivery and reducing systemic toxicity. Moreover, stimuli-responsive nanocarriers designed to release therapeutic payloads in response to internal or external triggers offer precise control over drug release kinetics, further enhancing therapeutic efficacy. Furthermore, the challenges and future perspectives in the translation of nanocarrier-based drug delivery systems from bench to bedside are critically evaluated. Considerations such as scalability, manufacturing reproducibility, regulatory approval, and clinical feasibility are discussed to provide insights into the clinical translation and commercialization of these innovative technologies. In conclusion, nanocarrier-based drug delivery systems hold immense potential for revolutionizing the treatment landscape of oral cancer by overcoming existing challenges and improving therapeutic outcomes. Continued research efforts and interdisciplinary collaborations are essential to harness the full potential of nanotechnology in the fight against oral cancer.

Keywords: Oral Cancer, Drug Delivery Approach, Nano-formulation

Personalized Medicine: Challenges and Scope

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Abstract

The concept of personalized medicine has garnered significant attention, driven by the belief that individuals exhibit characteristics at various levels, including molecular, physiological, environmental, and behavioral aspects. This suggests that tailored interventions may be necessary for individuals with specific diseases, taking into account their unique attributes. This belief has been substantiated to some extent through the utilization of cutting-edge technologies like DNA sequencing, proteomics, imaging methods, and wireless health monitoring devices. These tools have unveiled considerable variability in disease processes among different individuals. This review explores the rationale behind personalized medicine, its historical context, the advancing technologies that facilitate it, recent experiences encompassing both success and setbacks, approaches for evaluating and implementing personalized treatments, and prospective avenues. Additionally, we address the present constraints of personalized medicine. Ultimately, we contend that personalized medicine, grounded in biological realities, is poised to become increasingly prevalent in specific contexts, particularly as relevant assays and deployment approaches become more streamlined and cost-effective.

Phytosomes: A Novel Approach for Treating Eczema

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Abstract

Introduction: *Millions of people worldwide experience symptoms of eczema, a chronic inflammatory dermatological condition marked by skin lesions, redness, and itching. Conventional therapies frequently have unfavorable side effects and offer very little relief. Phytosomes are a novel approach that improves the bioavailability and effectiveness of plant extracts by complexing them with phospholipids. This approach presents a viable substitute for the treatment of eczema and may enhance the distribution of phytoconstituent to the intended tissues.* ***Aim:*** *To review and summarize the phytosomes consisting of different phytoconstituents used to treat eczema.* ***Methods:*** *A literature review of the past 10 years using databases like PubMed, ScienceDirect, etc.* ***Results:*** *Researchers examining phytosomes as a potential therapy for eczema have yielded encouraging outcomes. When compared to traditional therapy, clinical trials have shown a considerable reduction in symptoms like itching, redness, and inflammation. Certain phytosomes have demonstrated potential in the treatment of eczemas, such as the phytosomes of Centella asiatica and quercetin. Research has demonstrated their anti-inflammatory and calming properties, making them advantageous for atopic dermatitis. Phytosomes provide better skin penetration, faster onset of actions, longer-lasting active component release, and prolonged symptom relief, which improves therapeutic results and patient satisfaction.* ***Conclusion:*** *Phytosomes are a novel approach to the management of eczema, compared to traditional treatments, phytosomes offer better efficacy and patient outcomes. With their higher bioavailability and capacity to improve the skin's transport of phytoconstituents, they may be able to treat the complex pathophysiology of eczema. To confirm the long-term safety and effectiveness of phytosome-based therapies and prove their value as a therapy option for people with eczema, more investigation and clinical studies are necessary.*

Keywords: Phytosomes, Phytoconstituents, Eczema, Novel Approach, Plant Extract

Polysaccharides Biomaterials for Glucose-responsive Smart Hydrogels

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Abstract

Hydrogels made from natural polysaccharides have shown great promise as wound dressings and stimuli-responsive materials, thanks to their unique properties like biocompatibility, biodegradability, hydrophilicity, porosity, and stimuli responsiveness. As a result, polysaccharide-based hydrogels are now considered advanced materials for treating diabetic wounds. This review highlights key factors in designing hydrogel-based wound dressings, focusing on biocompatibility, biodegradability,

incorporation of therapeutic agents, moisturizing capacity, swelling behavior, and mechanical strength. Additionally, various cross-linking methods are discussed for enhancing the desired properties and stimuli responsiveness of these hydrogels. ***Methods:*** *A comprehensive review of the literature was conducted, and the common databases for biomedical and healthcare research were exhaustively searched from 2016 to 2023 viz. PubMed, MEDLINE, Scopus, Web of Science, and Google Scholar. The keywords used for the search are 'hydrogels', 'diabetic wounds', 'chitosan hydrogel', 'polysaccharides', 'stimuli responsive', and 'smart gels'. The experimental methodologies utilized in the development of hydrogels and their evaluation were deeply analyzed. The results from studies looking at the effects of chitosan-based hydrogels are compiled. Furthermore, clinical relevance and potential challenges associated with the translation of polysaccharide-based glucose-responsive smart gel-based therapies into diabetic wound care were evaluated. The research gaps were identified and prospective areas to investigate are also elucidated.* ***Results:*** *This review highlights the significant advancements in polysaccharide-based hydrogels for therapeutic delivery, particularly in the last decade. Polysaccharide hydrogels are attractive due to their non-toxicity, biodegradability, ability to respond to physiological stimuli, and capacity for reabsorption, eliminating the need for surgical removal and reducing secondary complications. These qualities make them excellent candidates for developing delivery systems for biotherapeutics, especially when combined with cutting-edge technologies. The controlled release of biotherapeutics has been successfully achieved using polysaccharide-based hydrogels, leading to the development of numerous delivery systems over the past decade.* ***Conclusion:*** *Polysaccharide-based hydrogels, due to their three-dimensional hydrophilic network structure, offer several advantages as wound dressing materials. Stimuli-responsive polysaccharide-based hydrogels, which can able to change their structure and properties in response to various stimuli, such as ROS, glucose, pH, enzymes, temperature, light, and magnetic field, etc., showed potential in controlled release of entrapped therapeutic agents at the wound site. Further, the choice of cross-linking.*

Keywords: Chitosan Hydrogel, Cross-linking, Controlled Release, Stimuli-responsive, Polysaccharides

Preterm Birth: Complications and Management

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Abstract

Preterm birth is the birth of babies that occur more than 3 weeks earlier than the expected date. It is estimated that around 13.4 million babies were born preterm in 2020. Prematurity is responsible for approximately 900,000 deaths in 2019. Globally it is the leading cause of death in children under 5 years. Often no cause is identified but some estimated causes can be infections, genetic influence, and chronic conditions such as diabetes and high blood pressure. Complications include cerebral palsy, hearing and vision problems, hyperbilirubinemia, apnea, anemia, etc. Prematurity can be managed by caring at birth like elective incubation, thermal protection by warmer and feeding fluids such as breast milk, 2.5–3.5 meq/kg sodium, 1500 IU/kg daily vitamin A, 400 IU/day, and injecting 0.5 mg of vitamin k intramuscularly. Strategies should be developed for providing initial quality neonatal care at birth.

Keywords: Preterm, Elective Incubation, Cerebral Palsy, Apnea, Hyperbilirubinemia

Recent Advancements in Quality by Design (QbD) Driven Transdermal Formulations for Dermatological Diseases

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Abstract

Transdermal drug delivery systems (TDDS) have received a lot of interest in the pharmaceutical industry because of their capacity to provide controlled release of drugs, improved patient compliance, and reduced side effects compared to conventional dosage forms. Quality by Design (QbD) principles have been increasingly applied in the development of transdermal formulations to ensure product quality and performance. However, implementing QbD principles involves a systematic approach to formulation development, with a focus on the quality attributes, such as (QTPP, CQA, CMAs, and CPPs) that affect product performance. QbD principles guide the design of experiments, risk assessment, and formulation optimization processes, ensuring the final product's quality, safety, and efficacy. Various formulation strategies, including polymer selection, drug-loading techniques, and enhancement of skin permeation, are optimized using QbD methodologies to achieve desired therapeutic outcomes. Recent studies have shown that QbD-driven transdermal formulations (matrix type patch, reservoir type patch, microneedle, and transdermal spray) can effectively deliver drugs for the treatment of dermatological diseases such as ringworm, athlete's foot, yeast infections, Tinea infections, and C. albicans. These formulations exhibit enhanced skin penetration, sustained-release profiles, and improved stability compared to conventional dosage forms. Moreover, QbD-driven transdermal formulations offer advantages such as reduced variability in drug delivery, enhanced product robustness, and better scalability for commercial production. Regulatory agencies increasingly emphasize the use of QbD principles in pharmaceutical development, further driving the adoption of these methodologies in transdermal formulation.

Keywords: Transdermal Drug Delivery System, Dermatological Diseases, Quality by Design, Design of Experiment

Recent Advancements in the Treatment of Migraine

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Abstract

Recurrent headache episodes are the hallmark of migraine, a complicated neurological condition that is frequently accompanied by sensory sensitivity. It includes a number of phases, each with unique

clinical characteristics and durations, such as the premonitory, aura, headache, postdrome, and interictal stages. Studies using functional neuroimaging reveal that the hypothalamus plays a role in modulating pain transmission during the premonitory period. Some migraine attacks are preceded by aura, which is characterized by cortical spreading depression that impairs motor, sensory, or visual functions. Trigeminovascular pathway activation, which transmits nociceptive signals to the brain and causes throbbing pain, is a hallmark of the headache phase. After the peak headache, there is a postdrome phase, sometimes known as a migraine hangover, which is characterized by symptoms like weariness, bodily aches, and mood swings. Increased pain sensitivity and other symptoms may be present during the interictal phase, the time in between migraine attacks, as a result of structural and chemical changes in the brain. Predicting migraine episodes and lessening their effects may be possible with knowledge of and monitoring interictal symptoms, according to research. NSAIDs, triptans, CGRP receptor antagonists, and preventative drugs are only a few of the drugs used to treat migraines today. In addition, certain people may find comfort in complementary and alternative therapies like biofeedback, cognitive-behavioral therapy, and vitamins. However further investigation is required to completely understand the effectiveness of these therapies. Preventing attacks, reducing symptoms, and enhancing patients' quality of life are the main goals of comprehensive migraine care. This review paper critically examines the phases & pathophysiology of migraine and highlights the recent advancements in drugs and treatments of migraine.

Keywords: Recurrent Headache, Migraine, Postdrome, Aura, Premonitory, Interictal, CGRP Receptor Antagonist, Complementary and Alternative Therapies, Triptans, Cognitive-behavioral Therapy

Review of Synthetic and Natural Products in the Treatment of Hepatocellular Carcinoma

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Abstract

Hepatocellular carcinoma (HCC) is a challenge in oncology, accounting for a significant worldwide health burden with few therapeutic choices. It was a leading cause of cancer death worldwide in 2020, accounting for around 906,000 new cases and 830,000 deaths. Despite advancements in cancer detection and therapy, 50% of patients remain incurable. Treatment type has a significant impact on patient recovery. The liver's unique anatomical position, endothelial fenestration, and immunosuppressive environment render it susceptible to seeding by tumor metastases from extrahepatic malignancies, often known as secondary liver cancer. Despite the complexities of HCC pathogenesis, treatment techniques have emerged, including studying the effects of synthetic and natural substances. Synthetic drugs, with their thoroughly constructed structures, provide specialized pharmacological capabilities that target pathways involved in HCC growth. These agents have promising anti-tumor

properties, such as reduction of angiogenesis, activation of apoptosis, and regulation of oncogenic signaling pathways. Notable synthetic medicines including sorafenib, lenvatinib, and regorafenib have been approved for HCC therapy, demonstrating the therapeutic utility of this method. Natural drugs originating from plants, marine creatures, and microbes, on the other hand, have gained popularity because of their various chemical scaffolds and intrinsic bioactivity. Their multi-targeted actions, including anti-inflammatory, antioxidant, and anti-proliferative properties, make them promising candidates for HCC treatment. The synergistic interaction of synthetic and natural substances offers a promising path for improving treatment results in HCC. Combination regimens that include both modalities capitalize on their different modes of action, overcoming resistance and boosting treatment success. This review sums up current knowledge of synthetic and natural agents in the therapeutic landscape for HCC.

Keywords: Hepatocellular Carcinoma, Synthetic Drugs, Natural Drugs, Angiogenesis, Apoptosis

Revolutionizing Cancer Therapy: The Promise of Nanosponges in Nanotechnology

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Abstract

Cancer remains a challenge in today's world, needing innovative and inventive methods of treatment. Nanotechnology has become an area in the fight against cancer providing delivery of treatment and reducing overall toxicity. One innovation that has captured interest is nanosponges, known for their features and wide range of uses, in cancer care. Nanosponges, characterized by their three-dimensional porous structures, uniform size distribution, and efficient entrapment capabilities, are extensively crafted for cancer therapy and drug delivery applications. These structures shield molecular agents from degradation, enhance the solubility of lipophilic therapeutic agents/drugs, and offer targeted delivery options. Functionalizing nanosponges for site-specific targeting is attainable through the conjugation of diverse ligands on their surface. These nanomaterials are regarded as safe and biodegradable, exhibiting minimal toxicity in cell cultures and demonstrating excellent tolerance levels. Nanosponge-based systems have the capacity to enhance the solubility, absorption, penetration, bioavailability, in vivo stability, targeted delivery, and sustained-release of various anticancer agents. Expanding the application of nanosponge-based drug delivery systems represents an exciting and challenging area of research, primarily aimed at overcoming the issues associated with current anticancer formulations and advancing cancer therapies further. Various endeavors have been undertaken to illustrate the qualities, appropriateness, and adaptability of nanosponges for their potential use in treating cancer. These efforts, drawn from a range of relevant studies, aim to showcase the diverse ways in which nanosponges can be applied effectively in cancer treatment.

Keywords: Nanosponges, Nanotechnology, Cancer Therapy, Targeted Drug Delivery

Role of ATP-sensitive Potassium Channel in the Treatment of Alzheimer's Disease

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Abstract

Alzheimer's disease (AD) is a multifaceted neurodegenerative condition characterized by progressive cognitive impairment and memory loss. Global statistics on AD report an estimated increase in AD cases from 46.8 million to 131 million by 2050. Even with a great deal of study on the origins, progression, and symptoms of AD, a permanent treatment is still unattainable. The buildup of amyloid plaques and neurofibrillary tangles (NFTs) in the brain is a hallmark of AD. Patients with AD have cognitive impairment as a result of these aberrant protein aggregates, which are made up of tau and beta-amyloid (Aß) proteins, respectively. These aggregates cause damage to neurons and the loss of synaptic connections. Research reveals that significant functions of ATP-sensitive potassium (KATP) channels exist in the pathophysiology of AD. KATP channels have a role in neurotransmitter release regulation, neuronal excitability regulation, and neuron damage prevention. K+ channels have therefore emerged as promising pharmacological targets for the management of neurodegenerative diseases. KATP channel openers (KCOs), which include minoxidil, nicorandil, and diazoxide, have shown therapeutic promise in the treatment of neurodegenerative disorders. By regulating neuronal excitability and neurotransmitter release, avoiding aberrant protein accumulation and excessive calcium influx, lowering reactive oxygen species (ROS) levels, and lowering microglial activation, KCOs contribute to the protection of neurons. This paper addresses the potential of KATP channel modulators as AD therapeutic agents and provides an overview of the state of knowledge about KATP channel function in AD.

Keywords: Alzheimer's Disease, Potassium Channel (KATP), Neurodegenerative Disease, KCOs (Potassium Channel Openers)

Role of Nanosponges in Blood–Brain Barrier System

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Abstract

Therapeutic medicines have a difficult time crossing the blood–brain barrier (BBB) and reaching the central nervous system (CNS). The therapy of neurological illnesses is hampered by its selective

permeability, which restricts the entry of medicines and nanoparticles. Recently, nanotechnology has shown promise as a means of addressing these difficulties. In this study, the authors investigate how nanosponges may improve medication transport over the BBB. Due to its novel characteristics including biocompatibility, surface qualities that may be tuned, and drug-loading capacity nanosponges, which are based on nanoparticles, have attracted a lot of interest. This research summarizes the methods used to create and modify nanosponges to enhance their BBB penetration. Nanosponges' interactions with the BBB, such as receptor-mediated transcytosis and passive diffusion, are also dissected. This work also explores the use of nanosponges in the delivery of various medicines for the treatment of neurological illnesses, such as small molecules, proteins, nucleic acids, and nanoparticles. Nanosponges have the potential to revolutionize CNS medication delivery, as shown by the case studies provided here showcasing their effective application in preclinical and clinical trials. Nanosponges' safety and toxicity profiles are also discussed, highlighting the need to conduct thorough investigations to guarantee their long-term safety. Future possibilities and problems in nanosponges for BBB drug delivery, including regulatory issues and scale-up manufacturing, are discussed in this research study. Finally, nanosponges show significant potential as a fresh method to improve medication transport across the BBB, opening new avenues for the treatment of neurological illnesses. This article paves the path for future research and development in this interesting topic by providing useful insights into the design, mechanisms, and uses of nanosponges in the setting of the BBB.

Keywords: Nanosponges, Blood–Brain Barrier, Drug Delivery, Central Nervous System, BBB Permeability, Nanoparticle Carriers

Role of Natural Products as Antitubercular Agents

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Abstract

Natural products play a crucial role as antitubercular agents due to their diverse chemical structures and unique biological activities. Plants, microorganisms, and marine organisms produce a vast array of secondary metabolites that exhibit potent antimycobacterial properties. Many traditional medicinal plants have been used for centuries in various cultures to treat tuberculosis (TB) symptoms. The complexity of natural product compounds often results in multi-targeted effects, making them effective against Mycobacterium tuberculosis, the causative agent of TB. Alkaloids, flavonoids, terpenoids, and polyphenols derived from plants have demonstrated significant antimycobacterial activity. For instance, compounds like rifampicin and streptomycin, derived from actinomycetes, have become crucial components of TB treatment regimens. Natural products also offer potential advantages, such as lower toxicity and reduced side effects compared to synthetic drugs. Additionally, the diverse chemical structures of natural products provide a broader spectrum of activity, helping to combat drug-resistant strains of Mycobacterium tuberculosis.

Keywords: Natural Products, Antitubercular Agent, *Mycobacterium tuberculosis*, Secondary Metabolites, Traditional Medicinal Plants

Role of Phosphodiesterase Inhibitions in Schizophrenia

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Abstract

In the area of psychopharmacology, research is underway to create new drugs that have the potential to completely transform the way that mental illnesses are treated. Schizophrenia (SCZ) is a chronic psychiatric illness with significant morbidity and mortality. It affects about 21 million people worldwide and reduces their life expectancy by 15 years shorter as compared to the general population. SCZ impairs mental and social functioning and often leads to the development of comorbid diseases. Along with psychotic (positive) symptoms (delusions and hallucinations), SCZ also exhibits negative and cognitive symptoms. Decreased emotional expression, pleasure deprivation, and decline in motivation with minimum social connections are the most common negative symptoms. With limited benefits for negative and cognitive issues, conventional antipsychotics mainly tackle positive symptoms. Drugs affecting glutamatergic, serotonergic, and phosphodiesterase pathways have offered new hope for treating SCZ including negative symptoms. The phosphodiesterase (PDE) enzymes are attractive targets for therapy because they are important regulators of the cyclic nucleotide signaling in the brain. Due to their critical roles in cellular pathways, these enzymes affect diverse neurobiological functions from learning and memory formation to neuroinflammation. These enzymes have an impact on several neurobiological processes, ranging from neuroinflammation to learning and memory formation, because of their vital roles in cellular pathways. PDE inhibitors have the ability to correct psychiatric symptoms by activating the cAMP-PKA-CREB and cGMP-PKG signaling, mitigating oxidative injury and neuroinflammation. In preclinical studies, PDE1, PDE2, and PDE4 inhibitors have shown therapeutic potential for treating schizophrenia, depression, and anxiety. More investigation is needed in this area to examine novel substances and determine their efficacy in treating schizophrenia.

Keywords: Phosphodiesterase, Cyclic Nucleotides, Cognitive Impairment, Oxidative Stress

Shaping the Future of Medicine: Integrating Traditional and Biopharmaceutical Approaches in Chem-Biology Research

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Abstract

The landscape of medicine is undergoing a profound transformation with the integration of traditional and biopharmaceutical approaches in chem-biology research. This abstract explores the pivotal role of this integration in shaping the future of medicine. Traditional pharmaceutical methods have long

relied on small-molecule drugs, but the advent of biopharmaceutics has brought about a paradigm shift, leveraging biological macromolecules for therapeutic interventions. In this review, we delve into the synergistic relationship between traditional and biopharmaceutical approaches, highlighting their respective strengths and limitations. Traditional methods offer well-established platforms for drug discovery and development, characterized by their efficiency and cost-effectiveness. Conversely, biopharmaceutical approaches capitalize on the specificity and potency of biomolecules, promising tailored therapies with enhanced efficacy and safety profiles. Furthermore, we discuss the translational implications of integrating these approaches, emphasizing the importance of interdisciplinary collaboration and innovative technologies. Advances in fields such as genomics, proteomics, and structural biology have empowered researchers to unravel intricate molecular mechanisms underlying disease pathogenesis, facilitating the rational design of therapeutics. Moreover, we explore the transformative potential of personalized medicine fueled by this integration, wherein treatments are tailored to individual genetic and physiological profiles. Through case studies and emerging trends, we illustrate the real-world applications and prospects of this integrated approach in addressing unmet medical needs across a spectrum of diseases. In conclusion, the convergence of traditional and biopharmaceutical approaches heralds a new era in medicine, marked by precision, efficacy, and patient-centricity. By embracing this integration, we can navigate the complexities of disease with unprecedented precision, ultimately revolutionizing the practice of medicine and improving patient outcomes.

Keywords: Traditional pharmaceutical methods, Biopharmaceutical approaches, Chem-biology research, Translational implications, Personalized medicine, Interdisciplinary collaboration, Precision medicine

Smart Ocular Delivery of Levofloxacin Hydrochloride Using Solid Lipid Nanoparticles-loaded In Situ Gelling System

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Abstract

Background: *Ocular infections, caused primarily by bacterial agents, pose a significant global health concern as per the World Health Organization (WHO). Conventional drug delivery systems come with a variety of limitations which demand the need to develop a novel drug delivery system to overcome their shortcomings. In this context, the current research aimed to develop a solid lipid nanoparticle (SLN)-loaded in situ gelling ocular drug delivery system, triggered by physiological stimuli.* ***Objectives:*** *The research focused on developing a solid lipid nanoparticle (SLN)-loaded physiological stimuli-based in situ gelling ocular drug delivery system of levofloxacin hydrochloride. The study aimed to analyze the efficacy of drug-loaded SLNs in an in situ gelling system and to further evaluate the characteristics of SLNs in vitro, including the in vitro parameters of the formulated SLNs and gels, and in vivo pharmacokinetics.* ***Methods:*** *The SLNs were prepared by hot homogenization method using glyceryl monostearate, tween 80, and polyvinyl alcohol. Further, the SLN-loaded in situ gel was*

prepared using poloxamer 407, chitosan, and HPMC. The prepared formulations were characterized for their in vitro and in vivo parameters. ***Results:*** *The prepared formulations exhibited in situ gelation with excellent flowability during instillation, and the pre-corneal residence time elevated 3-4 folds. In vivo pharmacokinetic studies indicated that the ocular bioavailability of the drug increased by 2-4 folds with improved permeability compared to the marketed preparations. The drug concentration in aqueous humor above MIC90 was maintained for 8 hours after installation, indicating the reduced frequency of administration.* ***Conclusion:*** *These findings suggest that the SLN-loaded in situ gel formulation is a promising approach for improving ocular drug delivery, enhancing bioavailability, and reducing dosing frequency for treating bacterial eye infections.*

Keywords: Amlodipine Besylate, Liposomes, Parkinson's Disease, MPTP, Nasal-to-brain Delivery

Synthetic Modulators of Matrix Metalloproteinases: A Review

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Abstract

Matrix metalloproteinases (MMPs) are a significant family of zinc-containing calcium-dependent proteases or endopeptidases that are known to mediate enzymatic proteolysis of cell surface proteins and the extracellular matrix, also referred to as ECM which includes collagens, elastin, matrix glycoproteins, proteoglycan, gelatin, fibronectin, laminin, protein, RNA, water and minerals and these ECM components are essential for cell signaling, cell migration, wound healing, maintaining muscle morphology, encouraging muscle fiber regeneration, and tissue homeostasis. Recent studies have shown that at the cellular level, these enzyme's proteolytic functions are involved in the regulation of bioactive molecules like cytokines and growth factors through ECM remodeling. Along with these enzyme's beneficial roles, they are also known to instigate DNA damage, induce cellular senescence, and contribute to the establishment of senescence associate secretory phenotype (SASP). While MMPs were orthodoxically viewed as the enzymes that directly degrade the ECM, they have also been shown to be important modulators of bioactive factors. Earlier, there have been numerous attempts to inhibit these enzymes using broad-spectrum inhibitors for therapeutic purposes, but most of them have failed in clinical trials due to MMPs showcasing both pro- and anti-tumorigenic roles in neoplastic diseases and the musculoskeletal side effects caused by the broad-spectrum inhibitors. More selective MMP inhibitors (MMPIs) are required that possess the capability to precisely distinguish between remarkably homologous family members and ideally be administered topically in the not-so-long term. Recent research in understanding these endopeptidase enzyme's biochemistry and biology has been helpful in the development of next-generation immensely specific MMP inhibitors to study their complex roles in human health and pathology. This review will provide a thorough analysis and will explore various matrix metalloproteinases, their synthetic inhibitors, and their clinical significance in the process of developing treatments for the various pathological conditions that emerge due to the action of MMP and the disbalance of MMP-TIMP in the body.

Keywords: Enzymes, Bioactive, Modulators, DNA Damage, Remodeling

Topical Nano-formulations: Recent Advancement in the Management of Eczema

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Abstract

Background: *Eczema, also known as atopic dermatitis, is an inflammatory condition characterized by severe itching and recurrent lesions. The breakdown of the skin's barrier may lead to increasing skin inflammation and triggering allergic reactivity. The pathophysiology of AD is influenced by immune dysregulation and skin barrier defects, with Type 2 cytokines like IL-4 and IL-13 playing a crucial role in chemokine synthesis and skin barrier breakdown mainly because of intercellular proteins, keratins, transglutaminases flaws that allow allergens to penetrate the skin. AD is characterized by cyclic immunological changes, including reduced synthesis of antimicrobial peptides, IL-31-induced pruritus, and substantial production of T cell cytokines. Various herbal extracts like coconut oil, aloe vera extract, and root extracts of Glycyrrhiza are used as anti-inflammatory agents. Primary treatment agents include topical corticosteroids like halometasone, clobetasol propionate are effective drugs. Pimecrolimus, a topical calcineurin inhibitor works by interfering with the NF-kappa B pathway and calcineurin phosphate activity, inhibiting the transcription of different cytokines. Calcipotriol, PDE4 inhibitor suppresses angiogenesis, cytokine production, and proliferation of epidermal cells. In addition, we have comprehensively compiled recent drug therapies like Cerdulatinib, a JAK-inhibitor that inhibits spleen tyrosine kinase along with Tapinarof lotion, a topical AhR modifying drug. Phase 3 clinical trial of roflmilast cream has been completed. Flavanoids encapsulated nanocarriers like quercetin and silibinin nanocapsules, Epigallocatechin nanoparticles prepared by emulsion solidification along with Rocatinlimab, OX40 receptor activator and Tralokinumab, IgG4 monoclonal antibody are currently in clinical trial are used for treatment of eczema.*

Keywords: Eczema, Atopic Dermatitis, Nano-formulations, Flavonoid

Unlocking the Potential of AI: A Comprehensive Guide to Drug Development and Discovery

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Abstract

Drug discovery and development is an integral part of pharmaceutical research as it helps to bring in new molecules for the effective treatment of already existing and new diseases. Generally, drug

development takes 10 to 12 years around the globe and an additional 2 to 3 years in developing countries. The cost of bringing a new drug to the market is approximately 2.8 billion to 3 billion USD. The objective of this study is to study the potential of artificial intelligence (AI) which can comprehensively guide researchers for faster drug development and discovery. Adopting and understanding new technology, like machine learning technology-driven modern drug discovery and development, can reduce the cost of drug development and can also reduce the time required at various stages of drug discovery and development. Deep Learning methods, such as artificial neural networks (ANN), can easily facilitate understanding of the relationship between the body and the molecule based on the previous algorithms and stored data. AI and technology-driven models enable the storage of data, predict in silico models, help in studying the structural-activity relationship (SAR), and can reduce the cost of sampling to a large extent. Talented data scientists, and software engineers with a thorough understanding of AI systems, can help utilize the advances that the AI platform promises, to bolster drug development in this century.

Keywords: Artificial Intelligence, Artificial Neural Networks, Drug Discovery, Drug Development, Deep Learning Methods

Unlocking Therapeutic Synergy: Investigating the Combined Impact of Curcumin and Nimboline on Cancer Cell Line

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Abstract

Background: *Curcumin and nimbolide have the potential to fight cancer. However, their efficacy and mechanisms of action on breast cancer and other cancer types are not well-researched. This study aims to investigate these aspects, providing insights into novel cancer treatment strategies.* ***Objective:*** *This study aims to evaluate the anticancer activity of a synergistic combination of herbal drugs and investigate the effect of combining phytoconstituents with minimal side effects in combating cancer.* ***Methods:*** *The MTT assay was utilized to assess the impact of nimbolide on cancerous and normal cell lines. After exposure to various concentrations of the compound, cells were incubated for 24 and 48 hours, and their viability was determined. Subsequently, IC50 values were computed for each cell line.* ***Results:*** *Both curcumin and nimbolide demonstrate anti-proliferative, pro-apoptotic, and anti-metastatic effects in breast cancer cell lines such as MCF-7 and MDA-MB-231. They regulate signaling pathways involved in cell survival, proliferation, apoptosis, and metastasis. When used together, they have a synergistic interaction that amplifies their efficacy against cancer.* ***Conclusion:*** *Curcumin and nimbolide emerge as promising therapeutic agents for breast cancer treatment due to their ability to inhibit cancer cell growth, induce apoptosis, and suppress metastasis. Further research and clinical development are warranted to fully exploit their potential in cancer therapy.*

Keywords: Curcumin, Nimbolide, Breast Cancer Cell Lines, Anticancer Effects, Apoptosis, Synergistic Effects

Unveiling the Healing Power of Topically Applied Antipsoriatic Herbal Oils in Managing Psoriasis

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Abstract

Background: *Psoriasis is a long-term inflammatory skin condition that is typified by aberrant keratinocyte proliferation and differentiation. While topical and systemic medications are among the traditional medical therapies that are accessible, their long-term usage is frequently limited due to their limited efficacy and potential side effects, such as organ toxicity and immunosuppression. As a result, research into using herbal medicines as a less risky substitute for treating psoriasis has increased.* ***Objective:*** *This study aims to investigate the potential efficacy and safety of herbal oils as alternative treatments for psoriasis, with a focus on chamomile, emu oil, evening primrose oil, fish oil, and tea tree oil, when topically applied.* ***Methods:*** *A review of literature concerning herbal oils with antipsoriatic properties was conducted, emphasizing their use in mitigating side effects, and improving medication bioavailability. The therapeutic effects of essential oils such as tea tree, lavender, chamomile, and peppermint were also explored, particularly in managing skin infections.* ***Results:*** *Herbal oils, including those mentioned, offer promise in psoriasis management by addressing limitations associated with conventional treatments. Tea tree oil, known for its antibacterial and anti-inflammatory properties, emerges as a noteworthy candidate. Similarly, peppermint oil exhibits antibacterial qualities and provides a soothing effect.* ***Conclusion:*** *Herbal oils represent a potential avenue for circumventing the drawbacks of traditional psoriasis therapies. Their antibacterial properties, along with anti-inflammatory effects, make them valuable adjuncts in skin ailment management. Further research is warranted to elucidate their mechanisms and optimize therapeutic applications.*

Keywords: Psoriasis, Herbal Oils, Alternative Medicine, Topical Treatments

Unveiling the Role of Nanoparticles in Cancer Immunotherapy

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Abstract

Cancer immunotherapy is a fast-developing subject, although it faces difficulties such as unpredictable clinical results, resistance, and expensive costs. Nanoparticles (NPs) have emerged as a viable strategy for improving cancer treatment. NPs are being used in a variety of methods to improve the efficacy of this therapy. They allow for the simultaneous administration of cancer antigens and immune-stimulating adjuvants, resulting in greater immune responses. NPs can also target immunosuppressive components of the tumor microenvironment, such as regulatory T cells and tumor-associated macrophages, to boost the anticancer immune response. Furthermore, by using precise local delivery

guided by medical imaging, NPs help to improve antigen presentation and solve delivery problems in solid tumors. When used in conjunction with immunotherapy, particularly immune checkpoint inhibitors, NPs provide a powerful technique for modulating the tumor microenvironment, resulting in enhanced T cell-mediated anticancer responses. Finally, NPs offer a viable technique for overcoming constraints in cancer immunotherapy by providing precise control and enhanced dispersion, potentially leading to more effective cancer treatment choices. Ongoing research and clinical trials are expected to refine this approach's potential. Furthermore, by using precise local delivery guided by medical imaging, NPs help to improve antigen presentation and solve delivery problems in solid tumors. When used in conjunction with immunotherapy, particularly immune checkpoint inhibitors, NPs provide a powerful technique for modulating the tumor microenvironment, resulting in enhanced T cell-mediated anticancer responses. Finally, NPs offer a viable technique for overcoming constraints in cancer immunotherapy by providing precise control and enhanced dispersion, potentially leading to more effective cancer treatment choices. Ongoing research and clinical trials are expected to refine this approach's potential. To a great response in immunotherapy, NPs can effectively transport cancer antigens and adjuvants to antigen-presenting cells in lymph nodes. Furthermore, dendritic cells can receive precise delivery of adjuvants or antigens from NPs, which enhances anticancer immunity. To boost anticancer response, NPs can also interfere with immune cells at different stages.

Keywords: Cancer, Immunotherapy, Nanoparticles, Medical Imaging, Treatment, Dispersion

TRACK IV

Phytopharmaceuticals, Regulatory Compliance and Practice

Abstract

Regulatory Challenges in the Development of Orphan Drugs

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Abstract

The development of orphan drugs, intended to treat rare diseases affecting small patient populations, presents a unique set of regulatory challenges that demand nuanced consideration. There are various distinctive hurdles faced by stakeholders in the development and approval of orphan drugs, shedding light on the complexities involved in navigating the regulatory landscape for rare disease therapeutics. Orphan drug development encounters challenges at various stages, from the initial identification of eligible patient populations to the design and conduct of clinical trials. Regulatory agencies recognize the importance of incentivizing orphan drug development, offering designations such as orphan drug status and market exclusivity. However, the definition of endpoints, the limited availability of validated biomarkers, and the scarcity of patients for robust clinical trials pose substantial obstacles. This abstract explores the delicate balance between encouraging innovation for rare diseases and safeguarding the rigorous standards of drug approval. It discusses the evolving regulatory pathways tailored for orphan drugs, encompassing accelerated approval, surrogate endpoints, and adaptive trial designs. Additionally, the post-approval challenges, including reimbursement hurdles and the need for ongoing post-market surveillance are also a task. In navigating these challenges, collaboration among regulators, industry, and patient advocacy groups emerges as a crucial factor in advancing the development of orphan drugs. By providing insights into the regulatory intricacies of orphan drug development, this abstract aims to foster a comprehensive understanding of the unique considerations and potential solutions within this critical facet of pharmaceutical innovation.

Keywords: Rare Diseases, Regulatory Requirements, Approval Challenges, Clinical Trials

Reviewing the Therapeutic Potential of *Lagerstroemia lanceolata*: A Comprehensive Analysis of Phytochemicals and Pharmacological Effects

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Abstract

Lagerstroemia lanceolata Wall. belongs to the family Lythraceae and is seen extending from south Bombay to Kerela and in the hills of the Deccan Peninsula up to an altitude of 1,200 meters. Lagerstroemia lanceolata commonly called nandi tree in English, Vevala in Tamil, and Venthekku in Malayalam. Traditionally, it has been employed in managing diabetes mellitus., Asthma, Chronic Bronchitis, Cough, Cold, etc. The plant's primary constituents are tannins, Steroids, triterpenoids, phenols, glycosides, flavonoids, alkaloids, coumarins, ellagic acids, proteins, and amino acids. The research investigated the fatty acid composition and physicochemical characteristics of Lagerstroemia lanceolata. Using light petroleum ether as a solvent, the oil from the Lagerstroemia lanceolata was extracted. Physicochemical properties such as specific gravity, oil, color, saponification value, refractive index, unsaponifiable matter, acid value, and iodine value were assessed for the ether extract.

The oil contains five major types of fatty acids: oleic acid (42.20%) is the main component, followed by linoleic acid (24.80%), palmitic acid (15.20%), and stearic acid (6.10%). Of these, oleic and linoleic acids account for about 65% of the total fatty acids, while palmitoleic acid is a minor constituent (3.80%). On the basis of the parameters examined, the results showed that the petroleum ether extract of seed contains active herbal components with high analgesic and anti-inflammatory potential. Phenolic and flavonoid compounds present in the methanolic extract of Lagerstroemia lanceolata leaf are responsible for its anti-inflammatory activity. Moreover, it contains a notable amount of quercetin, a flavonoid recognized for its potent antioxidant properties, as demonstrated in vitro studies.

Keywords: *Lagerstroemia lanceolata*, Quercetin, Antioxidant, Anti-inflammatory, Analgesic

A Comparative Study of the Effects on the Healthcare Industry of Different International Regulations Pertaining to Refurbished Medical Devices

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Abstract

The refurbishment of medical devices is a burgeoning sector within healthcare, driven by the need for cost-effective solutions and the extension of equipment lifespan. However, ensuring the safety and quality of refurbished devices is imperative to prevent potential harm to patients or users. Regulatory bodies such as the World Health Organization (WHO) are instrumental in developing global guidelines to govern the refurbishment process, including processes, labeling, and importation requirements. Standards like IEC 63077:2019 and ISO 13485:2016 provide essential frameworks for quality management in refurbishment. Despite acceptance in major markets like the EU and the USA, regulations vary across countries, necessitating a comparative analysis. ***Objectives:*** *The primary objective is to evaluate the regulatory landscape surrounding refurbished medical devices globally, identifying variations across countries and regions. Specifically, the study aims to assess existing guidelines and standards, their implementation, and their impact on patient safety and device quality.* ***Methods:*** *This study makes use of an extensive analysis of published works and legal documentation about refurbished medical equipment. Data collection involves gathering information on regulations, standards, and guidelines from reputable sources such as WHO publications, national regulatory bodies, and academic literature. This approach is utilized to identify likenesses and variations in regulatory structure.* ***Results:*** *Regulatory approaches to refurbished medical devices vary globally. While major markets like the EU and the USA accept refurbished devices, regulations differ in defining refurbishment and outlining standards for refurbishment processes, labeling, and importation. Standards such as IEC 63077:2019 and ISO 13485:2016 provide foundational guidelines but are not uniformly implemented across all regions. National variations exist, with some countries, like Malaysia and Pakistan, implementing specific guidelines and regulations for refurbished devices.* ***Conclusion:*** *The regulatory landscape surrounding refurbished medical devices is complex and varies significantly across countries and regions. While major markets like the EU and the USA have established frameworks, variations exist in defining refurbishment and implementing standards. National regulations, such as Malaysia's Good Refurbishment Practice and Pakistan's amended Medical Device Rules, demonstrate efforts to address refurbishment-specific concerns. However, harmonization of standards is vital to ensure constant quality across all such medical devices.*

Keywords: Complexity, Global Standards, Consistency, Patient Benefits, Harmonization

Phytotherapeutic Potential of Various Herbal Plants

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Abstract

Since antiquity, medicinal plants have been used as a source of medicine. They have always been at the forefront of all civilization's cultures. They are high in phytochemicals, and it is from these phytochemicals that many contemporary medicines have been found. Achyranthes aspera (Amaranthaceae) is a valuable therapeutic herb that thrives as an invasive plant throughout India. Though practically all of its parts are employed in ancient systems of medicine, the seeds, roots, and shoots are among the most important therapeutic elements. The article provides an update on its phytochemical and pharmacological qualities. Pursuant to the review, a large number of phytochemical substances have been identified from the plant, which include antiperiodic, diuretic, purgative, laxative, antiasthmatic, hepatoprotective, anti-allergic, and other essential therapeutic characteristics. The crushed plant is used to treat pneumonia, and an infusion of the root is used to treat digestive issues as a mild astringent. In the early stages of diarrhea and dysentery, a decoction of powdered leaves with honey or sugar candy is beneficial. Extensive studies have been conducted over the last few decades to demonstrate its biological activities and the pharmacology of its extracts. Many chemical components, including saponins, oleonolic acid, dihydroxy ketones, alkaloids, long-chain compounds, and others, have been identified. It is typically discovered in rubbish and cultivated areas in Puerto Rico and the US Virgin Islands. Chirchita (Hindi), Apamarga (Sanskrit), Kalalat (Malayalam), Aghedi (Gujarati), Agadha (Rathi), Apang (Bengali), Nayurivi (Tamil), and Prickly-chaff flower plant or Devil's Horsewhip (English) are some of the names it is known by in various parts of India. The objective here is to deliver comprehensively reorganized information on the patterns of distribution, ethnopharmacology, chemical contents, and pharmacological activity of Achyranthes species to support their therapeutic value.

Keywords: *Achyranthes aspera*, Pharmacological Activities, Chemical Constituents, Ethnopharmacological Relevance

Advance Technologies Using Herbal Leads for the Treatment of Breast Cancer

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Abstract

In this abstract, the use of herbal medicines in cancer treatment, particularly breast cancer, has received a lot of attention because of their potential therapeutic benefits. Herbal substances, including phytoestrogens found in soybeans and traditional Chinese medicines rich in alkaloids, coumarins, flavonoids, and polyphenols, have exhibited anti-breast cancer capabilities by targeting molecular signaling pathways implicated in cancer development. Recent research has demonstrated the usefulness of natural herbal components in suppressing breast cancer stem cells (BCSCs), which are known to contribute to treatment resistance. These drugs alter systems associated with BCSCs, potentially suppressing, or eliminating them. Furthermore, nanoformulations loaded with herbal compounds are

being investigated as a unique technique for treating breast cancer. Natural products are increasingly being used in medication discovery, particularly for cancer treatment. Herbal medications and natural substances provide a promising therapy option for breast cancer by targeting specific pathways involved in cancer development and resistance. Further study and clinical trials are required to fully realize the potential of these herbal approaches in treating breast cancer.

Keywords: Complementary and Alternative therapies (CAMs), Immune cells, T cells, PD-1, Vitamin E, Phytoestrogens, Hydrophilic Isoflavones

Adverse Effect of Cosmetic Tattooing

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Abstract

Cosmetic tattooing, also termed micropigmentation or permanent makeup, has emerged as a popular method for facial enhancement and imperfection concealment. Despite its widespread adoption, this procedure carries inherent risks. A comprehensive overview of the adverse effects associated with cosmetic tattooing. Common adverse effects encompass allergic reactions, infections, and pigment migration. Allergic responses may present as itching, swelling, or erythema, often attributable to sensitivities to pigment constituents or anesthetics. Infections may arise from inadequate sterilization or post-treatment care, leading to symptoms like pain, inflammation, or purulent discharge. Pigment migration, characterized by the dispersion of pigment beyond the intended area, can yield asymmetrical outcomes, necessitating corrective interventions. Moreover, complications such as granulomas, keloids, and hypertrophic scarring may occur, particularly in predisposed individuals. Granulomas manifest as inflammatory nodules surrounding foreign substances, while keloids and hypertrophic scars stem from aberrant wound healing processes, posing challenges for management and often requiring medical intervention. Furthermore, long-term effects like pigment fading, color alterations, and structural changes present maintenance difficulties, prompting periodic touch-ups or removal procedures. Psychological ramifications, such as dissatisfaction or distress, warrant consideration. To mitigate adverse effects, preventive strategies such as stringent hygiene practices, allergen patch testing, and thorough client education on aftercare are imperative. Additionally, practitioners must possess adequate training, experience, and anatomical knowledge to minimize risks and optimize outcomes.

Keywords: Cosmetic, Tattooing, Makeup, Micropigmentation

Algae and Cyanobacteria in Pharmaceuticals

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Abstract

This study provides valuable insights into the expanding role of algae and cyanobacteria in pharmaceuticals, emphasizing their potential for drug discovery & development. The study of algal and

cyanobacteria in the field of pharmaceuticals offers an intriguing point of convergence between the increasing need for innovative medicinal agents and the wide diversity of microorganisms. ***Objective:*** *The main objective is bioprospecting for natural products which involves the targeted discovery, isolation of bioactive compounds, and removal of heavy metals and radionuclides with algae and cyanobacteria, specifically those exhibiting antimicrobial, anti-inflammatory, or other medicinal properties. The possible emergence of resistance against pathogens, as well as the potential decline in antibiotic efficacy, has prompted researchers to look for a new source of antibiotics.* ***Method:*** *Through literature search and various scientific journals of PubMed, Web of Science, Scopus, Google Scholar, Crossref, and PMC were included in the study.* ***Result and Conclusion:*** *Algae and cyanobacteria present promising opportunities for drug discovery and development, with potential applications ranging from novel antibiotics to anti- cancer agents. The biological therapy approach to the effective use of microorganisms that effectively eliminate harmful substances and heavy metals from biological systems was studied. Hence, the utilization of these biosorbent species, which are highly efficient & also cost-effective, proves to be immensely beneficial. This study also gives us comprehensive knowledge about the exploration, extraction, screening, and trading of bioactive products from microalgae and cyanobacteria and their pharmaceutical and other applications.*

Keywords: Microalgae, Biosorption, Heavy metals, Pharmaceuticals.

Anticancer Properties of *Oroxylum indicum*

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Abstract

Cancer is a complex illness characterized by abnormal cell growth in a particular organ, often requiring treatments like chemotherapy, radiation therapy, surgery, hormone therapy, bone marrow transplantation, and immunotherapy. Despite advancements in cancer treatment, the global burden remains significant, with issues such as resistance to radiotherapy and chemotherapy leading to unfavorable outcomes. Consequently, there is growing interest in exploring natural compounds as potential cancer treatments due to their perceived safety compared to synthetic drugs. One such compound under study is Oroxylum indicum, known for its historical use in Ayurvedic medicine for cancer treatment. This plant contains active components like oroxylin A, chrysin, and baicalein, which have shown promise in inhibiting cancer cell growth through various pathways. Oroxylin A exhibits anti-proliferative, pro-apoptotic, anti-metastatic, and anti-angiogenic effects by interfering with cancer progression pathways. Similarly, chrysin induces apoptosis in various human cells and inhibits tumor growth, while baicalein suppresses cell growth, and metastasis, and promotes apoptosis. These compounds act through different molecular pathways such as the mitogen-activated protein kinases (MAPK) pathway and apoptosis via reactive oxygen species (ROS), 12-lipoxygenase, and PI3K/Akt. This review aims to summarize the diverse pathways targeted by Oroxylum indicum in cancer treatment.

Keywords: Anticancer, *Oroxylum indicum*, Baicalein, Chrysin, Oroxylin A

Application of Nanophytoherbals in Parkinson's Therapy

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Abstract

Neurodegenerative disorders (ND) are primarily characterized by neuron loss and parkinsonism is amongst more prevalent N.Ds. Parkinson's disease (PD) is a complicated neurological illness that worsens with time and is characterized by bradykinesia, tremors, and rigidity also as the condition worsens, some individuals may experience postural instability. Due to the presence of the blood-brain barrier(BBB), the approaches involved in developing treatments for neurodegenerative diseases are extremely difficult and complex. The problems arising, due to the presence of the closely spaced epithelial cells and blood vessels in BBB, in drug penetration into the brain can be solved to a greater extent by the usage of nanotechnology by using small-sized molecules ranging from 1-100 nm. Even amongst many nano-preparations, Due to their natural abundance, potential for targeted delivery to the brain, and lower likelihood of causing negative side effects, the conjugates of nanoparticles and medicinal plants known as nano phytoherbals have recently gained importance in the development of novel neuro-therapeutics. In previous studies, it has been seen that phytoconstituents such as curcumin and resveratrol when administered as nanoformulations significantly improved the conditions of patients suffering from N.Ds. This chapter further discusses the effects and applications of more such phytoherbals and their nanoformulations in the treatment of parkinsonism as well as their comparative analysis with conventional herbal formulations.

Keywords: BBB, Parkinsonism, Phytoherbals, Nanoformulations, Nanoparticles

Assessing Potential Targets of Endocrine Disrupting Chemicals Using in Silico Methods

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Abstract

Background: *EDCs are compounds that interfere with the normal function of hormones, often mimicking or blocking their actions, which can lead to various health problems, including reproductive disorders, developmental abnormalities, and even cancer. Through in silico methods, the interaction between potential targets of EDCs is identified and studied. These computational techniques leverage data on chemical structures, biological pathways, and molecular interactions to simulate and predict how EDCs interact with endocrine receptors, enzymes, and other targets within the body.* ***Objective:*** *This study employed the use of computational techniques to identify, predict, and understand the interactions between EDCs and biological targets within the endocrine system. This helps in prioritizing compounds for further investigation, predicting their effects, understanding mechanisms of action, and supporting regulatory decisions.* ***Method:*** *Thorough literature search and use desired software to dock the endocrine disrupting chemicals (ligands) against the androgen receptor, estrogen receptor beta, and alpha.* ***Result and Conclusion:*** *The assessment of potential targets of Endocrine Disrupting*

Chemicals (EDCs) using in silico methods provided valuable insights into the mechanisms by which these chemicals exert their effects on biological systems. Through computational techniques, we studied specific receptors, and molecular targets that may be affected by EDCs.

Keywords: Endocrine Disrupting Chemicals, Docking, DES, Phthalates, Estrogen Receptor

Benzene Contamination in Dry Shampoos: A Regulatory Case Study

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Abstract

Dry shampoos have gained immense popularity as a convenient hair care solution, with the market reaching a value of USD 3,742 million by 2023 and as per a survey expected a growth rate of 7.2% over the next five to six years. These products function by absorbing oil from the scalp, offering a quick alternative to traditional hair-washing routines. However, recent incidents have seen major brands like TRESemme, Dove, and others recalling their dry shampoo products due to the presence of benzene, a hazardous chemical compound. Benzene is classified as a potential carcinogen by various regulatory bodies, including the U.S. Centres for Disease Control and Prevention, the Environmental Protection Agency, and the World Health Organization. The acceptable limit for benzene in cosmetics, according to the U.S. Food and Drug Administration, is 2 parts per million (ppm). Nonetheless, concerns over consumer safety have emerged due to the less stringent regulations governing cosmetics compared to pharmaceuticals. The recall was initiated after benzene levels exceeding 170 times the Food and Drug Administration (FDA) limit were detected in certain batches of dry shampoo products. An independent laboratory tested certain batches of dry shampoo spray from 34 companies, revealing that 70% contained measurable levels of benzene, with 11 samples surpassing the FDA limit by more than 10 times. Benzene exposure can arise through inhalation, ingestion, or skin contact, and has been associated with various forms of cancer. This incident underscores the necessity for stricter regulations and improved quality control measures in the cosmetics industry to safeguard consumer well-being.

Keywords: Dry Shampoo, Regulatory recall, Carcinogen, TRESemme, Quality Control.

Breaking Barriers: Radiopharmaceuticals and the Regulatory Frontier

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Abstract

Radiopharmaceuticals are integral tools in contemporary medicine, contributing significantly to disease diagnosis and treatment. Radiopharmaceuticals are unique because they contain radioactive isotopes and are used in nuclear medicine for diagnostic or therapeutic purposes. The global radiopharmaceutical market was valued at USD 5.2 Billion in 2022 and is projected to reach USD 9.75

Billion by 2030 at a CAGR (Compound Annual Growth Rate) of 9.4% between 2023 and 2030 and it is found to increase However, the regulatory landscape surrounding these critical medical assets presents notable challenges impacting their development, approval, and accessibility within the Product Lifecycle Management (PLM) framework. The current work succinctly outlines the hurdles, encompassing intricate approval procedures, stringent safety criteria, and the evolving regulatory landscape. Achieving a delicate equilibrium between patient safety and swift access to innovative radiopharmaceuticals necessitates continuous collaboration among regulatory bodies, industry stakeholders, and healthcare professionals. Addressing the challenges entails the streamlining of approval processes, bolstering communication channels, and fostering a cohesive global regulatory approach. Concurrently, the work also highlights promising trends in radiopharmaceutical development, including advances in precision medicine, targeted therapy, and innovative manufacturing techniques such as automation. As the demand for radiopharmaceuticals surges, the present work underscores the imperative for ongoing collaboration, emphasizing a proactive stance to ensure the timely availability of safe and effective radiopharmaceuticals worldwide. The evolving regulatory framework mirrors the dynamic nature of radiopharmaceuticals and underscores the continuous commitment to ensuring patient safety and the effectiveness of radiopharmaceutical products.

Keywords: Radiopharmaceuticals, Regulatory challenges, Product Lifecycle Management (PLM), Precision medicine, Collaboration.

Cosmetic Regulation Comparison Between India and the USA

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Abstract

There are notable distinctions between the regulatory frameworks, compliance requirements, and safety standards pertaining to cosmetics in India and the USA. Under the Federal Food, Drug, and Cosmetic Act, which is supervised by the Food and Drug Administration (FDA), cosmetics are regulated in the United States with an emphasis on pre-market approval and post-marketing reporting systems. In contrast, the Drugs and Cosmetic Act (1940) governs regulations in India and involves intricate pre-marketing approval processes. The two nations also have different labeling laws; India follows certain D&C regulations, whereas the USA follows FD&C regulations. Furthermore, India places a great deal of attention on factory premises' adherence to laws, whereas the USA places more emphasis on safety substantiation and compliance with legal authorities for cosmetics. India's cosmetics market is expanding at a rate of 15-20% per year, which is faster than the global average for many other areas. Notwithstanding these distinctions, both nations are vital in determining international cosmetic laws. To maintain compliance and product safety, cosmetic producers operating in both markets must have a thorough awareness of these variances. The regulatory differences between the USA and India highlight how crucial it is to unify international cosmetic laws to promote innovation, trade, and above all consumer safety.

Keywords: Cosmetic Regulations, USA, India, Regulatory Framework, Compliance Requirements, Safety Standards

Effect of Phytoconstituents for the Treatment of Psoriasis

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Abstract

Psoriasis is a skin disease caused by the immune system that affects millions of people globally. It is typified by red, scaly areas that can cause discomfort and itching. Although they frequently relieve symptoms, conventional treatments may have drawbacks including side effects or insufficient effectiveness for certain people. The use of natural alternatives, especially phytoconstituents, has drawn more attention in recent years due to its possible efficacy in treating psoriasis. To cure psoriasis, this article attempts to give a thorough overview of phytoconstituents that have demonstrated promise. Curcumin, indigo naturalis, aloe vera, and neem are important phytoconstituents that have been the subject of much research due to their immunomodulatory, antioxidant, and anti-inflammatory qualities. These features are critical in the pathophysiology of psoriasis. Key psoriasis pathways, such as the nuclear factor-kappa B (NF-κB) pathway, cytokine generation, and keratinocyte proliferation, are inhibited by these phytoconstituents. The review also covers the mechanisms of action of these phytoconstituents, emphasizing their potential as safe and efficient supplements or substitutes for traditional medicines. Phytoconstituents then, show promise as potent therapeutic alternatives for psoriasis treatment. It is necessary to conduct additional studies and clinical trials to confirm their safety and effectiveness, opening the door for the creation of cutting-edge phytoconstituent-based psoriasis treatments.

Keywords: NF-κB, immunomodulation, psoriasis, Phytoconstituents, anti-inflammatory, antioxidant.

Evaluation of Anti-inflammatory Activity of Herbal Extract Against Hypotonic Solution-induced Inflammation on Blood Cells

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Abstract

A model that imitates or stimulates the synthesis or release of the biochemical mediators of inflammation is created for an anti-inflammatory activity study, and the reaction of these biochemicals to the test medications is observed. Using the Soxhlet method, dried strawberries were extracted with ethanol solvent and first tested for the presence of several phytochemicals. Further analysis of the extracts was done to check for phenolics, flavonoids, and total alkaloids. The anti-inflammatory effect of strawberry extract (SBE) that has been reported may be ascribed to the abundance of bioactive components, including flavonoids and polyphenols, which are recognized for their anti-inflammatory and antioxidant characteristics. Additionally, by modifying inflammatory pathways and lowering oxidative stress, strawberries' anthocyanin content may add to their therapeutic benefits. Using a

hypotonic solution, this study assessed the possible anti-inflammatory effects of strawberry extract (SBE) on blood cells in vitro. Using a controlled experimental methodology, blood samples were taken from healthy albino rats for the study. Following the induction of hemolysis by the hypnotic solution (0.2N NaCl), SBE (0.2 mg/ml) is administered. The degree of hemolysis, which is a sign of blood cell destruction caused by inflammation, was measured by spectrophotometric analysis. The SBE treatment was associated with a dose-dependent decrease in hemolysis rates, which may have an anti-inflammatory impact. Moreover, statistical examination demonstrated noteworthy distinctions between the groups that were treated and those that were not ($p < 0.05$), corroborating the effectiveness of the strawberry extract in reducing inflammation-induced cellular damage. These results highlight the potential of SBE as a natural anti-inflammatory drug and call for more research into its modes of action and therapeutic uses.

Keywords: Herbal Extract, Inflammation, Spectrophotometry, Hypotonic Solution, Blood Cells

Exploring Menthone-derived Schiff Bases: Potential Anticonvulsant Agents

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Abstract

Epilepsy, a neurological disorder characterized by recurrent seizures, poses a significant burden on affected individuals globally. Despite advancements in antiepileptic drugs, there remains a need for novel therapeutic agents with improved efficacy and fewer side effects. Schiff bases, derived from the condensation of an amino group with a carbonyl compound, have gained attention due to their diverse pharmacological properties. Menthone Schiff base, a chemical compound derived from menthone and aromatic amines, plays a crucial role in the study and management of epilepsy. Its pharmacological properties have been extensively investigated due to its potential as an antiepileptic agent. Research indicates that menthone Schiff base exhibits remarkable anticonvulsant activity, making it a promising candidate for developing new drugs to address epilepsy. Modulating neurotransmitters and ion channels involved in seizures effectively reduces their frequency and severity. Additionally, the menthone Schiff base demonstrates favorable pharmacokinetic characteristics, including good oral bioavailability and central nervous system penetration, enhancing its suitability for epilepsy treatment. Its low toxicity profile further supports its safe use in epileptic patients. Furthermore, studies suggest that menthone Schiff base may offer neuroprotective effects, safeguarding against neuronal damage associated with recurrent seizures, thus providing comprehensive epilepsy management. The compound's versatility allows for structural modifications, optimizing efficacy while minimizing side effects. Ongoing research underscores its pivotal role in expanding the arsenal of antiepileptic medications, addressing the needs of patients with refractory epilepsy. Embracing the potential of menthone Schiff base could usher in a new era of improved seizure control and enhanced quality of life for millions worldwide.

Keywords: Schiff Base, Menthone, Cyclic Ketones, Anticonvulsant.

From Plant to Pill: Understanding the Extraction and Formulation of Phytopharmaceuticals

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Abstract

For thousands of years, the use of plants as medicine has been a fundamental aspect of human healthcare. The extraction and formulation of phytopharmaceuticals have developed into a precise and complex procedure thanks to advances in science and technology. This talk explores the complex process of turning a plant into a pill, explaining the essential steps in the extraction of bioactive components from plant sources and the subsequent formulation of those compounds into potent pharmaceuticals. The first part of the talk examines the wide range of plant species that are used in phytopharmaceuticals, highlighting the significance of choosing botanicals based on their safety and bioactivity profiles. The extraction processes used to separate the desired components are then covered in detail. These include solvent extraction, supercritical fluid extraction, and cutting-edge approaches like ultrasound-assisted extraction. This paper will examine how to optimize extraction parameters to get the highest possible yield and potency with the least possible environmental impact. Formulation techniques that aim to improve bioavailability, stability, and therapeutic efficacy become more important after extraction. This includes devising dosage forms, encapsulating strategies, and excipient selections that are specific to the properties of the phytopharmaceuticals. To address issues related to low solubility and fast metabolism, special emphasis will be placed on novel formulation techniques such as nanotechnology and microencapsulation. To guarantee the consistency and safety of phytopharmaceutical products, the presentation will also emphasize the significance of quality control and standardization throughout the extraction and formulation process. Personalized medicine and plant biotechnology, as well as regulatory issues and the field's future possibilities, will be covered. In conclusion, utilizing the therapeutic potential of medicinal plants and expanding drug discovery and development in the pharmaceutical business requires an understanding of the extraction and formulation of phytopharmaceuticals.

Keywords: Therapeutic, Encapsulation, Nanotechnology

GDUFA: Boosting Generic Medicine Access

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Abstract

Access to affordable medications is a crucial aspect of healthcare, particularly in the context of rising healthcare costs and the increasing burden of chronic diseases. Generic drugs play a vital role in improving accessibility by providing cost-effective alternatives to brand-name medications. However, the approval process for generic drugs has historically been plagued by delays and inefficiencies,

hindering timely market entry and limiting patient access. ***Objectives:*** *This study seeks to evaluate the impact of GDUFA on the accessibility of generic drugs in the pharmaceutical market. By analyzing key metrics such as approval timelines, number of approvals, and market availability, we aim to assess the effectiveness of GDUFA in improving patient access to affordable medications.* ***Methods:*** *A retrospective analysis of Food and Drug Administration (FDA) approval data for generic drugs before and after the implementation of GDUFA will be conducted. This analysis will provide insights into the changes in the approval process and market dynamics following the enactment of GDUFA.* ***Results:*** *Implementation of GDUFA is expected to lead to a significant reduction in average approval time for generic drugs and an increase in the number of approved medications. These findings will demonstrate the tangible impact of GDUFA on enhancing accessibility and affordability in the pharmaceutical market.* ***Conclusion:*** *By streamlining the generic drug approval process, GDUFA has the potential to improve patient access to affordable medications, thereby addressing a critical need in healthcare delivery. This study will contribute valuable insights into the effectiveness of GDUFA and inform future policy decisions aimed at promoting accessibility and affordability in the pharmaceutical market.*

Keywords: GDUFA, Generic Drugs, Food and Drug Administration (FDA), Approval Process, Accessibility, Healthcare Costs

In Vitro and In Vivo Anti-PCOS Activity of Selected Phytoconstituent

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Abstract

Background: *A complex endocrine and metabolic condition affecting women during the reproductive stages is known as polycystic ovarian syndrome (PCOS). Its frequency in adolescent women varies greatly worldwide, ranging from 2.2% to 26%; and in India, it varies from 3.7% to 22.5%. It is one of the primary causes of infertility and irregular menstruation in women.* ***Objectives:*** *The purpose of the study is to evaluate the anti-PCOS effects of selected phytoconstituents through In vivo and In vitro experiments by reviewing research articles. Examine the effects of phytoconstituents on insulin sensitivity, inflammatory indicators, and hormone synthesis in vitro examine how phytoconstituents affect in vivo reproductive function, ovarian morphology, and metabolic parameters. Describe the underlying mechanisms by which phytoconstituents reduce the symptoms associated with PCOS.* ***Methods:*** *Using thorough analysis of the literature and data mining from public domain databases containing information about natural products, an exhaustive list of phytoconstituents and manually curating the PubMed articles, four public databases, namely, Dr. Duke's phytochemical database, PCIDB (Phytochemical Interaction Database), TCMSP (Traditional Chinese Medicine Systems Pharmacology)and IMPPAT (Indian Medicinal Plants, And Therapeutics) were searched*. ***Result:*** *The findings of this study provide insights into the potential anti-PCOS effects. The results demonstrate the ability of phytoconstituent to modulate hormone production, improve insulin sensitivity, reduce inflammation, and restore reproductive function in PCOS models.* ***Conclusion:*** *These findings support further exploration of phytoconstituents as promising therapeutic agents for PCOS management, potentially offering safer and more natural alternatives to conventional treatments.*

Keywords: PCOS, Phytoconstituents, Reproductive health, Insulin, Inflammation

Inonotus obliquus: A Natural Alkaloid

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Abstract

Inonotus obliquus, commonly known as chaga mushroom, possesses a plethora of pharmacological properties that make it a promising candidate for various therapeutic applications. Its rich content of bioactive compounds such as polysaccharides, phenolic compounds, and triterpenoids contributes to its antioxidant, anti-inflammatory, immunomodulatory, anticancer, antimicrobial, and hepatoprotective effects. Studies have demonstrated its ability to protect cells from oxidative stress, modulate immune responses, inhibit inflammation, and exert anticancer activity both in vitro and in vivo. Clinical trials have shown encouraging results, particularly in cancer patients, highlighting its potential as an adjuvant therapy. Furthermore, its antimicrobial activity and hepatoprotective effects suggest broader applications in managing infections and liver disorders. Continued research, especially through well-designed clinical trials, is crucial for fully elucidating its therapeutic potential and ensuring its safe and effective use in clinical settings.

Keywords: Chaga Mushroom, Pharmacological Properties, Bioactive Compounds, Antioxidant, Anti-inflammatory, Immunomodulatory, Anticancer, Antimicrobial, Hepatoprotective

Investigating the Cardio-protective Potential of Natural Antioxidant Against Tacrolimus-induced Cardiotoxicity in Wistar Rats: A Mechanistic Insights

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Abstract

Cardiovascular diseases are the leading causes of morbidity and mortality worldwide. Several factors are associated with cardiac toxicity like genetic factors, chemotherapy, lifestyle, environmental factors, etc. Among these, medication is one of the more emerging factors concealed by researchers in cardiotoxicity. Tacrolimus has been associated with a wide range of cardiovascular complications, including hypertension, left ventricular hypertrophy, and arrhythmias. On the other hand, recent evidence suggests that natural antioxidants counteract the cardiotoxicity of tacrolimus by ameliorating oxidative stress and inflammation. ***Objective:*** *We aim to explore the intricate interplay between tacrolimus and natural antioxidants in the context of cardiotoxicity by elucidating the underlying mechanisms.* ***Methodology:*** *A combination of in vitro and in vivo experiments is used to investigate the effects of tacrolimus and natural antioxidants on cardiomyocytes. Experimental techniques include ELISA to measure creatine kinase-MB, troponin, inflammatory markers (TNF-a, IL-6) level, oxidative stress assay to measure malondialdehyde, superoxide dismutase, and reduced thiol content level, apoptosis assays to assess sensitivity to cell death.* ***Results:*** *The level of creatine kinase-MB, troponin,*

and inflammatory markers (TNF-a, IL-6) is observed high in tacrolimus administered group, Due to the proposed mechanism of metabolism of tacrolimus via CYP450 3A4 enzyme, generation of reactive oxygen species (ROS) and NOS and mitochondrial damage. Inhibition of CYP450 3A4 enzyme by antioxidants results from low levels of CK-MB, troponin, TNF-a, and IL-6. ***Conclusion:*** *The study integrates to provide a comprehensive understanding of the molecular mechanism of tacrolimus and antioxidants in the context of cardiotoxicity.*

Keywords: Tacrolimus, Cardiotoxicity, Oxidative Stress

In Vitro Inhibitory Effects of Plant Extracts Against a Nosocomial Pathogen *Enterococcus faecalis*

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Abstract

Background: *Enterococcus faecalis is a common member of the human gut microbiota and is considered a nosocomial pathogen due to the emergence of multidrug resistance. Nowadays, the investigations for natural medicine with high antimicrobial activity have risen to combat drug resistance.* ***Objective:*** *Plants are natural and rich sources of phytochemicals or bioactive compounds. This study is planned to evaluate the antibacterial efficacy of twelve plant extracts with unknown medicinal value against E. faecalis.* ***Methods:*** *Primary extracts obtained from mature leaves of twelve plants were assessed for their antibacterial potential. The ethanol extracts were prepared, and their inhibitory effects were evaluated in liquid and solid medium by microdilution method and spot assay, respectively.* ***Results:*** *The results of the microdilution method and spot assays revealed that out of twelve, ethanol extracts of two plants showed the highest inhibitory effect towards E. faecalis with a MIC value of less than 0.24 mg/ml.* ***Conclusion:*** *The identification of antibacterial efficacy in plants with unknown medicinal value can be useful for the development of novel phytochemicals/bioactive agents to limit microbial infections and drug resistance.*

Keywords: Human Gut Microbiota, Resistance, Plant Extracts, Antibacterial, Bioactive Agents

Management of Diabetes Mellitus: Harnessing the Power of Vitamin D and Cutting-edge Technologies

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Abstract

Diabetes mellitus (DM) is a hormone-related disease that remains a global health concern with increasing prevalence and associated complications. Recent breakthroughs in DM treatment include

nutritional therapy, stem cells, nanotechnology, gene therapies, and lifestyle modifications. Vitamin D, often known as the sunshine vitamin, plays a crucial role in maintaining robust skeletal structure, a well-functioning immune system, and optimal overall well-being. Beyond its traditional role in bone health, vitamin D also plays a pivotal role in immune regulation, inflammation, and insulin sensitivity. Additionally, the therapeutic implications of vitamin D supplementation and various technologies available for DM while considering different formulation approaches are discussed, offering promising targeted drug delivery avenues and improved efficacy. ***Objective:*** *This study aims to investigate recently emerging technologies that demonstrate promising outcomes in the management of diabetes mellitus (DM). Additionally, it explores the fundamental emerging technologies available for DM.* ***Method:*** *Studies were obtained from epidemiological studies, randomized clinical trials, and meta-analyses available in PubMed, Google Scholar, and Research Gate.* ***Result and Conclusion:*** *Evidence indicates that vitamin D deficiency may contribute to DM pathogenesis, potentially exacerbating insulin resistance and high glycated hemoglobin (HbA1c), highlighting a robust link between vitamin D deficiency and an elevated incidence of diabetes mellitus. Moreover, recently emerging technologies for DM, such as nutritional therapy, stem cells, nanotechnology, gene therapies, and lifestyle modifications, have demonstrated favorable outcomes and addressed the multifaceted challenges associated with diabetes mellitus.*

Keywords: Diabetes Mellitus, Vitamin D, Novel Formulations, Nanotechnology, Gene Therapies

Medicinal *Cannabis*: Emergence, Evolution and Stigmatization

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Abstract

Cannabis sativa, a plant that is used in healthcare, food production, and cosmetics, is commonly referred to as "hemp" or weed". Cannabis is shown to contain about 566 different chemical components, of which 125 are cannabinoids and 198 are not. Cannabis is the psychoactive and physiologically active component of the plant; it is mostly found in the flowers, although it can be found in lesser quantity in the leaves, stems, and seeds (shoot). Three broad categories of cannabinoids exist: synthetic cannabinoids, which are substances created in a laboratory, endogenous cannabinoids, often known as "endocannabinoids". This study aims to assess the extent of knowledge about the pharmacology, toxicity, indigenous usage, emergence, regulatory landscape, and industrial applications of the plant Cannabis sativa. Due to its intricacy, several plant components have historically been used in pharmacotherapy and ethnomedicine. In past centuries, C. sativa has been used to treat gastrointestinal diseases, postpartum hemorrhage, STD (Sexually Transmitted Diseases) prevention, arthritis, and other autoimmune diseases. Though it is prohibited in most countries, C. sativa is nonetheless used cautiously. Therefore, the purpose of this study is to provide an overview of the methods for characterizing the chemicals found in C. sativa, as well as the potential biological benefits of the plant components.

Keywords: *Cannabis sativa*, Medicinal Cannabis, Cannabinol, Cannabinoids

Natural Perspective of Weight Management

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Abstract

A growing number of people are embracing natural approaches to weight management as they strive for healthier lifestyles; they are moving away from artificial interventions and toward more comprehensive and long-lasting solutions. The broad field of natural weight management techniques is examined, which includes dietary adjustments, lifestyle adjustments, and integrative methods based on conventional wisdom. Food as medicine is a fundamental component of the natural weight management approach. This approach strives to fuel the body while promoting a balanced metabolism, with an emphasis on whole, unprocessed foods rich in minerals and phytochemicals. Particularly because of their high fiber, vitamin, mineral, and antioxidant content, plant-based diets have drawn interest for their potential to assist weight loss and maintenance. The study describes a number of phytoconstituents that have shown promise in helping people manage their weight, emphasizing their effectiveness and mechanisms of action. Numerous biological activities of phytochemicals, including alkaloids, terpenoids, flavonoids, and polyphenols, affect lipid metabolism, energy expenditure, appetite regulation, and metabolic processes. A growing percentage of people are using ingredients like cinnamon, Garcinia cambogia, and green tea extract because of their ability to control blood sugar, boost metabolism, and reduce hunger. The natural approach to weight management, in its simplest form, supports a personalized, holistic strategy that respects the connection between the environment, the body, and the mind. People can set out on a path to reach and sustain their ideal weight and level of well-being by embracing mindful eating habits, whole food, frequent exercise, and complementary therapies.

Keywords: Weight management, Phytoconstituents, Metabolic processes, Lipid metabolism

Natural Extract Coatings on Orthopedic Implants: Harmonizing Efficacy, Safety, and Regulatory Obligations

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Abstract

The incorporation of phytopharmaceutical-coated implants offers a fresh strategy for tackling the intricate issues of effectiveness, safety, and regulatory conformity in the quickly developing field of orthopedic surgery. The background places this breakthrough in the perspective of the complex global standards of regulation that regulate implantable medical devices, highlighting the strict guidelines established by regulatory agencies like the Food and Drug Administration (FDA) in the US and the Medical Device Regulation (MDR) of the EU. In light of this, the purpose of this abstract is to clarify the regulatory obstacles that arise during the creation and application of implants coated with

phytopharmaceuticals and investigate the prospective therapeutic advantages and technological developments associated with them. To analyze the subtleties of regulatory pathways and the therapeutic implications of these implants, a methodologically sound examination of relevant literature, regulatory guidelines, and clinical investigations is carried out. The results emphasize how difficult it can be to navigate various regulatory environments and how important it is to have strong clinical data to support the safety and effectiveness of implants coated with phytopharmaceuticals. Moreover, cooperative endeavors between producers, regulatory agencies, and orthopedic surgeons are considered essential for optimizing market accessibility, guaranteeing consistent patient results, and promoting continuous innovation in the field. In conclusion, even though achieving regulatory compliance is extremely difficult, integrating phytopharmaceuticals into orthopedic implants has great potential to improve patient outcomes and care. However, this is only possible if guidelines are strictly followed and stakeholders work together to effectively manage regulatory complexities.

Keywords: Clinical Benefits, Collaborative Efforts, Orthopedic Surgery, Phytopharmaceutical-coated Implants, Regulatory Compliance

Natural Tubulin Targeting Anticancer Agents

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Abstract

Cancer therapy continues to be a significant global health challenge, necessitating the exploration of innovative treatment approaches. Conventional therapies demonstrated significant side effects and drug resistance as well. Targeting tubulin, a vital component of microtubules, has emerged as a promising strategy for developing anticancer drugs due to its involvement in mitotic spindle formation and maintenance and ultimately cell survival. Plant-derived compounds, which are rich in diverse phytochemicals, offer a wide array of bioactive properties that can interfere with tubulin polymerization and effectively inhibit cancer cell growth. ***Methods:*** *Relevant literature was gathered, studied, analyzed, and included after the database search from PubMed, Scopus, and the Web of Science.* ***Results:*** *Several plant-based compounds have exhibited remarkable abilities as tubulin inhibitors for example taxanes, vinca alkaloids, colchicine, podophyllotoxins, and combretastatins. Furthermore, various other plant-derived compounds have been identified as potent tubulin inhibitors through distinct mechanisms. These compounds exert their anticancer effects by disrupting tubulin dynamics, impeding mitotic progression, and inducing apoptosis in cancer cells. Leveraging the multifaceted nature of these plant-based compounds provides an opportunity to overcome resistance mechanisms commonly associated with traditional chemotherapeutic agents.* ***Conclusion:*** *The exploration of plant-based compounds as tubulin inhibitors holds great promise for advanced cancer therapy. These compounds possess inherent bioactivity and exhibit diverse mechanisms of action, making them potential candidates for the development of novel and effective anticancer drugs. Ultimately, tapping into nature's pharmacopoeia may significantly contribute to the advancement of personalized and targeted cancer treatments.*

Keywords: Cancer, Tubulin, Natural product, Microtubule-stabilizing and Destabilizing

Nature Smile: Herbal Remedies for Oral Health

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Abstract

Background: *Oral health is an integral component of overall well-being, which impacts an individual's ability to communicate and consume food. Dental caries and periodontal diseases remain prevalent among adults as well as children and these conditions arise from the activity of various oral microbes. Herbal remedies offer promising paths in oral healthcare, presenting natural alternatives to traditional treatments. These remedies, derived from natural sources like plants and their phytoconstituents, offer a gentle potent approach to oral care. Phytoconstituents exhibit antimicrobial properties against oral pathogens and biofilms, potentially diminishing dental caries and periodontal diseases. The essential for herbal alternatives in oral care arises from the need to eliminate various side effects while prioritizing sustainability and eco-friendly approaches, aligning with modern values of health and eco-consciousness.* ***Objectives:*** *This abstract aims to explore the potential of medicinal plants that are potent enough to combat oral pathogens and their role in addressing dental caries and periodontal diseases.* ***Methods:*** *This abstract has focused on papers between 2011 to 2024, which were accessed from search engines like Google Scholar and PubMed.* ***Results:*** *Identified 75 medicinal plants exhibiting oral health benefits, particularly in combating periodontal diseases, dental caries, and gingivitis.* ***Conclusion:*** *Integrating herbal medicines into oral healthcare emphasizes their role as beneficial therapies in combating oral infections and improving overall well-being. Further research is required to explore the efficacy and safety of herbal treatments, encouraging a holistic approach to oral health promotion and disease prevention.*

Keywords: Oral Health, Dental caries, Periodontal disease, Herbal medicine, Phytoconstituents

Navigating the Regulatory Landscape for Advanced Therapy Medicinal Products: Key Considerations and Insights

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Abstract

In the realm of medical innovation, Advanced Therapy Medicinal Products (ATMPs), which include gene therapies, cell therapies, and tissue-engineered products, represent the forefront of cutting-edge therapeutics. In the journey from concept to clinical application, regulatory aspects emerge as pivotal determinants, shaping the safety, quality, and efficacy of these cutting-edge interventions. The regulatory groundwork commences with a thorough examination of classification, acting as the crucial element in the development of ATMPs. Strategic engagement with regulatory agencies becomes a cornerstone, wielding substantial influence over the entire developmental trajectory. The intricacies involved in obtaining marketing authorization are crucial for successfully translating these therapies into clinical practice. Quality control assumes a central role in manufacturing processes, demanding unwavering adherence to Good Manufacturing Practice (GMP) standards to ensure the reliability and consistency of ATMPs. The examination extends into the intricate realms of nonclinical and clinical development,

emphasizing sophisticated study designs, considerations tailored to diverse patient populations, and the imperative of robust data to firmly establish safety and efficacy profiles. Acknowledging the distinctive challenges embedded in ATMPs, the abstract sheds light on tailored risk management strategies. Additionally, it underscores the imperative of establishing robust pharmacovigilance systems, crucial for vigilant post-approval monitoring and the prompt mitigation of potential adverse events, safeguarding against unforeseen threats. In conclusion, this abstract offers a thorough overview of regulatory considerations guiding the development and deployment of ATMPs which is a valuable resource for scholars and stakeholders navigating the intersection of innovation and regulations, addressing various aspects like classification and manufacturing standards. This contributes to a nuanced understanding of the dynamic regulatory environment governing these groundbreaking medical interventions.

Keywords: ATMP, gene therapy, cell-based therapy, challenges, risk management, regulation, pharmacovigilance, development

Navigating the Regulatory Landscape: The Need for Clear Guidelines for Nutraceuticals in India and Their Impact on the Healthcare System

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Abstract

The growing consumer consciousness of health and wellness has led to a notable surge in the nutraceutical business in India in recent times. However, the absence of precise regulatory requirements presents difficulties for this emerging industry. This study examines India's present regulatory environment for nutraceuticals and emphasizes the necessity of thorough and open rules to protect consumer safety and market integrity. The lack of clear regulations for nutraceuticals has resulted in uncertainty about their quality standards, labeling specifications, and classification. Inconsistent standards could jeopardize the safety and efficacy of products, endangering customers in addition to impeding industry progress. The nutraceutical industry in India has seen a major upsurge recently due to the increased consumer knowledge of health and wellness. However, this new industry faces challenges due to the lack of specific regulatory criteria. The current regulatory landscape for nutraceuticals in India is examined in this paper, which highlights the need for comprehensive and transparent regulations to safeguard consumer safety and market integrity. The absence of well-defined rules pertaining to nutraceuticals has led to ambiguity over their classification, labeling requirements, and quality standards. Inconsistent standards could put consumers' safety and product effectiveness in peril, as well as impede the advancement of the sector. Finally, initiatives to raise consumer, healthcare provider, and industry stakeholder knowledge and education about nutraceutical regulations and their effects should be undertaken. This will protect public health and encourage a culture of accountability and compliance, allowing the sector to grow responsibly. In conclusion, it is critical to create thorough and precise regulatory rules for nutraceuticals in India to fully realize the potential of this rapidly expanding industry and reduce threats to patient safety and the integrity of the healthcare system. India can become a leader in the global nutraceutical business and advance public health and well-being by filling legislative loopholes and creating a supporting ecosystem.

Keywords: Nutraceuticals Regulatory Framework Healthcare System India Public Health, Legislative loopholes, Ecosystem, Nutraceutical Industry

Pharmacognostical Study of *Cyclanthera pedata*

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Abstract

Plants are an important part of our daily requirements which play an essential role in health care. Data or a study by the World Health Organization proves that approximately 80% of the world's population depends mainly on traditional medicines (obtained from a plant) also a developing country and industries depend on plant products. In contemporary times, plants are increasingly recognized for their health benefits, with research highlighting their therapeutic properties and nutritional value. Cyclanthera pedata plant is reported that the aerial parts are being used for their anti-inflammatory, hypoglycaemic. Cyclanthera pedata plant is reported that fruit contain nutritional value and have health benefits. The fruit was determining the impact of chemical processing. Which are total carbohydrates and reducing carbohydrates were low (0.52% and 0.57%). And also the (0.4%) total protein content. Cyclanthera pedata plant reported that antioxidant activity against lipid peroxidation was characterized by a good concentration of compound 4, and also reported the addition of flavonoids. Plant species belonging to the Cucurbitaceae family Cyclanthera pedata plant are also known as meetha Kerela and ram Kerela in the local language. The present research was carried out standardization of Cyclanthera pedata leaf and fruit. Which included microscopic, macroscopy characters. Identification, and Phytochemicals, are performed. Total sugar (TS) Total phenolic (TP) In Vitro antioxidant activity. Microscopic characterization. (MC).

Keywords: Fruit and Leaves, *Cyclanthera pedata*, Antioxidant Properties, Nutritional Value

Photoprotective Phytoherbals in Nanocosmeceuticals

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Abstract

Ultraviolet rays, pollution, and synthetic chemicals affect the skin causing various problems such as sunburn which further leads to skin cancer. This study focuses on the various herbal ingredients which have the power for skin protection and healing. Nature has the potential with its everlasting treasure of herbal ingredients to prevent and cure skin-related problems. Prohibition of UV rays from penetrating the skin can be achieved by using herbal ingredients. The nano cosmeceutical formulations of herbal ingredients such as antioxidant-rich phytoherbals, carotenoids containing phytoherbals, polyphenols rich phytoherbals, vitamins enriched phytoherbals, melanin enhancers, pigmentation support. Herbs and herbal ingredients have great potential to protect of skin from UV rays. Antioxidants such as green tea extract, grape seed extract inhibit free radical formation and neutralize reactive oxygen species, and enhance skin protection from harmful UV rays. The gel from aloe is believed to stimulate skin and provide assistance in new cell growth. As compared to synthetic products herbal proves to be effective in chronic conditions with fewer side effects and availability at low cost. This

study concludes the harmful effects of UV rays, the types of UV rays, and the study of herbal ingredients and their chemical constituents present in it which helps in the protection of skin from UV.

Keywords: Antioxidant, Carotenoids, Melanin, Vitamin, Radical

Phytochemical Investigation, Antioxidant Assay, and Qualitative Identification of Quercetin Using Thin-layer Chromatography in the Leaf and Root Extracts of *Phoenix sylvestris*

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Abstract

Phoenix sylvestris has a longstanding history of significance and is well-known for its nutritive benefits across the world. It is an abundant source of flavonoids, carbs, alkaloids, phenols, amino acids, tannins, terpenoids, minerals, and dietary fibers. ***Objective:*** *The objective of this study is to analyze the ethyl acetate extracts of leaf and root of P. sylvestris from India for its phytochemicals, antioxidant potential, and detection of quercetin via thin-layer chromatography.* ***Method:*** *Ethyl acetate extracts of roots and leaves of P. sylvestris were prepared using the Soxhlet extraction method and phytochemical screening was conducted. The total phenolic and flavonoid content of the obtained extracts of P. sylvestris were determined using in vitro colorimetric assay namely, Folin–Ciocalteu method and aluminium chloride method, respectively. Further, a DPPH radical scavenging assay was employed to assess the antioxidant properties of the ethyl acetate extract of leaves and roots of P. sylvestris, and qualitative detection of quercetin via thin-layer chromatography was also carried out.* ***Result:*** *The results of this study depict that the tested extracts of P. sylvestris possess considerable amounts of phenols and flavonoids and a significant scavenging power of free radicals.* ***Conclusion:*** *The findings of this study might assist readers in approaching the accessible statistics and exploring the antioxidant potential of P. sylvestris for its varying significant uses targeting towards development of new leads as treatment strategies for different pathological conditions.*

Keywords: *P. sylvestris*, Folin–Ciocalteu, Soxhlet Extraction Method, Antioxidant Property, DPPH

Phyto-leads to Fight Against Neuro Degenerative Diseases: a Holistic Approach

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Abstract

Neurological illnesses are a major source of concern in the global healthcare system. Lifestyle changes are associated with a much higher incidence of chronic sickness and disease, which imposes a

significant financial and healthcare burden on society globally. Plants have long been utilized as a source of medicine for a wide range of ailments all around the world. The historical trajectory of nutritional supplements may be reconstructed by establishing links between complementary and alternative medicine activities, such as apothecary, ethnopharmacology, phytotherapy, and herbalism. The therapy's forefathers included vegetables, animals, materials made from minerals, and medicinal plants, both natural and mystical. The goal of research is to treat patients with great care and minimally disclose adverse consequences. Much research on functional foods has been started in recent decades to create diets that have more positive impacts on health and fewer negative ones. This has led to studies being done to determine various extraction techniques for removing important phytochemicals or bioactive ingredients from foods that have medicinal properties. The term "functional meals" has so become confused with other similar terms like "pharmafoods," "medifoods," "vitafoods," or "medicinal foods." By modeling the atomic-level interaction that exists between a small molecule and a protein using the molecular docking technique for natural products, we may shed light on fundamental biochemical processes and define the activity of tiny molecules in the binding sites of target proteins. The two main steps in the docking procedure are predicting the ligand composition and its orientation or position inside these sites (also referred to as pose) and assessing the binding affinity.

Keywords: Coffee, Berries, Marine Algae, Cannabis, Neurodegeneration, Neurodegenerative Disorders, Neuroprotection, Herbal Supplements, Phytochemical, Nutraceutical, Docking, Computational Studies

Phyto-pharmaceutics for the Treatment of Cervical Cancer

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Abstract

Cervical cancer is a cancer of the cervix. It is usually caused by the human papillomavirus (HPV) and can have symptoms like abnormal vaginal bleeding and pelvic pain. In India, cancer of the cervix is the 3rd most common cancer with an incidence rate of 18.3%, and the second leading cause of death with a mortality rate of 9.1% as per GLOBOCAN 2020. There are different treatments available for cervical cancer namely, surgery, radiation therapy, chemotherapy, immunotherapy, and targeted therapy. There are some common drugs, which come under chemotherapy and immunotherapy. They have some side effects including kidney damage, hair loss, low blood cell counts, high blood pressure, increased risk of infections, and skin rash. Radiation therapy in turn shows side effects like fatigue, skin changes in the treated area, nausea, diarrhea, etc. There is a need for cancer treatment modalities that can show low to no side effects for patient compliance. Phytopharmaceutical drugs (herbal medicines) are medications derived from plants that are used for therapeutic purposes. They have been used for centuries in traditional medicine practices and are still used today as alternative or complementary treatments. There is ongoing research on the use of phytopharmaceutical drugs as potential treatments for cervical cancer. Some herbs and compounds, such as green tea extract, curcumin, and resveratrol, have shown promising anticancer properties in laboratory studies.

Keywords: Cervical Cancer, Radiation Therapy, Immunotherapy, Phyto-pharmaceutics, Herbal Compounds

Preventive Action and Antioxidant Properties of a Hydroalcoholic Extract Belong to the Rubiaceae Family

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Abstract

Nephrotoxicity is a significant concern in clinical medicine and drug development. Several factors are responsible, but drug-induced nephrotoxicity accounts for a substantial portion of acute kidney injury cases, leading to significant morbidity and mortality. The mechanisms underlying drug-induced nephrotoxicity are multifaceted and can involve direct cellular damage, inflammation, oxidative stress, mitochondrial dysfunction, and disturbances in intracellular calcium homeostasis. Phytoconstituents, polyphenols, flavonoids, alkaloids, and terpenoids derived from plants, have garnered increasing interest due to their potential nephroprotective properties. Objectives: The main objective of our research is to assess the nephroprotective activity of hydroalcoholic stem extract of a plant belonging to Rubiaceae family to preserve kidney function and prevent or reduce the severity of kidney damage caused by a variety of insults. Methodology: In vitro and in vivo experiments are used to investigate the preventive effects of hydroalcoholic extract of a plant belonging to Rubiaceae family. Assessment of parameters oxidative stress to measure MDA, protein carbonyls, reactive oxygen species (ROS), BUN test, and serum creatinine level was done. Results: Nephroprotective and antioxidant activity was verified after obtaining the statistical data. $P<0.005$. it was concluded that the plant may contain antioxidant and nephroprotective activities. Conclusion: Phytoconstituents represent a promising avenue for the development of nephroprotective therapies. A better understanding of the nephroprotective properties of phytoconstituents could lead to the development of novel therapeutic approaches for the prevention and treatment of nephrotoxicity.

Keywords: Nephroprotective, Oxidative Stress, BUN, Serum Creatinine, Reactive Oxygen Species (ROS), Polyphenols.

Protein Kinase Inhibitors and Hepatocellular Carcinoma

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Abstract

Hepatocellular carcinoma (HCC) holds a major fraction among all the primary liver diseases and is one of the leading causes of cancer-related deaths worldwide. It is a highly aggressive form of liver cancer with a poor prognosis and a high mortality rate. The most common risk factors include fatty liver disease, cirrhosis, obesity, alcoholism, smoking, diabetes, aflatoxin B1, and chronic infection with the hepatitis virus. Management strategies for the HCC include radiotherapy, locoregional (ablation and embolic therapies), and surgical therapies (resection and liver transplantation). However, these therapies are associated with various complexities like poor prognosis, recurrence, and adverse effects, which calls for the development of newer and better therapies for the treatment of HCC and associated risks. Recent research suggests protein kinases as an essential target for the treatment of HCC. The growth and progression of cancer cells have been associated with the deregulation of a wide variety of

protein kinases. Protein kinases belong to an enzyme family which are associated with cell movement, metabolism, cell division motion, immune and nervous system function, and programmed cell death based on their potential to phosphorylate the target protein. The hyperactivity of these kinases is linked with the occurrence of various cancers, including HCC. Because of their crucial function in the signaling systems that drive the features of malignant cells, these are potential therapeutic targets in cancer. The current study delves into the 8 significance of protein kinases in signal transduction along with their biological signaling pathways. Furthermore, it specifically outlines the therapeutic use of kinase inhibitor targets such as phosphoinositide 3-kinases (PI3K), Protein Kinase B (Akt), serine/threonine protein kinase, tyrosine-protein kinase, inositol requiring enzyme type 1 (IRE1), protein kinase R (PKR)-like endoplasmic reticulum kinase (PERK), mitogen-activated protein kinases (MAPK), rat sarcoma virus (RAS), and rapidly accelerated fibrosarcoma (RAF).

Keywords: Hepatocellular Carcinoma (HCC), Protein Kinase Inhibitors, Signaling Pathway, Tyrosine Kinase Inhibitors, Serine/Threonine Kinases

Regulatory Aspects of Phytopharmaceuticals in India, USA, Europe: A Comparative Study

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Abstract

*This study compares the regulatory aspects of phytopharmaceuticals in India, the United States, and Europe. **Background:** Phytopharmaceuticals are purified and standardized fractions of medicinal plants used for diagnosis, treatment, mitigation, or prevention of diseases. The regulation of phytopharmaceuticals in India is in line with regulations in the USA, China, and other countries, emphasizing scientific evaluation and data generation. In India, the new phytopharmaceutical regulation permits development using advanced techniques and encourages research in drug development for academia, researchers, and industry. In the USA, the Food and Drug Administration (FDA) regulates botanical drugs, which are subject to the same regulatory requirements as other drugs. The FDA guides botanical drug development, emphasizing the unique nature of botanical drugs and the need for regulatory policies that differ from those applied to non-botanical drugs. In Europe, herbal preparations are classified into three categories based on their traditional use: traditional use, well-established use, and traditional use with data on safety and efficacy. Herbal medicines are subject to regulatory requirements concerning registration or marketing authorization. **Methods:** The study reviewed primary sources, including scientific articles and regulatory documents, to examine the regulatory frameworks for phytopharmaceuticals in India, the USA, Europe, and other countries. **Conclusion:** The regulatory aspects of phytopharmaceuticals in India, the USA, Europe, and other countries involve scientific evaluation and data generation. In India, the new regulation promotes research in phytopharmaceutical drug development for academia, researchers, and industry. In the USA, the FDA guides botanical drug development, emphasizing the unique nature of botanical drugs and the need for regulatory policies that differ from those applied to non-botanical drugs. In Europe, herbal preparations are classified into three categories based on their traditional use, and herbal medicines are subject to regulatory requirements concerning registration or marketing authorization.*

Keywords: United States of Food and Drug Administration (FDA), Ministry of Health and Welfare (MHFW), Standardization, Post-marketing Surveillance

Regulatory Dossier Requirements for Approval of Biotherapeutics in India as per NDCT Rules 2019

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Abstract

Biotherapeutics including similar biologics, vaccines, recombinant deoxyribonucleic acid (r-DNA) derived products, living modified organisms, monoclonal antibodies, stem cell-derived products, gene therapeutic products or xenografts account for the major portion of new drug approvals granted by CDSCO in recent times. Implementation of New Drugs and Clinical Trial Rules, 2019 has structured the approval process of biotherapeutics in India by including these products under the definition of new drugs, defining rules for the conduct of clinical trials, stating requirements for the grant of permission to import, manufacture and conduct of clinical trial, inclusion of special provisions for academic clinical trials, accelerated/expeditious review approval, timelines for approval and waiver of clinical trials. Further, CDSCO has published Guidelines on Similar Biologics 2016 for guidance on approval of biosimilars and Guidance for the Industry for submission of Quality Safety and Efficacy Documents for Post-approval changes in biological products. The checklist requirements of CDSCO for submission of applications for approval of biotherapeutics in India based on the CTD module are reviewed. The focus is to emphasize the precise data requirements laid in NDCT Rules and Biosimilar Guidelines for approval of biotherapeutics with respect to applicable forms and fees, drug characterization and formulation data requirements, stability testing, nonclinical and clinical trials data, special population studies, and other data requirements. The understanding of the data requirements as per the NDCT Rules and other guidance issued by CDSCO will streamline the dossier submission for manufacturers and importers of biotherapeutics for its approval in India.

Keywords: Biotherapeutics, CDSCO, NDCT Rules, Similar Biologics, Post-approval Changes

Role of Herbal Nanomedicine in the Management of Breast Cancer

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Abstract

Breast cancer is the second largest cause of cancer deaths globally and mostly affects women. Traditional therapies including chemotherapy, radiation, surgery, targeted therapy, hormonal, and immunotherapy are effective yet hazardous and have unintended consequences. Herbal medications are potential alternatives. Ginseng, garlic, black cohosh, turmeric, green tea, echinacea, burdock, flaxseed, and black cumin fight breast cancer. This work focuses on the use of herbal drug nanoformulations for the treatment and management of breast cancer. Herbal therapies are natural, biodegradable, and have fewer negative effects than conventional treatments. They struggle with bioavailability and absorption. Researchers use herbal nanomedicine to treat these issues. Herbal nanomedicine overcomes the drawbacks of traditional herbal medicines by merging nanotechnology with herbal medicine. Nanotechnology makes herbal medications bioavailable and absorbable by forming nanoparticles. Herbal nanomedicine may treat breast cancer for various reasons. It enhances

herbal ingredient transport to the target region, boosting therapeutic effectiveness. It also lowers systemic toxicity and side effects, making therapy safer. Several herbal nanomedicine formulations have shown encouraging results in preclinical studies, such as, Garlic-extracted nanoparticles inhibited breast cancer in animal studies. Nanocarriers with turmeric extract had higher bioavailability and effectiveness than standard turmeric formulations. Herbal nanomedicine addresses these issues by enhancing herbal chemical distribution and efficacy while reducing negative effects. Further study and development are needed to maximize herbal nanomedicine breast cancer therapy potential.

Keywords: Breast Cancer, Herbal Medicine, Nanomedicine, Nanocarrier, Bioavailability

Standardization of Leaves of *Aegle marmelos* Correa, Assessment of Antioxidant Activity, and In Vitro Release of Umbelliferone from In Situ Gel Using Goat Eye

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Abstract

Cataract, a common ocular affliction, At its core, cataract embodies the duality of clarity and obscurity, serving as a poignant allegory for the human condition. The formation of cataracts is linked to both the production of reactive oxygen species (ROS) and the reduction of endogenous antioxidants. Antioxidant compounds like vitamin C (Ascorbic acid), vitamin E (tocopherol), and beta-carotene from the plant Aegle marmelos (Bael) show promising candidates for ROS reduction. ***Objective:*** *The main objective of our research is to assess the antioxidant, anti-inflammatory, and antimicrobial activity of Aegle marmelos and assess of in vitro release of umbelliferone from in situ gel using goat eye.* ***Methodology:*** *Pharmacognostical studies, Physiochemical studies, and phytochemical test studies were performed for preliminary examination, ABTS assay for radical scavenging activity, DPPH & FRAP assay for antioxidant, albumin denaturation method for anti-inflammatory activity, Paper disc diffusion method for antibacterial activity was performed.* ***Results:*** *The Aegle marmelos plant extract showed inhibition of ABTS+, inhibition of DPPH radical, and reduction of triazine complexed Fe3+ to its ferrous form Fe2+ in a dose-dependent manner. it sufficiently inhibits albumin denaturation.* ***Conclusion:*** *Plant extract of Aegle marmelos in ethanol showed positive results for antioxidant, anti-inflammatory, and antimicrobial activity. The performed study result investigates that Aegle marmelos has intrinsic properties to reduce the cataract problem.*

The Effect of Extract of Flower of *Madhuca indica* Against PCOS

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Abstract

Madhuca indica, also known as the butternut tree is widely distributed across the Indo-Pak subcontinent. The secondary metabolites study of flowers of madhuca indica has sown the presence of

antioxidants such as carotene and ascorbic acid, vitamins such as Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Inositol. PCOS is a hormonal disorder that affects women in the reproductive stage. According to ICMR Polycystic Ovarian Disease (PCOD) affects 1 in 5 women in India. Studies have shown that biotin may help with PCOS hair loss and hirsutism. Animal model studies on rats have shown that niacin administration has reduced body weight gain and ovary weight in PCOS rats. Inositol is an insulin-sensitizing agent that could benefit women with PCOS. Further studies have shown the presence of rutin, kaempferol, and quercetin which can help in decreasing inflammation and oxidative stress in women. These molecules have positive effects on the development of follicles and help in improving fertility in women by enhancing the growth and maturation of oocytes, they also help in improving insulin sensitivity. carotene and ascorbic acid may enhance oocyte quality and improve the chance of successful fertilization. Overall, all the secondary metabolites present in the extract contribute to improving the condition of women suffering from PCOD.

Keywords: PCOD, *Madhuca indica*, Phytoconstituent, Oxidative Stress, Inositol

Traditional to Modern Approaches of Phytopharmaceuticals in Special Reference to Diabetes Management and Its Regulations

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Abstract

Since ancient times, it has been in the practice of the utilization of herbs and products derived from natural sources to cure minor to major health complications. Phytopharmaceuticals in modern days as the new drug class is drawing enough attention to its credibility to be utilized for several diseases including metabolic disorders. The approach to connect with metabolic disorders we observe the worldwide alarming statistics on diabetes. Diabetes mellitus, characterized by impaired insulin secretion or action, represents a global health challenge with significant morbidity and mortality. As conventional treatments continue to face limitations, there is a growing interest in exploring alternative therapies, including phytopharmaceuticals, derived from plants. ***Objectives:*** *This abstract comprises its objective to reveal insights into the role of phytopharmaceuticals in the management of diabetes, highlighting their mechanisms of action, efficacy, and regulatory considerations.* ***Methodology:*** *To prepare the abstract and whole presentation, including the data compilation on global statistics on diabetes, reviewing the current publications of interest, and regulations of phytopharmaceuticals.* ***Results:*** *The presenting work emphasizes the significant role of phytopharmaceuticals in offering a rich source of bioactive compounds with potential antidiabetic properties. Moreover, phytopharmaceuticals often exhibit antioxidant and anti-inflammatory properties, which are beneficial in mitigating diabetes-related complications.* ***Conclusion:*** *The work on phytopharmaceuticals represents a promising adjunctive therapy in the management of diabetes and indicates that the continued research, coupled with regulatory oversight, is essential to harness the full therapeutic potential of plant-derived compounds while ensuring patient safety and quality regulations in diabetes management.*

Keywords: Phytopharmaceuticals, Diabetes, Alternative Therapy

Transformation of Herbal Regulatory Framework Worldwide

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Abstract

The process of changing the global framework for herbal legislation has been complex and ever-changing, with notable differences in regulations across various nations and areas. This shift is essential since herbal goods are becoming more and more popular around the world. Herbal medications fall under a variety of regulatory categories, each with different needs and levels of regulation, including complementary and alternative medicine, natural health products, over-the-counter, prescription, and traditional herbal medicines. Some nations, like Malaysia, require herbal product registration, while others, like India, regulate herbal pharmaceuticals under the Drug and Cosmetic Act. Herbal products are regulated in Australia as complementary medicines, with a focus on claims supported by evidence. The FDA classifies botanical products in the US according to their ultimate use and claims. Using full marketing permission or traditional use registration, the European Union has put in place a regulatory framework for herbal therapeutic products. Under the Traditional Herbal Medicinal Products Directive, the UK and other European nations regulate traditional herbal medicinal products. To guarantee the security and effectiveness of herbal products, the necessity of quality control and safety monitoring across the value chain is underlined. Stringent rules and quality requirements are necessary to address serious issues about product quality, composition variances, potential toxicity hazards, and non-reporting.

Keywords: Herbal, Framework, Regulatory, Safety

Unlocking the Potential of Red Algae: Enhancing Hair Health with Natural Formulations

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Abstract

Red algae-based formulations have gained attention in the world of hair care products because of their diverse benefits and natural origin. Red algae is a rich source of nutrients such as vitamins A, B, C, and E, minerals, calcium, iron, magnesium, proteins, and antioxidants such as flavonoids and polyphenols, and all these components play a vital role in the maintenance of hair and scalp health. The ability of red algae to retain moisture and moisturize is one of its most striking features in hair and this is because of the polysaccharides that act as humectants and stimulate as well as retain moisture within hair follicles which ultimately help to reduce hair dryness and flabbiness, as well as enhance the general appearance and management of hair. Red algae-based formulations are promising in the fight against dandruff too because of the presence of components like polysaccharides and polyphenols as well as Flavonoids. Even in many studies, it is proven that many species of red algae also help in preventing hair loss. Overall red algae formulations have a great future with some of the best benefits and this review article focuses on those benefits for nurturing hair.

Keywords: Red Algae, Hair nourishment, Anti-dandruff, Scalp Health, Nutrient Rich, Moisture Retention

TRACK V

Emergency Healthcare and Combat Casualty Management

Abstract

Current Strategies Against Antibiotic Resistance Bacterial Infection

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Abstract

Antibiotic-resistant bacteria (ARB) infections represent a significant worldwide health concern in the modern era. Promising strategies to tackle antibiotic resistance include seeking alternatives to current antibiotics or sensitizing ARB in addition to developing new antibiotics to combat it. The most promising anti-ARB strategies are currently under development. These strategies include the following: (i) Novel antibiotics are discovered by modifying known antibiotics, screening small-molecule libraries, or investigating novel locations; (ii) the efficacy of known antibiotics is increased by metabolic stimulation or by loading a novel, more effective delivery system; (iii) alternative antibiotics, such as bacteriophages and their encoded endolysins, anti-biofilm medications, probiotics, nanomaterials, vaccines, and antibody therapies, are developed as alternatives to conventional antibiotics. Preclinical or clinical research indicates that these therapies have a lot of potential against ARB. It is anticipated that a few anti-ARB products will be commercially available shortly.

Keywords: Antibiotic-resistant Bacteria, Endolysins, Anti-ARB, Anti-biofilm

Emergency Medical Device Regulation: A Global Perspective

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Abstract

Background: *The abstract provides a deep insight into the critical aspects of emergency care regulation on a global scale. It highlights the importance of governance mechanisms in formalizing health system frameworks to ensure the highest attainable standard of health, focusing on accessibility, acceptability, and quality of emergency care services.* ***Objective:*** *The abstract aims to provide a comprehensive overview of emergency medical device regulation from a global standpoint. By synthesizing existing literature and regulatory frameworks, it seeks to identify common trends, challenges, and best practices in regulating emergency medical devices across different regions.* ***Method:*** *A systematic review of relevant literature was conducted to gather insights into emergency medical device regulation worldwide.* ***Conclusion:*** *The abstract provides valuable insights into the complex landscape of emergency medical device regulation from a global standpoint. It emphasizes the need for robust governance mechanisms to ensure equitable access to emergency care services and underscores the importance of aligning regulatory frameworks with evolving healthcare needs. Additionally, collaboration among regulatory authorities, healthcare providers, manufacturers, and other stakeholders is crucial for developing robust regulatory frameworks that prioritize patient safety while facilitating timely access to life-saving devices during emergencies. By examining key provisions in national constitutions and international treaties, the article advocates for a rights-based approach to emergency care system development to enhance healthcare quality, accessibility, and affordability on a global scale.*

Keywords: Medical Device Regulation, Emergency Devices, International Harmonization, Emergency Response Systems, Public Health Emergencies

Emergency Use Drugs and Its Regulatory Framework

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Abstract

In response to escalating global health crises, the expedited approval pathways for Emergency Use Drugs (EUDs) have become essential. This systematic review examines and compares the regulatory frameworks governing accelerated drug approval in key countries such as the USA, Europe, India, China, Australia, Canada, and Japan. The objective is to analyze existing guidelines and identify areas for potential harmonization to enhance the efficiency of international accelerated approval processes. A comprehensive literature search encompassing official regulatory agency websites and scientific databases yielded 800 citations, eventually filtered to 30 relevant sources using PRISMA methodology. These sources explain the prioritization of EUDs across all examined nations, typically necessitating sponsor-requested priority review based on early clinical data indicative of therapeutic benefit. Furthermore, despite differences in regulatory frameworks, all countries understand the importance of accelerated access to critical treatments during emergencies. The accelerated approval mechanisms have proven pivotal in responding promptly and effectively to public health crises, though not without risks. Ensuring the safety and efficacy of accelerated EUDs remains important, requiring strong pre- and post-approval administration. This review highlights the significance of international collaboration and standardization in navigating the balance between feasibility and safety in drug approvals during emergent healthcare challenges.

Keywords: Post-approval Administrations, Pre-approval Administrations, Accelerated Approval

Environmental Forensic Investigation of Chemical Toxicants Affecting Human Health and Ecosystems

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Abstract

Chemical toxicants pose a significant threat to environmental integrity and human health, needing an in-depth study of their sources, behavior, and impacts. That is how environmental forensics, an interdisciplinary field, came to be, playing an important role in finding and understanding the sources, routes, and effects of contaminants in the environment. With increased concern about the ecological consequences of human activities, environmental forensics has evolved as an important tool for prosecuting environmental crimes, assessing pollution occurrences, and assisting with regulatory compliance. In this abstract, we discuss the crucial role of environmental forensics in defining ecological consequences and the use of modern analytical techniques to monitor and regulate pesticides and PCBs in the environment. In this abstract, we discuss the crucial role of environmental forensics

in defining ecological consequences and the use of modern analytical techniques to monitor and regulate pesticides and PCBs in the environment. The use of sophisticated techniques such as isotope analysis, fingerprinting, and molecular diagnostics in environmental forensics allows for the exact identification of contaminants and their dispersion patterns. Furthermore, the use of geographic information systems (GIS) and statistical modeling improves our spatial and temporal understanding of pollution episodes. The use of forensic methods aids regulatory enforcement operations by providing evidence for liability attribution and compliance monitoring. Environmental forensics helps to inform evidence-based decision-making and risk management techniques by explaining the cause-and-effect linkages between pollutant exposure and ecological outcomes. Furthermore, these chemical toxicants have a negative impact on ecosystems, resulting in biodiversity loss, habitat degradation, and ecosystem disruption, with cascade consequences for ecosystem services and human well-being. Environmental forensics is a useful tool for identifying the sources of these contaminants, discriminating between historical and contemporary inputs, and measuring their persistence and bioaccumulation in ecosystems.

Keywords: Environmental Forensics, Chemical, Toxicants, Ecosystem, Health

Evaluation of the Radiological Contaminants on Dermal Surfaces

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Abstract

The use of nuclear power generation and radioactive materials in agriculture, research, medicine, mineral explosion, testing facilities, etc. has increased. Skin is the largest organ and the primary protective shield of the human body. Dermal contamination with radiological agents can occur intentionally or through accidental exposure at the workplace. After contamination, they get deposited on the exposed skin of the victims from where they may penetrate blood circulation causing toxic effects. Contamination of the skin with radionuclides such as Cesium-137 and Strontium-90 emitted during nuclear reactor accidents and nuclear holocaust, are especially dangerous due to their long half-lives. The nuclear catastrophe of Fukushima and the radiological incidence of Mayapuri show us the urgency of the evaluation of these radiological contaminants on dermal surfaces and the development of dermal decontamination formulations. Over the past few decades, numerous dermal decontamination products have been developed, aiming towards rapid and effective removal of these hazardous substances. Conventional approaches, such as soap and water, bleaches have limited efficacy and toxic effects. The Personal Decontamination Kit (PDK), Shudhika, and Remocon are a few examples of dermal decontamination formulations targeting individual contaminants. Still, there is a lack of a single pharmaceutical formulation capable of removing a broad spectrum of radiological contaminants from the skin. We have optimized and prepared the dermal formulations for radiological decontamination and evaluated their efficacy against various contaminants of interest. Since the formulation is to be used topically on the skin, studies on skin permeation, penetration, and interaction were carried out to ascertain formulation mechanisms and safety.

Keywords: Radiological, Decontamination, Hazardous Agents, Disaster Management

General Insights into STD

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Abstract

Background: *STDs are caused by bacteria, viruses, fungi, or parasites, and can be passed through vaginal, oral, and anal sex. Many STIs have no early symptoms, so people can have an infection but do not know about it. Common STDs include HIV and AIDS (in 2022, 39 million) genital warts (HPV) Hepatitis B (in 2019, 296 million) Chlamydia (in 2020, 128.5 million) Gonorrhea (in 2020, 82.4 million) Syphilis (in 2019, 49.71 million).* ***Objective:*** *To know about the general aspects of STDs. If you are not comfortable talking with your regular healthcare provider about STDs, many clinics provide confidential and free or low-cost testing for all adults and adolescents from ages 13 to 64, all sexually active women, everyone pregnant, all sexually active gay, bisexual, and other men who have sex with men.* ***Methodology:*** *Extensive literature serves.* ***Results:*** *STIs can cause cervical cancer or any other cancers Infertility Pregnancy complications increased risk of HIV infection. Its treatment varies and may include medication and practicing safe sex to avoid spreading. Bacterial STDs can be treated with antibiotics or other treatment plans like malaria which causes a rising temperature that kills off syphilis bacteria from one body.* ***Conclusion:*** *STDs can be treated and prevented easily if one has the right information.*

Keywords: Common STDs, HIVs, Chlamydia, STIs, Sexually Active Gay

Identification of Potential Small Molecules Targeting Drug-resistance Targets of *Escherichia coli* Using Structure-based Drug Design Approach

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Abstract

The escalating prevalence of drug-resistant Escherichia coli strains poses a formidable challenge to global public health, necessitating the pursuit of novel therapeutic avenues. With conventional antibiotics increasingly failing to provide effective treatment options, urgent action is imperative. Consequently, this study adopts a structure-based drug design (SBDD) methodology to discern potential small molecules capable of addressing drug-resistant mechanisms within Escherichia coli. By leveraging the computational method, we aim to identify promising compounds with heightened binding affinities to these resistant targets. Through this approach, we endeavor to contribute to the development of alternative therapeutic interventions to mitigate the burgeoning threat of drug-resistant bacterial infections. ***Objectives:*** *Identification of potential hit molecule targeting drug-resistance target*

of E. coli docking studies of selected hits. ***Methodology:*** *In the methodology, the target protein is selected and prepared, followed by the curation of a ligand database. SBDD methods are then employed, for virtual screening to identify potential hits, followed by molecular docking simulations.* ***Results:*** *Virtual screening identified several candidate compounds from large chemical libraries that exhibit favorable interactions with the active site of different drug-resistance targets. The selected compounds demonstrate high binding affinity.* ***Conclusion:*** *Through the integration of computational modeling and virtual screening, we successfully identified small molecules with the potential to combat drug-resistance in Escherichia coli. Further experimental validation of these compounds is warranted to evaluate their efficacy and safety profiles, ultimately paving the way for the development of novel therapeutic agents to address the growing threat of drug-resistant bacterial infections.*

Keywords: Alternative Treatment Options, Antibiotic resistance, Structure-based Drug Design

Management of Radiation Contaminated Blast Wounds Using Hemostatic Agents

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Abstract

Explosions, whether intentional or accidental, cause mass destruction with multiple casualties. Victims succumb majorly to four types of blast injuries namely, primary (rupture of gas/fluid interfaces), secondary (penetrating and perforating injuries), tertiary (penetrating injuries and blunt trauma), and quaternary (toxic substance contamination). Radiological Dispersal Devices (RDDs), also known as dirty bombs, introduce a quinary injury wherein the radiological contaminants induce complex systemic toxicological effects such as radiation-induced coagulopathy (RIC). These blast injuries cause internal or external hemorrhages, whether, at the wound site or distal, resulting in exsanguination. Currently, due to a large number of casualties only minimal acceptable care is provided with no specific on-site treatment strategies. Therefore, the best on-site intervention to increase survivability is a quick-action self-applicable advanced hemostatic agent. These advanced hemostatic agents should be tailored towards comprehensive wound management and countering the effects of radiation exposure-induced pathophysiology. A potential approach can be the development of a polymer-based sealing agent, with complexation properties and superior active hemostatic properties (via platelet activation or fibrin formation) targeted against the pathophysiology of RIC. The physical barrier should prevent fluid leakage and minimize further exposure. Also, it should adhere to wound beds, withstand arterial pressure, and have strong bioavailability. Further biomaterials can also be incorporated to address radiation burns. Rigorous clinical validations should be conducted to optimize the efficacy of such interventions in real-world settings. The development of these advanced hemostatic agents can transform the therapeutic landscape for radiation blast injuries, improving survivability in both civilian and military settings.

Keywords: Emergency Medicine, Casualty Management, Wound Management, Hemorrhage, Radiation Toxicity

Novel Approach to Mitigate Radiation Effects: Modulating Hematopoietic Recovery Via Mitochondrial Permeability Transition Pore Inhibition

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Abstract

Exposure to acute whole-body radiation often results in a hematopoietic form of acute radiation syndrome (hARS) due to the loss of Hematopoietic Stem and Progenitor Cells (HSPCs), leading to compromised hematopoiesis. While Hematopoietic Stem Cell (HSC) transplant remains the established modality for hARS management, challenges such as timely HLA matching of donors restrict its widespread application. Alternatively, Umbilical Cord Blood (UCB) stem cells have emerged as a promising resource, yet their limited quantity poses constraints. This study introduces a novel strategy aimed at enhancing HSC transplantation efficiency in hARS through the utilization of a potent inhibitor of the mitochondrial permeability transition pore (MPTP). Subsequent investigations using developing zebrafish models revealed the capacity to induce a hypometabolic state and delay radiation-induced damage. Further experiments employing reporter zebrafish demonstrated the ability to accelerate erythropoiesis and expand HSCs. Notably, short-term ex-vivo exposure to murine bone marrow cells led to a significant increase in CXCR4 expression, HSPC migration, proliferation, and colony-forming potential. In-vivo studies corroborated these findings, showing that exposure facilitated enhanced homing and subsequent repopulation of transplanted HSPCs. This novel intervention presents a promising and cost-effective approach to improving HSC transplantation efficiency, addressing critical limitations associated with traditional methods, and holds significant potential for the management of hARS and other hematological disorders.

Keywords: Hematopoietic form of Acute Radiation Syndrome, Radiation Countermeasure, Transplantation, Hypometabolic State, Mitochondria

Novel Composite Hemostatic Dressing Material: A New Way to Manage Combat Casualty and Prolonged Field Care

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Abstract

Hemostatic beads are necessary in instances where stopping blood loss immediately is crucial, such as trauma from civilian vehicle accidents and combat casualty wounds (bullet wounds, knife stabs, projectile wounds). This study emphasizes a novel composite hemostatic bead that was produced by an inotropic gelation technique employing zeolite and chitosan. The novel combination of zeolite, a microporous aluminosilicate mineral, with chitosan, a biopolymer derived from chitin, results in the hemostatic properties of the bead. Excellent swelling and capacity for absorption are achieved by accurately regulating the porosity and shape of the bead through the use of the inotropic gelation technique. The intrinsic hemostatic properties of chitosan, especially its positive charge along with its interactions with blood components, strengthen the beads' ability to stop bleeding. The porous shape of

the beads allows blood to be absorbed more quickly and platelets to aggregate more quickly, aiding in hemostasis and plaque formation. These chitosan-zeolite hemostatic beads offer several advantages in both military and civilian situations when quick action is needed. Their biocompatibility reduces the risk of adverse responses, making them suitable for a range of patients. Moreover, the beads won't need to be removed due to chitosan is biodegradable as well as antibacterial activity can provide prolonged field care for a maximum of 72-96 hours without harming the surrounding tissue. As a result of their increased swelling and absorption capacity, biocompatibility, and biodegradability, the inotropic gelation-synthesized chitosan-zeolite hemostatic beads hold tremendous potential for treating trauma in civilian patients as well as war wounds. Furthermore, because chitosan is biodegradable, the beads won't need to be removed because they gradually break down without damaging surrounding tissue, which is particularly useful in civilian trauma scenarios where extended hospital stays are not desired.

Keywords: Hemostatic Beads, Chitosan, Zeolite, Inotropic Gelation, Combat Wounds, Trauma Management

Optimization and Development of Chitosan, Gelatin, and PVA Composite Scaffold for Muscle Repair and Regeneration

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Abstract

High-impact incidents such as blast traumas, accidents, and combat injuries during military conflicts cause muscle damage and loss resulting in morbidity. The regeneration potential of skeletal muscle is very restrictive which makes healing a difficult task. The current modalities for muscle repair/regeneration include surgical procedures, minimally invasive physical rehabilitation, acupuncture, cell transplantation, and the use of scaffolds. In this study, we aimed to develop a biomaterial-based functional scaffold for muscle regeneration. Initially, we selected biomaterials through literature mining (PubMed). The results were corroborated with data mining in Gene Expression Omnibus (GEO) to enrich genes involved in the regulation of muscle cell proliferation and differentiation. The biomaterials were optimized by response surface methodology (RSM), and characterized by Scanning Electron Microscope (SEM) and Fourier Transform Infrared (FTIR). The physiological properties i.e., swelling (in PBS), degradation (in PBS and PBS with lysozyme), and mechanical strength (Universal Testing Machine) were evaluated. The biocompatibility and proliferation potential of the scaffold was checked in L929 cell line and mouse Mesenchymal Stem Cells (mMSCs). Further, scaffolds were evaluated for their MSCs differentiation potential into satellite and muscle cells. By data mining, we found chitosan and gelatin with pH and thermo-responsive properties. The chitosan (2%) and gelatin (2%) were mixed with PVA (2% and 15%) to enhance the mechanical properties of the composite. The freeze-dried scaffold showed uniform, porous, and rough surfaces. The mechanical strength of the scaffold lies within the range of strength possessed by muscle tissues compared with control groups (Chitosan, Gelatin, and PVA). The scaffold showed >2-fold increase in viability of L929 cells and MSCs. The scaffold-induced differentiation of MSCs into satellite muscle cells. The designed scaffold composition significantly enhanced MSCs differentiation into satellite cells for muscle repair and regeneration. The composition can also be used in the form of injectable hydrogels due to its pH and thermo-responsiveness to enhance the drug loading efficiency.

Keywords: Regeneration, Stem Cells, Differentiation, Optimization, Response Surface Methodology, Data Mining, Gene Expression

Pharmacoeconomic Evaluation of Anti-tuberculosis Therapy in India

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Abstract

Background: *India bears the highest tuberculosis (TB) burden globally, contributing approximately 20% of the total TB cases worldwide. The country is facing a huge challenge with an estimated prevalence of 3 million TB cases, witnessing 2 million new cases annually. India ranks second globally in terms of multidrug-resistant TB (MDR-TB) burden with an estimated 99,000 new MDR-TB cases annually. Pharmacoeconomic analysis assists policymakers and healthcare providers in assessing rational drug use affordability and accessibility. It guides decision-making by evaluating cost-effectiveness, aiding resource allocation, and promoting optimal patient care. Through economic analysis, it enhances drug accessibility ensuring efficient healthcare utilization and affordability.* ***Objective:*** *To get an insight into pharmacoeconomic analysis for the evaluation of anti-TB drugs.* ***Method:*** *Collection of data from databases like PubMed, ScienceDirect, and Google Scholar.* ***Result:*** *Researchers found that using second-line drugs after first-line treatment failure was more cost-effective than sticking to first-line drugs only. For confirmed MDR-TB cases, using standardized second-line treatment (STR2) was cost-effective compared to DOTS. Individualized treatment for MDR-TB after first-line failure (ITR1) was even more beneficial compared to STR2. Strategies using second-line drugs (STR2 and ITR1) remained cost-effective under different assumptions about costs, effectiveness, and TB prevalence. Overall, the study suggests that incorporating second-line drugs after first-line treatment failure can provide better outcomes at reasonable costs in TB treatment.* ***Conclusion:*** *Pharmacoeconomic analysis assists policymakers and healthcare providers in assessing rational drug use affordability and accessibility.*

Keywords: TB Burden, TB Regimen, DOTS, MDR-TB, Pharmacoeconomic Analysis, WHO Funding

Pharmaco-economic Study on Commonly Available Analgesic Drugs

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Abstract

Pharmacoeconomics refers to the scientific discipline that compares the value of one pharmaceutical drug or drug therapy to another. It is a sub-discipline of health economics. A pharmacoeconomic study evaluates the cost and effects of a pharmaceutical product. Pharmacoeconomic studies serve to guide optimal healthcare resource allocation, in a standardized and scientifically grounded manner. Noncompliance with prescribed drug regimens is a widespread phenomenon that results in decreased efficacy and is often associated with increased medical expenditures. Despite this, economic evaluations

based on decision analytic models rarely incorporate noncompliance to allow for the differences in compliance observed between controlled clinical trials and routine clinical practice. They are more suited to provide the data needed to estimate the real benefit of the treatment in actual care. When costs are applied and compared with these benefits, you can estimate the efficiency of allocating resources to this new drug. The pharmacoeconomic evaluation was conducted on analgesics. The largest category for pain therapy includes nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and muscle relaxants. The drugs included in the study are Paracetamol and its combination, nimesulide and its combination, ibuprofen, thiocolchicoside, chlorzoxazone, tramadol, and aspirin. This study also helps us to know the different types of dosage forms of a particular drug available in the market. To analyze the cost-effectiveness of analgesics and provide for rational drug use in the clinic. The pain relief rate and adverse reactions of different groups were observed and pharmacoeconomics was undertaken.

Keywords: Pharmacoeconomic, Anti-inflammatory, Analgesics, Pharmaceuticals, Routine Clinical Trial, NSAIDS

RBC Membrane-associated Proteins (RMAPs) Based Proteomic Strategies for High Throughput Radiation Bio-dosimetry

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Abstract

Identification and validation of RBC membrane-associated proteins (RMAPs) based proteomic strategies for high throughput radiation bio-dosimetry in triage situations. ***Objectives:*** *This study identifies radiation-responsive RMAPs in rabbits, forming the basis for RMAPs-based proteomic strategies for high-throughput radiation bio-dosimetry in radiological/nuclear incident triage.* ***Methods:*** *A single acute total body-radiation dose of 2 Gy at a dose rate of 0.746 Gy/min was given to New Zealand White Rabbits and following this RMAPs were collected at early time points of 6 h till the 7 d. Using in-gel proteomics strategies followed by MALDI- TOF-MS analysis of the differentially expressed radiation-responsive RMAPs could identify seven proteins. The biological functions of these proteins were investigated through bioinformatics analysis.* ***Results:*** *Seven RMAPs viz., PVALB, PRKCB, GPD1, CP2G1, CSNK2B, ATP1B1, and TPI1 were identified as potential biomarker candidates based on fold change, radiation responsiveness, GO, pathway enrichment, and hub position in the PPI network. Most proteins, according to KEGG enrichment, are involved in cellular radiation response, oxidative damage, DNA repair, apoptosis, immune response, and cell signaling.* ***Conclusion:*** *This study establishes the foundation for RMAPs-based proteomic strategies for high throughput radiation bio-dosimetry in triage situations involving radiological/nuclear incidents.*

Keywords: RMAPs-based Proteomic Strategies, Bioinformatic Analysis, Biomarkers, RMAPs

Recent Advance on Adverse Drug Reactions of Beta Blockers in the Treatment of Hypertension

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Abstract

This paper presents the most recent information on the common and significant adverse drug reactions (ADRs) associated with beta-blocker medications and the novel methods by which the adverse drug reactions can be reduced. Hypertension is a common and serious health condition that affects millions of people worldwide. Medication known as beta blockers are commonly used to treat hypertension. To raise awareness among patients and healthcare providers, this presentation gives a general review of the ADRs connected to beta-blocker medications as well as other drug interactions. ***Objectives:*** *To provide a brief overview of the current knowledge of ADRs linked to beta blockers and various drug interactions used to treat hypertension. To examine current research results and developments in the knowledge of beta-blocker related ADRs. It will help in controlling and avoiding serious ADRs and drug interactions.* ***Method:*** *Thorough literature search by various scientific journals.* ***Results:*** *This could include insights into the mechanisms underlying specific ADRs, identification of novel drug interactions, and emerging strategies for ADR prevention and management. The results would discuss the significance of drug–drug interactions involving beta blockers in hypertensive patients.* ***Conclusion:*** *The conclusion will outline the clinical implications of the identified drug–drug interactions as well as ADRs. This could involve recommendations for healthcare providers regarding medication selection, dosing adjustments, or monitoring strategies to minimize the risk of ADRs and optimize therapeutic outcomes.*

Keywords: Hypertension, Beta blockers, Adverse Drug Reactions, Drug–Drug Interactions

The Emerging Role of Nutraceuticals in Disease Management

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Abstract

Bioactive substances found in food and supplements called "nutraceuticals" have attracted a lot of interest due to their potential therapeutic benefits in the treatment of a wide range of illnesses. The various functions and uses of nutraceuticals in the prevention and treatment of a wide range of medical disorders are examined in this review. Compounds such as omega-3 fatty acids and plant sterols are effective in lowering blood pressure, cholesterol, and heart disease risk in cardiovascular illnesses. Similarly, a lower incidence of cognitive decline, including Alzheimer's disease, and enhanced cognitive performance are linked to antioxidants present in fruits, green tea, and certain fatty acids. Nutraceutical therapies are beneficial for metabolic illnesses including diabetes and obesity. Certain nutrients, such as capsaicin, green tea extract, and chromium, have been shown to have the ability to

control blood sugar levels and aid in weight loss. Nutraceuticals are essential for maintaining healthy bones and joints. They help prevent osteoporosis and relieve joint pain since they contain glucosamine, chondroitin, calcium, and vitamin D. Moreover, probiotics found in nutraceuticals help manage digestive diseases by fostering gut health and reducing symptoms of illnesses like irritable bowel syndrome. Collagen peptides help keep skin hydrated and supple, and antioxidants and vitamins help the immune system and eye health. To sum up, nutraceuticals present a viable option for the therapy and prevention of disease in a range of medical problems. To clarify their modes of action, determine the best dosages, and assess their long-term safety and efficacy, more research is necessary. Regulatory agencies, medical practitioners, and researchers must work together to fully use nutraceuticals' potential to enhance public health outcomes.

Keywords: Cognitive Disorders, Metabolic Disorders, Bone and Joint Health, Digestive Disorders, Skin Ailments, Immunological Function, Eye Health

Unveiling the Complexities: A Comprehensive Review on Non-alcoholic Steatohepatitis

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Abstract

NASH has become a major health problem worldwide as its incidence rises and it can develop into very severe liver disease, such as cirrhosis and hepatocellular carcinoma. Recent investigations have provided new information into NASH pathogenesis, diagnostic techniques, and therapy giving the basis for efficient disease management. The complex interplay between genetic, metabolic, and environmental factors in the onset of NASH has been the subject of recent investigations. Genome-wide association studies have discovered new risk loci, revealing the complicated genetic component of NASH. In addition, the development of omics technologies has made it possible to detect the important molecular pathways that contribute to hepatic lipid accumulation, inflammation, and fibrosis and, hence, provide potential therapeutic targets. ***Introduction:*** *Accurate diagnosis and risk stratification are required for effective NASH management. Non-invasive imaging modalities like transient elastography and magnetic resonance imaging have proved useful in the evaluation of liver fibrosis and steatosis, thus reducing the need to carry out invasive liver biopsies. Biomarker discovery projects have also identified potential markers for the early diagnosis and prognosis of NASH, thus assisting in clinical decision-making. The therapeutic approaches for NASH have evolved at a rapid pace, with an expanding armamentarium of medications that target different pathogenic pathways. Multiple phase III clinical studies have shown the efficacy of novel agents such as FXR ligands, GLP-1 receptor agonists, and ACC inhibitors in improving liver histology and metabolic parameters in patients with NASH, thus opening the path for possible regulatory approval and clinical adoption.* ***Results:*** *Significant progress has been made in NASH research and our knowledge of its pathophysiology, diagnostic methods, and therapeutic options has greatly expanded.* ***Conclusion:*** *Multi-disciplinary cooperation is essential to convert these findings into better outcomes for patients and address the emerging NASH public health burden.*

Keywords: ACC Inhibitors, NASH, Genomic, Fibrosis, FXR Ligands

The Rise of E-pharmacy in India

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Abstract

The advent of e-pharmacy platforms has revolutionized healthcare delivery in India, driven by socio-economic factors, technological advancements, and regulatory changes. Traditional brick-and-mortar pharmacies struggled to meet the demands of a growing population, especially in underserved rural and semi-urban areas. E-pharmacies address this gap by offering convenient, affordable access to medications through intuitive smartphone apps, artificial intelligence-driven prescription analysis, and efficient supply chain management. Key drivers of this shift include increased smartphone usage, internet penetration, and digital payment systems, which facilitate the rapid growth of e-pharmacies. These platforms provide doorstep delivery and teleconsultation services, enhancing healthcare accessibility. However, challenges such as regulatory concerns over drug authenticity, data security, and prescription verification remain significant. The legal framework, including the Drugs and Cosmetics Act of 1940 and the Information Technology Act of 2000, plays a crucial role in governing e-pharmacies. Despite resistance from traditional pharmacies and regulatory ambiguity, e-pharmacies offer opportunities to improve medication adherence, access in remote areas, and transparency in drug pricing. Collaboration among government agencies, healthcare providers, pharmaceutical companies, and tech developers is essential to overcome these obstacles, ensure patient safety, and expand access to high-quality healthcare. The rise of e-pharmacy in India signifies a transformative shift in the pharmaceutical industry, promising enhanced healthcare delivery and improved patient outcomes.

Keywords: E-pharmacy, India, Healthcare Delivery, Digital Transformation, Technology in Healthcare