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ABSTRACT BOOK

NATIONAL CONFERENCE 2026

20 MARCH 

On

**"REDEFINING PHARMACY EDUCATION THROUGH
RESEARCH ,TECHNOLOGICAL INNOVATION &
HOLISTIC STRESS MANAGEMENT"**

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OM SAI VINDHYA COLLEGE OF PHARMACY, MIRZAPUR



TISUHI MARIHAN, MIRZAPUR, 231310, UTTAR PRADESH INDIA

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NATIONAL CONFERENCE

20 MARCH 2026

**"REDEFINING PHARMACY EDUCATION THROUGH
RESEARCH, TECHNOLOGICAL INNOVATION &
HOLISTIC STRESS MANAGEMENT"**



Organized by

OM SAI VINDHYA COLLEGE OF PHARMACY

TISUHI MARIHAN, MIRZAPUR, 231310, UTTAR PRADESH INDIA



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PREFACE

It is with great pride and enthusiasm that we present the Abstract Book of the National Conference on “Redefining Pharmacy Education through Research, Technological Innovation & Holistic Stress Management.” This conference has been conceptualized as a dynamic platform to bring together academicians, researchers, healthcare professionals, and students from across the country to exchange knowledge, share innovative ideas, and address the evolving challenges in pharmaceutical education and practice.

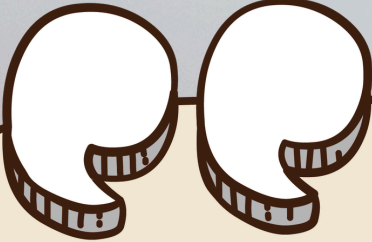
In recent years, pharmacy education has undergone a significant transformation, driven by rapid advancements in scientific research, digital technologies, and an increasing emphasis on patient-centered healthcare. The integration of modern tools such as artificial intelligence, data analytics, and innovative drug delivery systems has not only enhanced the learning experience but also expanded the scope of pharmaceutical sciences. At the same time, the growing academic and professional demands have highlighted the importance of mental well-being, making holistic stress management an essential component of a successful healthcare career.

This conference aims to bridge the gap between traditional teaching methodologies and emerging trends by fostering a multidisciplinary approach. It emphasizes the importance of research-oriented learning, technological adaptation, and the cultivation of resilience and well-being among students and professionals. The diverse range of abstracts compiled in this book reflects the dedication, creativity, and scientific rigor of contributors who are actively working towards advancing the field of pharmacy.

We sincerely appreciate the efforts of all authors, reviewers, and organizing committee members whose valuable contributions have made this publication possible. We also extend our gratitude to the keynote speakers and participants for enriching this academic gathering with their insights and experiences.

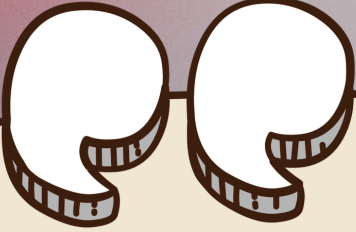
We hope that this Abstract Book will serve as a valuable resource for knowledge dissemination, inspire future research, and contribute to the continuous evolution of pharmacy education.

— **Organizing Committee**



It gives me immense pleasure to extend my warm greetings on the occasion of the National Conference on “Redefining Pharmacy Education through Research, Technological Innovation & Holistic Stress Management.” This conference reflects a progressive vision toward transforming pharmaceutical education in alignment with modern scientific advancements. I appreciate the efforts of the organizing committee in creating a platform that encourages innovation, research excellence, and the well-being of future healthcare professionals. I wish the conference great success.

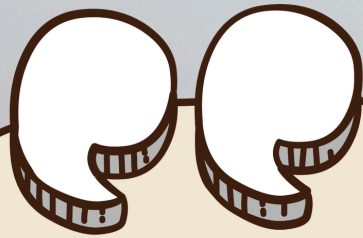
Chief Patron



I am delighted to be associated with this National Conference that focuses on redefining pharmacy education through a balanced approach of research, technology, and mental wellness. In today’s competitive environment, such initiatives are essential to prepare students not only academically but also emotionally. I congratulate the organizers and extend my best wishes for a successful event.

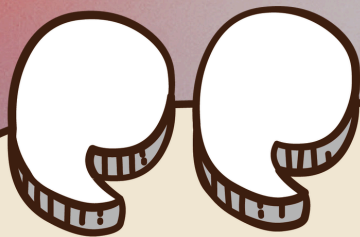
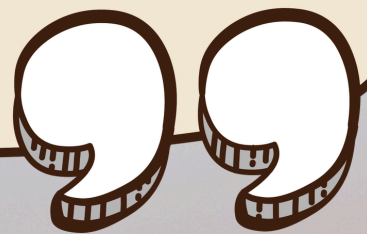
Patron





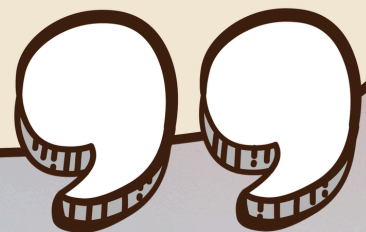
It is a matter of great honor to welcome all participants to this National Conference. The theme highlights the need for integrating research-driven education with technological innovation while addressing the critical aspect of stress management. I believe this conference will open new avenues for discussion, collaboration, and academic excellence. I extend my sincere thanks to all contributors and participants.

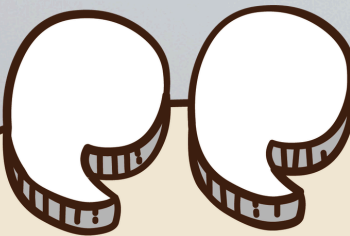
Conference Chairperson



It gives me great pleasure to present this Abstract Book as part of the National Conference. The enthusiastic response from participants reflects the growing interest in research and innovation in pharmacy education. I sincerely thank all authors, reviewers, and committee members for their valuable contributions. I hope this conference proves to be a meaningful learning experience for all.

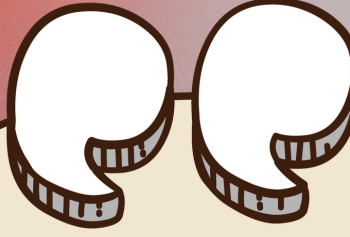
Organising Secretary





The quality and diversity of abstracts received for this conference highlight the evolving landscape of pharmaceutical sciences. This platform encourages critical thinking, research excellence, and academic collaboration. I appreciate the efforts of all contributors and wish the conference a successful outcome.

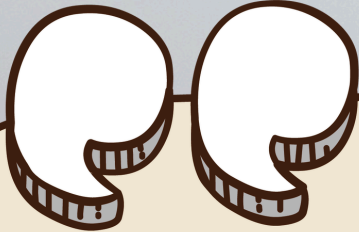
Scientific Committee Head



We are proud to present this collection of abstracts that represent innovative research and scholarly work in the field of pharmacy. Each submission reflects dedication and scientific curiosity. We hope this publication serves as a valuable academic resource and inspires further research.

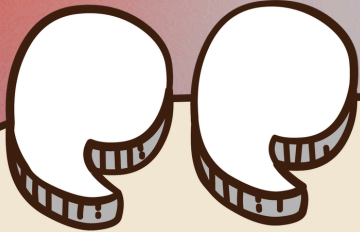
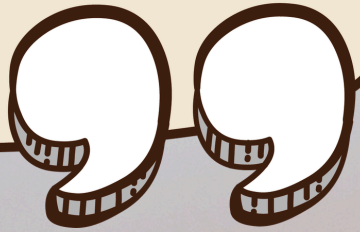
Editorial Board





It is a privilege to be associated with this conference focusing on innovation and holistic development in pharmacy education. The inclusion of stress management as a key theme is highly commendable. I congratulate the organizers for their vision and wish the conference great success.

Guest of Honour



I am honored to be part of this prestigious National Conference. The theme is highly relevant in today's context where technology and research are rapidly transforming healthcare education. I look forward to insightful discussions and knowledge exchange during this event.

Keynote Speaker



ABOUT THE CONFERENCE

Conference Details

The National Conference on “Redefining Pharmacy Education through Research, Technological Innovation & Holistic Stress Management” is a significant academic initiative aimed at bringing together scholars, researchers, academicians, industry experts, and students from across the country. The conference serves as a platform for exchanging knowledge, presenting innovative research, and discussing emerging trends in pharmaceutical education and healthcare practices. It is designed to promote academic excellence, interdisciplinary collaboration, and professional development in the field of pharmacy.

Theme Explanation

The theme of the conference emphasizes the urgent need to transform traditional pharmacy education by integrating modern research methodologies, advanced technological tools, and a holistic approach to mental well-being. With rapid advancements in pharmaceutical sciences and healthcare technologies such as artificial intelligence, digital health systems, and innovative drug delivery approaches, it is essential to equip future pharmacists with updated knowledge and practical skills. Additionally, recognizing the increasing levels of stress among students and professionals, the conference highlights the importance of holistic stress management to ensure overall well-being and productivity.

Objectives of the Conference

- To promote research-oriented learning and innovation in pharmacy education
- To explore the role of emerging technologies in transforming pharmaceutical sciences
- To provide a platform for researchers and students to present their work
- To encourage collaboration between academia, industry, and healthcare sectors
- To address mental health challenges and promote holistic stress management strategies

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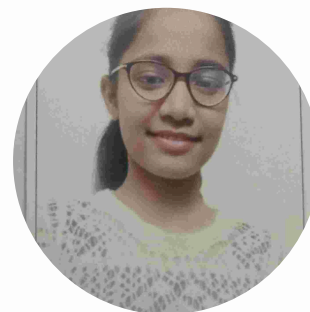
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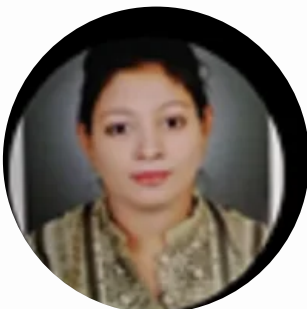
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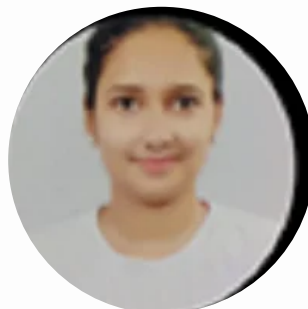
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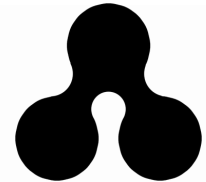


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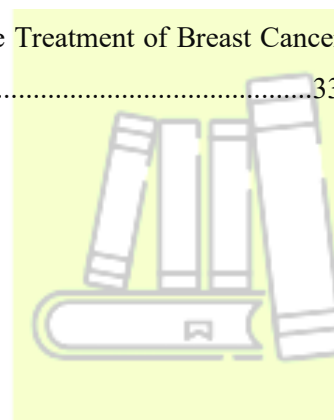
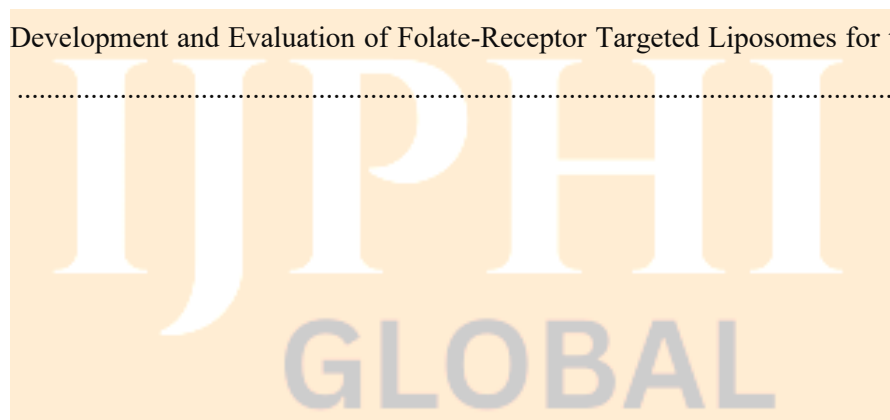


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Innovative CRISPR Platforms for Targeted and Personalized Treatment

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Abstract

The emergence of clustered regularly interspaced short palindromic repeats (CRISPR)–Cas systems has revolutionized genome engineering and opened new avenues for targeted and personalized therapeutics. CRISPR-based platforms offer unprecedented precision in gene editing, enabling site-specific modification, correction, or regulation of disease-causing genes. Recent advancements, including CRISPR-Cas9, Cas12, Cas13, base editing, and prime editing technologies, have significantly enhanced editing accuracy while minimizing off-target effects, thereby expanding their translational potential. Innovative CRISPR platforms are being explored for the treatment of monogenic disorders, cancer, infectious diseases, and rare genetic conditions. Personalized treatment strategies leverage patient-specific genomic data to design customized guide RNAs, facilitating precision medicine approaches tailored to individual genetic profiles. Furthermore, novel delivery systems, such as lipid nanoparticles, viral vectors, polymeric nanoparticles, and exosome-mediated delivery, have improved in vivo targeting efficiency and therapeutic outcomes. Despite remarkable progress, challenges remain, including off-target mutations, immune responses, delivery limitations, and ethical considerations. Ongoing research focuses on developing next-generation editing systems with enhanced specificity, improved delivery vehicles, and safer clinical translation pathways. This poster highlights recent innovations in CRISPR-based therapeutic platforms, discusses their clinical applications in personalized medicine, and examines current challenges and future directions in genome-editing technologies. Collectively, innovative CRISPR systems represent a transformative shift toward highly precise, patient-specific therapeutic interventions.

Keywords: CRISPR-Cas9 genome editing, precision medicine, base and prime editing, targeted gene therapy, and nanoparticle-mediated delivery.

A holistic approach to pharmacy education: technology, research, and student well-being

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Abstract:

Pharmacy education is rapidly evolving because of advancements in healthcare technology, increased research demands, and growing awareness of student well-being. Traditional teaching methods alone are no longer sufficient to prepare future pharmacists for complex healthcare challenges. Therefore, adopting a holistic approach that integrates technological innovation, research engagement, and mental well-being is essential for developing competent and resilient pharmacy professionals. This study explored how the integration of digital tools, research-based learning, and well-being strategies can enhance the quality of pharmacy education. The methodology involved reviewing recent educational practices and analyzing models that incorporate virtual learning platforms, simulation-based training, artificial intelligence–assisted drug discovery tools, and collaborative research opportunities for students. In addition, approaches promoting student well-being, such as stress management programs, peer support systems, and balanced academic environments, were examined. The findings indicate that technology-driven learning improves conceptual understanding and accessibility, whereas early involvement in research enhances critical thinking, innovation, and scientific curiosity among pharmacy students. Simultaneously, prioritizing mental health and well-being contributes to better academic performance, reduced burnout, and improved professional readiness. The integration of these three components creates a supportive and dynamic learning ecosystem that prepares students for modern pharmaceutical practice and research. In conclusion, a holistic framework that combines technology, research, and student well-being can significantly transform pharmacy education by fostering skilled, innovative, and mentally resilient healthcare professionals capable of addressing future healthcare needs.

Keywords: pharmacy education, educational technology, research training, student well-being, and holistic learning approach.

Redefining pharmacy education through digital innovation and holistic well-being

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Abstract:

Pharmacy education is undergoing significant transformation to meet the evolving demands of modern healthcare. Redefining pharmacy education through digital innovation and holistic well-being has become essential to prepare competent and adaptable pharmacy professionals. The background of this study highlights the growing need to integrate advanced digital technologies with strategies that support the overall well-being of students. The objective of this work is to explore how digital innovations combined with holistic well-being approaches can enhance the quality, effectiveness, and sustainability of pharmacy education. The methodology is based on a review of emerging digital tools, such as e-learning platforms, virtual laboratories, simulation-based learning, and computational resources, that support modern pharmaceutical training. In addition, holistic well-being practices, including stress management, mindfulness, balanced academic environments, and student support systems, are considered key elements in improving learning outcomes. The results suggest that digital innovations significantly enhance interactive learning, accessibility of educational resources, and practical skill development among pharmacy students. Furthermore, incorporating holistic well-being strategies helps reduce academic stress, improves concentration, and promotes a healthier learning environment. The integration of these elements encourages creativity, critical thinking, and long-term professional development. The conclusion emphasizes that combining digital innovation with holistic well-being practices can effectively redefine pharmacy education. Such an integrated approach not only improves academic performance but also supports the mental and emotional health of students, ultimately preparing future pharmacists to respond efficiently to the challenges of modern healthcare systems.

Keywords: pharmacy education, digital innovation, holistic well-being, e-learning, and stress management.

Transdermal Hydrogel Systems for Stress Management: Advancing Pharmaceutical Innovation

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Abstract

Background: Chronic stress is a major contributor to neurological, cardiovascular, and immunological disorders, significantly affecting global health. Conventional oral pharmacotherapy for stress and anxiety is often associated with poor patient compliance, first-pass metabolism, fluctuating plasma drug levels, and systemic side effects. Transdermal drug delivery systems (TDDS) have emerged as promising alternatives for sustained and controlled release. Hydrogels, due to their high-water content, biocompatibility, flexibility, and tunable physicochemical properties, represent an innovative platform for transdermal delivery of anti-stress therapeutics.

Objective: This study explores the development and evaluation of a hydrogel-based transdermal system for the controlled delivery of stress-relieving agents to enhance therapeutic efficacy, patient compliance, and holistic stress management.

Methods: Hydrogels were formulated using biocompatible polymers, such as carbopol, employing a cross-linking technique to optimize gel strength and drug release characteristics. The prepared formulations were evaluated for physicochemical properties, including pH, viscosity, swelling index, spread ability, and drug content uniformity. In vitro drug release studies were performed using Franz diffusion cells, followed by kinetic modeling to determine the release mechanisms. Skin permeation studies were conducted using excised animal skin to assess transdermal flux and permeability coefficients.

Results & Conclusion: The optimized hydrogel formulation exhibited desirable mechanical stability, skin-friendly pH, and uniform drug distribution. Sustained drug release was observed for 24 h, following diffusion-controlled kinetics (Higuchi model). Permeation studies demonstrated enhanced transdermal flux compared to that of conventional formulations. The hydrogel system showed potential for maintaining steady plasma drug levels, reducing dosing frequency, and minimizing systemic side effects. Transdermal hydrogel systems represent a technologically advanced and patient-centric approach for stress management. By combining controlled drug delivery with improved compliance and reduced adverse effects, this innovative platform aligns with modern pharmaceuticals education, emphasizing research integration, technological innovation, and holistic healthcare strategies. Further in vivo and clinical investigations are warranted to establish therapeutic efficacy.

Keywords: Stimuli-responsive hydrogel, smart polymeric networks, nanohydrogel drug delivery systems, personalized transdermal therapy, controlled and sustained release systems, and patient-centric drug delivery.

Development and Characterization of Tri-Herbal Bio-inks for 3D Printed Scaffolds: A Personalized Approach to Chronic Wound Management

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Abstract

Background: Chronic wounds, including diabetic foot ulcers and severe burn injuries, pose a persistent clinical burden, characterized by impaired healing, recurrent infection, and inadequate tissue regeneration. Conventional wound dressings have limitations in terms of conforming to complex wound geometries and providing the structural microenvironment required for effective cellular repair.

Objective: This study aimed to develop a biodegradable, patient-specific wound scaffold incorporating a polyherbal formulation of *Azadirachta indica* (neem), *Curcuma longa* (turmeric), and *Aloe barbadensis* (aloe vera), encapsulated within a sodium alginate hydrogel matrix, using simulated 3D bioprinting methodology.

Methodology: Standardized ethanolic and aqueous extracts of the three selected herbs were incorporated into a 2% w/v sodium alginate base to prepare a homogeneous bio-ink. Scaffold fabrication was performed via ionic gelation, in which the bio-ink was extruded through a calibrated syringe-based system into a calcium chloride crosslinking bath, producing a porous three-dimensional mesh structure. The wound-matched scaffold geometry was conceptualized using computer-aided design (CAD) principles.

Results and Discussion: The tri-herbal combination demonstrated a complementary pharmacological profile in which *A. indica* contributed broad-spectrum antimicrobial activity, curcumin offered anti-inflammatory properties, and *A. barbadensis* facilitated tissue regeneration and moisture retention. The porous scaffold architecture supported adequate

oxygen permeability and provided a matrix for sustained phytoconstituent release. The formulation was biomimetic and biodegradable, thereby reducing the trauma associated with conventional dressing changes.

Conclusion: This study presents an affordable and scientifically grounded approach to wound care by integrating principles of ethnopharmacology with scaffold-based drug delivery. The use of locally sourced medicinal plants as cost-effective alternatives to pharmaceutical agents is a cheaper patient option, particularly in resource-limited and rural healthcare settings.

Keywords: Chronic wound management, 3D bioprinting, bio-ink, sodium alginate scaffold, *Azadirachta indica*, curcumin, *Aloe barbadensis*, ionic gelation, controlled drug delivery, wound healing, ethnopharmacology, biodegradable scaffold, personalized medicine

Artificial Heart Systems: A Review on Principles, Design, and Clinical Applications

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Abstract

Introduction: An artificial heart is a device that helps people with heart problems. It can replace or help the heart work better. This machine ensures that blood continues to circulate around the body. New technology has improved this machine. It works more smoothly and lasts longer. This means that people who use it can live longer and feel better.

Objective: The main goal of using an artificial heart is to provide better blood supply to people with severe heart problems. It can be used until a real heart becomes available for transplant or used indefinitely. The artificial heart helps keep blood moving reduces the risk of death and makes people feel stronger and better

Method: Surgery is required to obtain a healthy heart. A device is inserted into the body to assist the heart in working better. The device is connected to the heart and the major blood vessels. There is also a device outside the body that helps control blood flow. Doctors keep an eye on the person after surgery to make sure everything is working well.

Results: People who got a heart felt a lot better. Their blood flow. They were able to do more things. They also lived longer. After surgery, there were some problems. They were not too bad. The machine performed well. People received the help they needed.

Conclusion: Artificial hearts are beneficial for people with severe heart problems. They help people live longer and feel better. We need to continue working to improve them and ensure that they are safe. In this way, more people can receive the help they need. They can have a better life with an artificial heart, also known as an artificial cardio or artificial heart. Artificial hearts are important for people who need cardiac assistance.

Keywords: Artificial hearts, Healthcare, Medical Innovation

Redefining Antidiabetic Therapy through Pharmaceutical Innovation: Preparation and Evaluation of Empagliflozin-Loaded Biodegradable Microspheres for Sustained Release

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Abstract

Background: Empagliflozin, a sodium–glucose cotransporter-2 (SGLT2) inhibitor, is widely prescribed for the management of type 2 diabetes mellitus. However, its relatively short half-life and the need for consistent plasma drug levels may limit sustained therapeutic outcomes. This study aimed to formulate and evaluate biodegradable polymeric microspheres of empagliflozin for sustained drug release, thereby improving patient compliance and therapeutic efficiency.

Methods: Empagliflozin-loaded biodegradable microspheres were prepared using the solvent evaporation technique employing biocompatible polymers, such as poly(lactic-co-glycolic acid) (PLGA). The formulations were optimized by varying the polymer concentration and drug–polymer ratios. The prepared microspheres were characterized for particle size distribution, surface morphology (scanning electron microscopy), drug entrapment efficiency, percentage yield, and in vitro drug release profile. Release kinetics were analyzed using mathematical models to determine the mechanism of drug release.

Results: The optimized formulation demonstrated uniform spherical particles with a smooth surface morphology and satisfactory entrapment efficiency. In vitro release studies showed a controlled and sustained release pattern extending up to 24–48 h, following Higuchi diffusion kinetics. The formulation significantly reduced the initial burst release and maintained prolonged drug availability compared to that of the pure drug.

Conclusion: The developed empagliflozin-loaded biodegradable microspheres exhibited promising sustained-release characteristics. This delivery system may enhance therapeutic efficacy, reduce dosing frequency, and improve patient adherence in the management of diabetes mellitus. This study highlights the integration of pharmaceutical research and technological innovation in advanced drug delivery systems.

Keywords: Empagliflozin; Biodegradable Microspheres; Sustained Drug Release; PLGA; Solvent Evaporation Method; Controlled Release Kinetics; Drug Entrapment Efficiency; Antidiabetic Therapy

Integrating Nanotechnology and Pharmaceutical Innovation: Formulation and Evaluation of Curcumin-Loaded Nanoparticulate Systems for Enhanced Bioavailability

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Abstract

Curcumin, a hydrophobic polyphenolic compound isolated from *Curcuma longa*, exhibits significant antioxidant, anti-inflammatory, and anticancer properties. However, clinical translation remains limited owing to poor aqueous solubility, rapid metabolism, and low systemic bioavailability following oral administration. The present study aimed to integrate nanotechnology and pharmaceutical innovation to develop and evaluate curcumin-loaded nanoparticulate drug delivery systems to enhance bioavailability. Curcumin-loaded nanoparticles were formulated using a biodegradable polymer/lipid-based approach employing solvent evaporation and high-speed homogenization techniques. The prepared nanoparticles were characterized for particle size, polydispersity index (PDI), zeta potential, morphology, drug loading capacity, and encapsulation efficiency. In vitro drug release studies were conducted using a dialysis membrane diffusion method, and release kinetics were analyzed using various mathematical models. Stability studies and comparative solubility assessments were also performed. The optimized formulation demonstrated a nanoscale particle size (<200 nm), narrow size distribution, high encapsulation efficiency, and improved surface stability. In vitro release studies revealed sustained and controlled drug release behavior compared to pure curcumin. Notably, solubility enhancement and improved dissolution rates were observed, suggesting significant potential for enhanced oral bioavailability. Kinetic modeling indicated diffusion-controlled release mechanisms. The findings highlight the potential of nanoparticulate systems to overcome biopharmaceutical limitations associated with curcumin and reinforce the role of nanotechnology in redefining modern pharmaceutical development. This research aligns with the evolving paradigm of innovative drug delivery systems that bridge natural therapeutics with advanced technological platforms, ultimately contributing to improved therapeutic efficacy and patient outcomes.

Keywords: curcumin, nanoparticulate drug delivery, bioavailability enhancement, polymeric nanoparticles, controlled drug release, phytopharmaceuticals, and pharmaceutical innovation.

Redefining Pharmacy Education Through Research, Technological Innovation, and Holistic Stress Management

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Abstract:

Pharmacy education is currently experiencing its first major transformation because of new scientific discoveries and advanced digital technologies and rising concerns about student mental health. The complete transformation of pharmacy education requires a unified system that combines research-based educational methods with modern technological solutions and complete stress reduction approaches to create pharmacists who can face any future challenges and work efficiently. The development of structured research programs throughout the educational system helps students build their abilities to think critically and make decisions based on evidence while developing their skills to create new ideas. The use of artificial intelligence and virtual simulation platforms and digital therapeutics and data analytics enables students to gain practical experience while developing their clinical reasoning skills and interprofessional collaboration abilities, which meet the demands of modern healthcare systems. The program must include complete stress management solutions because pharmacy training requires students to handle both cognitive challenges and emotional stress. The implementation of mindfulness practices together with resilience training and peer support systems and wellness-focused curriculum design will enhance mental health and academic success and long-term work sustainability. The program develops pharmacists who possess both clinical skills and emotional intelligence and ethical values through its balanced approach that combines scientific standards with technological flexibility and mental health support. The new educational system enables continuous learning because it helps individuals adapt to complex healthcare systems while achieving better results in patient care. The transformation of pharmacy education from knowledge distribution to professional development must achieve three goals, including research excellence, digital progress, and complete student wellness.

Keywords: pharmacy education, research integration, technological innovation, artificial intelligence, holistic stress management, and resilience training.

Artificial Intelligence in Ayurveda: A Comprehensive Review of Trends and Applications

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Abstract

Ayurveda, a traditional Indian system of medicine, emphasizes holistic health management through personalized diagnosis and treatment based on individual constitution (Prakriti) and disease characteristics (Vikriti). The integration of artificial intelligence (AI) in Ayurveda has emerged as a promising approach to enhance diagnostic accuracy, optimize treatment strategies, and facilitate predictive healthcare. AI techniques, including machine learning, natural language processing, and expert systems, are being utilized to analyze complex Ayurvedic texts, patient data, and clinical outcomes. These technologies can identify patterns and correlations that are often challenging to discern through conventional methods, enabling more precise recommendations for herbal formulations, lifestyle modifications, and Panchakarma therapies. Additionally, AI-driven platforms support decision-making for practitioners by providing real-time insights, reducing human error, and enabling remote healthcare delivery. The application of AI in Ayurveda also extends to drug discovery, disease prediction, and validation of traditional therapies through evidence-based research. Despite these advancements, challenges such as data standardization, limited digitalization of Ayurvedic records, and integration of AI tools with traditional practices remain significant. Ethical considerations, patient privacy, and interpretability of AI models are also critical concerns that must be addressed. This review summarizes current research trends, applications, and limitations of AI in Ayurveda, highlighting its potential to revolutionize personalized healthcare and bridge the gap between traditional wisdom and modern technology. Future research should focus on developing robust AI frameworks tailored to Ayurvedic principles, promoting digitization of classical texts, and validating AI-assisted interventions through clinical trials to ensure safe and effective integration into mainstream healthcare.

Keywords: Artificial Intelligence, Ayurveda, Healthcare, Lifestyle

Comparative Study of Homeopathic Phyto Gel and Synthetic (Diclofenac Sodium) For Reduce Pain and Inflammation in Arthritis

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Abstract

Background: Arthritis is characterized by joint inflammation. Inflammation may also affect the tendons and ligaments surrounding the joint. No use of steroidal anti-inflammatory drugs (NSAIDs): NSAIDs reduce both pain and inflammation. NSAIDs include diclofenac Sodium, ibuprofen (Advil, Motrin IB) and naproxen (Aleve). NSAIDs are available as creams, gels, or patches that can be applied to specific joints.

Objective: A comparative study of NSAIDs, drugs like diclofenac sodium, plant-based homeopathic phyto gels.

Methods: Synthetic drugs can produce several side effects, such as hepatitis, hypersensitivity reactions, nausea, and vomiting. In contrast, many herbal plants belonging to the families *Liliaceae*, *Cucurbitaceae*, *Rosaceae*, *Lamiaceae* (*Labiatae*), *Euphorbiaceae*, *Rubiaceae*, and *Asteraceae* serve as rich sources of bioactive phytochemicals. Examples of such plants include *Curcuma longa* (turmeric), *Zingiber officinale* (ginger), *Boswellia serrata* (frankincense), *Allium sativum* (garlic), and *Salix alba* (willow bark). These plants contain phytoconstituents such as allyl propyl disulfide, allicin, alliin, flavonoids, anthraquinones (e.g., alizarin), glycosides, ursolic acid, β -sitosterol, and caproic acid, which are known to exhibit significant anti-inflammatory and analgesic activities. Phytogels are developed through extraction or decoction processes using these herbal plants.

Results: A comparative study of synthetic and plant-based gels revealed that the latter exhibited better results with fewer side effects when the Diclofenac sodium synthetic drug was used for a long period.

Keywords: Inflammation, gel, Cucurbitaceae, Labiateae, pathogen

Solid Topical Dosage Forms in Cosmetic Pharmaceutics: A Review with Emphasis on *Tagetes erecta* as a Plant-Derived Bioactive Compound

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Abstract:

Topical dosage form development focuses on improving formulation stability and ease of application. In the present work, a solid serum stick was prepared as a topical solid dosage form containing *Tagetes erecta* flower extract. The plant contains carotenoids and phenolic compounds associated with antioxidant and depigmenting activities. However, its incorporation into solid topical systems, such as solid serum sticks, has not been widely reported. The formulation was prepared using an anhydrous wax–butter–oil base via a melt-and-pour technique. An anhydrous system was selected to avoid problems related to water-induced instability and microbial growth. Kojic dipalmitate was incorporated as an oil-soluble depigmenting agent. The physical appearance, melting characteristics, hardness, and spreadability of the sticks were evaluated. Stability was evaluated under different conditions during the study period. A preliminary patch test was conducted to examine skin compatibility. The prepared formulation spread smoothly during application. It exhibited a uniform texture and satisfactory mechanical strength. No visible phase separation or surface defects were observed during storage. On the basis of these observations, *Tagetes erecta* extract was found to be suitable for incorporation into an anhydrous solid topical dosage form. Solid serum sticks are therefore considered a practical option for the topical delivery of plant-derived bioactive compounds.

Keywords: *Tagetes erecta*, solid serum stick, topical solid dosage form, anhydrous wax, and plant-derived bioactive compounds.

Formulation and Evaluation of Natural Tinted Lip Balm with SPF and Plant-Derived Antioxidants for Dehydration and Colour Protection

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Abstract

This study describes the complete development and characterization of an all-natural tinted lip balm formulated to provide moderate sun protection (SPF 12–15), along with enhanced moisturization and aesthetic appeal. The formulation was designed using plant-derived and naturally sourced ingredients to align with current green-beauty trends. Beeswax and cocoa butter were incorporated to impart structural integrity, firmness, and occlusive moisturization, thereby preventing transepidermal water loss. Coconut oil served as an emollient to improve spreadability and ensure smooth application. Beetroot extract was employed as a natural colorant to provide an appealing tint, while non-nano zinc oxide was included as a physical broad-spectrum UV filter to protect against both UVA and UVB radiation. Vitamin E and selected plant antioxidants were added to enhance oxidative stability, minimize color degradation, and prolong product shelf life.

The prepared formulations were evaluated for key physicochemical and performance parameters, including the melting point, pH, spreadability, hardness, stability, and phase separation. The optimized formulation exhibited a melting point of approximately 65°C, ensuring adequate thermal stability under typical storage conditions, and a skin-compatible pH of 6.8. Stability studies revealed no phase separation, significant color change, or rancidity during the evaluation period. The lip balm demonstrated good spreadability, satisfactory hardness, and a consistent texture. In a comparative assessment, the developed formulation provided superior hydration relative to the control samples and maintained color retention and protective performance for approximately 4–5 h after application.

Overall, this study focused on the potential of natural ingredients in the development of multifunctional cosmetic products that combine aesthetic enhancement with dermatological benefits, offering a sustainable and consumer-friendly alternative within the expanding natural cosmetics market.

Keywords: Natural tinted lip balm, SPF, plant antioxidant, colour retention, sustainable cosmetics

Formulation And Evaluation Of A Solid Serum Stick for Antioxidant Protection Containing *Tagetes Erecta* Extract

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Abstract

Background: Topical dosage forms containing natural ingredients are increasingly accepted because of their safety, efficacy, and acceptability. In the current study, we formulated and evaluated a solid serum stick as a novel topical dosage form, which included the use of *Tagetes erecta*, which is rich in carotenoids and phenolic compounds with antioxidant activity. Jojoba oil was selected as the base material owing to its excellent skin compatibility and moisturizing activity. In addition, retinol was selected as the active ingredient to enhance skin renewal and anti-aging activity. Lavender essential oil was also selected for its skin-soothing, antimicrobial, and aromatherapy activities. A solid serum stick has several merits, including ease of use, accurate dosing, stability, and prevention of contamination. In addition, the formulation was subjected to evaluation for various physicochemical and stability characteristics to establish its potential as an effective topical dosage form. The results established that the developed solid serum stick has potential as a multifunctional cosmeceutical product.

Keywords: solid serum stick, *Tagetes erecta*, carotenoids, phenolic compounds, jojoba oil, retinol, lavender essential oil and cosmeceutical formulation in skin.

A study of physicochemical properties of metformin insinuating its other pharmacological action

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Abstract

Metformin, a cornerstone in the treatment of type 2 diabetes mellitus (T2DM), has garnered significant attention owing to its multifaceted pharmacological profile and physicochemical characteristics. Originally derived from *Galega officinalis*, its efficacy is attributed to its ability to inhibit hepatic gluconeogenesis, enhance insulin sensitivity, and modulate glucose absorption via AMP-activated protein kinase (AMPK) activation. This study systematically investigated the physicochemical attributes of metformin, including solubility, pKa, log P, molecular weight, and stability, and explored their influence on its pharmacokinetics (ADME profile) and pharmacodynamics. By correlating these properties with emerging therapeutic potentials, such as anticancer, cardioprotective, neuroprotective, and anti-aging effects, this study highlights metformin's pleiotropic capabilities. Additionally, experimental evaluations demonstrated metformin's antioxidant activity, gastroprotective effects, and modest antibacterial potential. The synthesis of metformin hydrochloride was achieved with an 85% yield, and it was confirmed via spectral analysis. Antioxidant assays (DPPH and nitric oxide scavenging) revealed moderate radical neutralization, whereas in vivo anti-ulcer studies affirmed its mucosal protective effects. Although metformin's antibacterial action was limited compared to standard antibiotics, it showed measurable inhibition at higher concentrations. This comprehensive analysis underscores the critical role of physicochemical parameters in shaping metformin's therapeutic efficacy and supports its potential repurposing in non-diabetes-related indications.

Keywords: Metformin, diabetes mellitus, activated protein kinase, Healthcare

Arachnoids cyst; the case study with treatment

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Abstract

An arachnoid cyst is a non-malignant structural abnormality related to the arachnoid membrane of the brain in which a CSF-filled sac develops. These cysts are symptomatic and asymptomatic and occurring in the posterior fossa are relatively uncommon; symptoms associated with this condition may include headache, visual disturbance, balance problems, and seizures.

This study presents the case of a four-year-old boy who had been experiencing trembling of the whole body for the past one year. The boy was treated in the outpatient department of the National Institute of Homeopathy in Kolkata, India. After careful analysis of the patient's symptoms and overall condition, they chose homeopathic medicine as an ant-miasmatic remedy.

Follow-up examinations were conducted throughout the treatment period. After approximately 18 months of continuous individualized homeopathic treatment, the patient showed significant improvement in symptoms as well as clinical condition, which was also assessed through MRI findings. This case report suggests that individualized homeopathic treatment may have potential benefits in the management of such rare conditions. We have another patient with the same condition, and we gave the same prescription to this patient and continually analyzed all conditions.

Keywords: Arachnoids cyst, Cyst, Homeopathic, Miasmatic

A Comprehensive Review on Telepharmacy

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Abstract:

Telepharmacy has been used to improve patient access to pharmacy services. Nevertheless, few studies have compared the perspectives of patients in these two groups. This study examined patients' expectations, willingness to use (WTU), willingness to pay for telepharmacy, and the determinants of patient expectations. Telepharmacy has emerged as a solution to the geographical limitations faced by traditional pharmacies. Telepharmacy has numerous benefits, including increased accessibility of healthcare services, reduced patient travel time, improved medication adherence, and assistance with healthcare services in areas that are not sufficiently served. It can also be used during emergencies, pandemics, and in situations where there is a lack of interaction between patients and healthcare providers. The primary goal of telepharmacy is to ensure the safe and effective use of medication and appropriate pharmaceutical care.

In conclusion, telepharmacy improves the delivery of pharmaceutical services and patient care by connecting patients and pharmacists through technology, thus increasing patient care and healthcare services.

Keywords: Patient care, pharmaceutical services, Telepharmacy, WTU

The Microbial Middleman: How Gut Bacteria Control Drug Response

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Abstract:

The human gut microbiome represents a complex and dynamic ecosystem composed of trillions of microorganisms, including bacteria, viruses, fungi, and protozoa, that inhabit the gastrointestinal tract. These microbial communities play a fundamental role in maintaining human health by contributing to vital physiological processes, such as digestion, metabolism, immune regulation, and protection against pathogenic microorganisms. Recent advances in microbiome research have revealed that bidirectional communication network known as the gut–brain axis, gut microbes interact with the central nervous system, influencing neurological functions, mood, and behavior; the microbiome plays a crucial role in shaping and modulating the host immune system. Disruptions in the composition and diversity of gut microbiota, a condition known as dysbiosis, have been linked to a wide range of diseases, including obesity, diabetes, inflammatory bowel disease, cardiovascular disorders, allergies, and certain neurodegenerative conditions.

Understanding the intricate relationship between the gut microbiome and human health has opened new frontiers for biomedical research. Innovative therapeutic strategies are being explored as potential tools for disease prevention and personalized medicine. Consequently, the gut microbiome has emerged as a promising area of research with significant implications for global healthcare.

Keywords: Drug response, Gut, Microbiota, microbiome

How to prevent and manage non communicable disease through Ai and Ayurveda system

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Abstract

Non-communicable diseases (NCDs), such as diabetes mellitus, hypertension, cardiovascular diseases, and cancer, are major global health challenges, being responsible for high morbidity and mortality. Lifestyle factors, including an unhealthy diet, physical inactivity, stress, and tobacco use, significantly contribute to the increasing prevalence of these diseases. Therefore, innovative preventive strategies are necessary to reduce their burden. The integration of artificial intelligence (AI) with traditional Ayurvedic principles offers a promising approach for the prevention and management of NCDs. AI technologies can analyze large health datasets, predict disease risk, monitor patient health in real-time, and provide personalized health recommendations. Mobile health applications and wearable devices powered by AI help track vital parameters, such as blood pressure, blood glucose, and physical activity, enabling early detection and preventive care. Ayurveda emphasizes a holistic lifestyle approach through concepts like a balanced diet (ahara), daily routine (dinacharya), seasonal regimen (ritucharya), yoga, and meditation, which help maintain physiological balance and strengthen immunity. Herbal medicines and natural therapies used in Ayurveda support long-term health management and reduce the risk factors associated with NCDs. Combining AI-driven health monitoring with Ayurvedic preventive principles can enhance early diagnosis, improve lifestyle modification, and promote personalized healthcare strategies. This integrative approach may significantly contribute to reducing the global burden of NCDs while promoting sustainable and holistic health management.

Keywords: Prevention, Prediction, Monitoring, Personalization, Lifestyle, Nutrition, Yoga, Wellness

Antibiotic Resistance: A Growing Global Health Threat

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Abstract:

Antibiotics are critical medicines used to help and cure infections caused by bacteria. Antibiotics have greatly reduced the mortality and morbidity caused by infections, especially bacterial infections, since their discovery. However, antibiotic abuse has led to antibiotic resistance, which is one of the major health challenges facing the world. Antibiotic resistance refers to the ability of bacteria to acclimatize and render antibiotics ineffective, rendering them useless.

Antibiotic resistance complicates the treatment of infections, increasing mortality and morbidity, as well as costs. Antibiotic resistance can be caused by tone- drug, overprescription by physicians, failure to complete the course of antibiotics, and the administration of antibiotics to animals for growth promotion, among other factors. Pharmacology can be used to understand antibiotics, antibiotic resistance, and the measures that can be taken to help antibiotic resistance.

Druggists and other healthcare staff are important preceptors in terms of antibiotic use. adding public mindfulness and promoting good drug habits can decelerate down the emergence of antibiotic resistance and ensure that antibiotics continue to be effective in the future.

Keywords: antibiotics, antibiotic resistance, bacterial infections, pharmacology, rational drug use, rational use of antibiotics

Addressing Academic Stress

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Abstract:

Academic stress and burnout are increasingly common among pharmacy students and professionals owing to rigorous coursework, demanding clinical responsibilities, and high expectations in healthcare practice. Addressing these challenges is essential to maintain personal well-being and professional competence. Academic stress can negatively affect mental health, academic performance, and overall quality of life if not managed effectively. Therefore, the implementation of effective burnout prevention and wellness strategies is crucial for pharmacy education and professional practice. Pharmacy students often face pressure from examinations, practical training, research, and clinical rotations. Similarly, pharmacy professionals experience workplace stress owing to long working hours, patient care responsibilities, and the need to stay updated with rapidly evolving medical knowledge. Without proper coping mechanisms, these pressures may lead to emotional exhaustion, decreased motivation, and reduced productivity.

Several wellness strategies can be adopted to mitigate these challenges. Time management, regular physical activity, mindfulness practices, and adequate sleep play important roles in reducing stress levels. Academic institutions can also contribute by providing supportive learning environments, mentorship programs, counseling services, and stress management workshops. Additionally, technological innovations, such as digital health tools, mobile wellness applications, and online counseling platforms, can support stress monitoring and mental health improvement.

Keywords: Academic stress, pharmacy students, Healthcare

Digital transformation in pharmacy education: opportunities and challenges

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Abstract:

Digital transformation is rapidly reshaping pharmacy education by integrating advanced technologies that enhance teaching, learning, and research practices. Traditional educational methods are gradually being supplemented with digital tools, such as e-learning platforms, virtual simulations, artificial intelligence, and online assessment systems. The growing demand for technologically skilled healthcare professionals has encouraged educational institutions to adopt innovative digital approaches in pharmacy training. This study aimed to explore the opportunities and challenges associated with digital transformation in pharmacy education and its impact on student learning outcomes. A qualitative review of recent literature, educational reports, and digital learning practices implemented in pharmacy institutions was conducted to analyze the effectiveness of technological integration in academic settings. The findings indicate that digital transformation offers several advantages, including improved accessibility to learning resources, interactive teaching methods, enhanced research capabilities, and flexible learning environments for students. Technologies such as virtual laboratories, simulation-based learning, and online collaboration tools help students better understand complex pharmaceutical concepts and improve practical knowledge. However, certain challenges remain, including limited technological infrastructure, lack of digital literacy among educators and students, high implementation costs, and concerns related to data privacy and academic integrity. Digital transformation has significant potential to redefine pharmacy education by promoting innovative learning strategies and improving academic engagement. Addressing technological barriers and providing proper training to educators and students can maximize the benefits of digital tools. A balanced integration of technology with traditional teaching methods is essential to ensure effective and sustainable advancements in pharmacy education.

Keywords: digital transformation, pharmacy education, e-learning, technological innovation, and virtual learning.

Steroid Misuse and Cushing’s Syndrome: A Clinical Review

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Abstract

Cushing’s is an endocrine disorder caused by prolonged exposure to excessive glucocorticoids. Endogenous causes include pituitary adenomas, adrenal tumors, and ectopic adrenocorticotropic hormone (ACTH) secretion. The most frequent cause globally is exogenous glucocorticoid exposure, often resulting from inappropriate medical use or misuse of corticosteroid medications. The widespread availability of systemic, topical, inhaled, and injectable corticosteroids has increased the risk of iatrogenic Cushing’s in clinical practice. Steroid misuse can lead to profound metabolic, cardiovascular, musculoskeletal, and neuropsychiatric complications, owing to chronic hypercortisolism. This condition is associated with increased morbidity and mortality, if not recognized and managed early. This review summarizes the current knowledge regarding the epidemiology, pathophysiology, clinical manifestations, diagnostic evaluation, and management of steroid-induced Cushing’s syndrome. Particular emphasis is placed on the mechanisms underlying hypothalamic-pituitary-adrenal (HPA) axis suppression and the clinical implications of long-term glucocorticoid exposure. Strategies for prevention, early detection, and therapeutic management have also been discussed to reduce the burden of steroid-related endocrine disorders.

Keywords: Corticosteroids, Steroid misuse, Cushing's syndrome, Hypercortisolism, Glucocorticoid toxicity, Endocrine disorders

The Brain,Gut,Ulcer Axis: Modern Psychosomatic Perspectives on Gastric Tensions

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Abstract

The interaction between psychological stress and gastrointestinal disorders has gained considerable attention in modern biomedical research. The concept of the brain–gut–ulcer axis represents a multidirectional communication network connecting the central nervous system, enteric nervous system, immune pathways, and endocrine responses, which collectively influence gastric physiology. Psychosomatic factors, such as emotional stress, anxiety, and depression, have been recognized as important contributors to gastric tension and ulcer pathogenesis. Although *Helicobacter pylori* infection and non-steroidal anti-inflammatory drugs (NSAIDs) remain primary etiological factors, psychosocial stress can significantly alter gastric secretion, mucosal defense mechanisms, and inflammatory responses. Advances in neurogastroenterology have revealed that stress-induced activation of the hypothalamic–pituitary–adrenal (HPA) axis, vagal pathways, and inflammatory mediators plays a key role in gastric mucosal injury. Furthermore, alterations in the gut microbiota and neurochemical signaling pathways have been linked to psychosomatic gastric disorders. This review explores modern perspectives on the brain–gut–ulcer axis, focusing on neurobiological mechanisms, psychosomatic influences, and emerging therapeutic strategies, including stress management, psychopharmacology, and microbiota-based interventions. Understanding the complex interactions within this axis may lead to improved preventive and therapeutic approaches for stress-related gastric diseases.

Keywords: Brain–gut axis, psychosomatic medicine, gastric ulcer, stress physiology, neurogastroenterology, gut microbiota.

From Mind to Joint: The Neurobiological Mechanisms Linking Chronic Psychological Stress to Arthritis, Spinal Degeneration and Neuropathic Pain

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Abstract

Background: Chronic psychological stress is a pervasive pathogenic trigger that is frequently underestimated in the development of musculoskeletal and neurological diseases. While genetic susceptibility, biomechanical loading, and metabolic dysfunction are recognized etiological contributors to arthritis, spinal degeneration, and neuropathic pain, the neuroimmunological consequences of sustained psychological stress remain inadequately integrated into clinical and research paradigms.

Objectives: This comprehensive review aims to (1) delineate the neuroendocrine and immunological mechanisms by which chronic stress initiates and perpetuates inflammatory arthritis, osteoarthritis, cervical and lumbar spondylosis, and peripheral and central neuropathic pain; (2) present a unified stress–inflammation–pain triad model; and (3) appraise emerging phytopharmacological strategies targeting this axis.

Methods: A comprehensive literature search was conducted across the PubMed, Scopus, Web of Science, and Google Scholar databases using Medical Subject Headings (MeSH) terms: psychological stress, HPA axis, rheumatoid arthritis, osteoarthritis, spondylosis, intervertebral disc degeneration, neuropathic pain, neuroinflammation, central sensitization, cytokines, and phytochemistry. Studies published between 1987 and 2024 were included, encompassing prospective cohorts, randomized controlled trials, mechanistic in vitro and in vivo studies, and systematic reviews.

Results: Chronic stress activates the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS), resulting in glucocorticoid receptor (GR) resistance, sustained catecholamine elevation, and upregulation of pro-inflammatory cytokines, including interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF- α), interleukin-1 β (IL-1 β), and substance P. These mediators collectively promote synovial hyperplasia and cartilage degradation in arthritis, accelerate nucleus pulposus cell senescence and disc matrix proteolysis in spondylosis, and induce peripheral and central sensitization in neuropathic pain. Clinical evidence from landmark cohort studies, including the Study to Evaluate Early Respiratory Anatomy (SERA) (NIH, 2020) and multiple systematic reviews, confirms that a high perceived stress burden significantly increases the risk of incident inflammatory arthritis and predicts chronic musculoskeletal disability.

Conclusion: Psychological stress is not a peripheral modulator but is a central pathogenic driver of arthritis, spinal degeneration, and neuropathic pain. Recognition of the stress-inflammation-pain triad as a unified mechanistic system necessitates the integration of psychosocial assessment tools into musculoskeletal practice and supports the development of multimodal therapies targeting neuroimmune dysregulation. Phytochemical compounds with combined adaptogenic and anti-inflammatory properties, notably from *Datura stramonium*, *Ricinus communis*, and *Calotropis gigantea*, represent promising, pharmacologically relevant adjunct interventions.

Keywords: Psychological stress; Rheumatoid arthritis; Osteoarthritis; Spondylosis; Intervertebral disc degeneration; Neuropathic pain; HPA axis; Glucocorticoid resistance

Artificial Intelligence: Driven Discovery of Antidiabetic Phytochemicals

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Abstract:

The global prevalence of diabetes mellitus continues to rise at an alarming rate, highlighting the urgent need for the development of effective and safer therapeutic agents. Medicinal plants have long been recognized as valuable sources of bioactive compounds, with *Ficus religiosa* being traditionally used for its potential antidiabetic properties. Recent advancements in computational pharmacognosy have introduced artificial intelligence (AI)-based approaches, including machine learning algorithms, molecular docking, and absorption, distribution, metabolism, excretion, and toxicity (ADMET) prediction, to accelerate the discovery of promising phytochemicals.

These innovative techniques enable the rapid and cost-effective screening of plant-derived compounds by predicting their binding affinity and interaction with key biological targets, such as dipeptidyl peptidase-4 (DPP-4), an important enzyme involved in glucose regulation. Flavonoids and alkaloids isolated from *Ficus religiosa* have demonstrated strong in silico interactions with DPP-4, suggesting their potential role in modulating glucose metabolism and managing diabetes.

This AI-assisted research framework streamlines the identification of bioactive compounds and supports focused experimental validation, thereby enhancing the efficiency of natural product drug discovery. The integration of artificial intelligence into pharmacognosy represents a transformative approach and paves the way for the development of novel plant-based antidiabetic therapies.

Keywords: Artificial intelligence, Pharmacognosy, Antidiabetic phytochemicals, *Ficus religiosa*, Molecular docking, Machine learning,

Cognitive Impairments in Traumatic Brain Injury: A Neuropsychological Perspective

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Abstract: Traumatic brain injury (TBI), which causes significant impairments in cognitive abilities such as memory, attention, processing speed, and executive functions, affects approximately 69 million people globally each year. Among the structural and functional changes to the brain that significantly affect patients' autonomy and quality of life are hippocampal atrophy, white matter injury, and neurotransmitter dysregulation. This study thoroughly examines cognitive deficits in adult patients with TBI using cutting-edge imaging techniques, such as fMRI and QEEG, in addition to standard neuropsychological tests, such as the WAIS-IV and CVLT-II. The results highlight the importance of tailored treatments by pointing to particular domain impairments and a correlation between biomarkers and cognition. Within a year, recovery patterns show notable improvement, demonstrating that cutting-edge therapies, such as transcranial magnetic stimulation (TMS), virtual reality (VR), and cognitive behavioral therapy (CBT), are used in rehabilitation for incapacitating conditions. Although all of these advancements have been made, little is known about how to optimize customized treatment and longer recovery times. By addressing cognitive challenges, the results of this study highlight the urgent need for coordinated, patient-centered interventions to enhance overall recovery outcomes following TBI.

Methods: Adults with moderate to severe TBI were the subjects of a cross-sectional study. Cognitive domains such as memory, attention, and executive function were evaluated using standardized neuropsychological tests (MMSE, WMS-IV, TMT, WCST, Digit Span).

Results: Most participants had cognitive deficits: 60% had attention and working memory problems, 65% had poor executive function, and 85% had memory impairments. Patients who scored lower on the Glasgow Coma Scale (GCS) had more severe deficits.

Keywords: Traumatic brain injuries, Neuropsychological, Healthcare

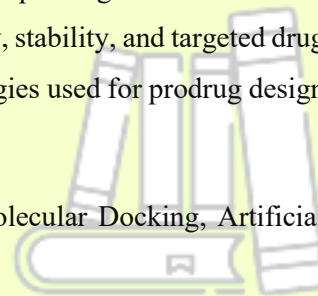
Computational Approaches in Prodrug Design: Strategies, Advances and Future Perspective

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Abstract

The prodrug strategy has become an essential tool in modern drug discovery for overcoming the limitations associated with the pharmacokinetics, toxicity, and bioavailability of active pharmaceutical ingredients. Advances in computational drug design have significantly enhanced the efficiency and rationality of prodrug development. Computational approaches, such as molecular modeling, quantum mechanical calculations, molecular docking, molecular dynamics simulations, quantitative structure–activity relationship (QSAR) modeling, and artificial intelligence (AI), provide predictive insights into drug metabolism, enzyme-mediated activation, and the physicochemical behavior of prodrug molecules. These techniques enable the design of prodrugs with improved solubility, permeability, stability, and targeted drug delivery. This review summarizes recent developments in computational strategies used for prodrug design and discusses future perspectives involving AI-driven drug discovery.

Keywords: Prodrugs, Computational Drug Design, Molecular Modeling, Molecular Docking, Artificial Intelligence, Drug Delivery



Minoxidil: From Antihypertensive to Hair Growth Miracle

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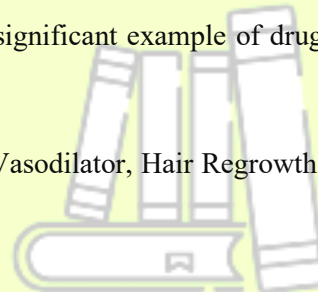
Abstract

Minoxidil is a potent vasodilator initially developed for the treatment of hypertension. However, an interesting side effect of hypertrichosis led to its repositioning as a topical agent for the treatment of hair loss, particularly androgenetic alopecia. Minoxidil enhances blood flow to hair follicles, prolongs the anagen phase of the hair cycle, and stimulates follicular growth.

It is widely used in both men and women and is available in various concentrations for topical application. Despite its effectiveness, the exact mechanism of action has not been completely understood. This poster highlights the pharmacological properties, mechanism of action, clinical uses, adverse effects, and recent advancements related to minoxidil. The transformation of minoxidil from an antihypertensive drug to a widely accepted hair growth promoter makes it a significant example of drug repurposing in pharmaceutical sciences.

Keywords: Minoxidil, Antihypertensive, Hair Loss, Androgenetic Alopecia, Vasodilator, Hair Regrowth, Drug Repurposing

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Extended-Release Nanoformulation of Fatty Acid-Conjugated Emtricitabine for HIV-1/HCV Coinfection

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Abstract:

HIV-1/ hepatitis C virus (HCV) coinfection is a major health burden in the world with tendency to develop faster disease progression, higher viral persistence and less therapeutic efficacy. Emtricitabine, a popular nucleoside reverse transcriptase inhibitor suffers due to its low half-life and the requirement to take them regularly, which could interfere with patient adherence and the overall effect of treatment.

In this study, we report the design and development of an extended-release nanoformulation of fatty acid-conjugated emtricitabine aimed at enhancing its pharmacokinetic and antiviral performance. The conjugation of fatty acids was used to enhance the lipophilicity and sustained release of the drug, and a nano-carrier system was utilized to enhance the stability of the drugs and cellular uptake. Physicochemical and morphological methods were used to characterize the synthesized conjugates and the resulting nano formulation to identify success in the formulation. The release studies were found to have a controlled and sustained drug release profile, which is in line with extended-release kinetics. Furthermore, preliminary antiviral evaluations suggest enhanced inhibitory activity against both HIV-1 and HCV compared to conventional formulations, accompanied by reduced cytotoxicity and improved cellular internalization. Altogether, the resulted nanoformulation could be a promising dual antiviral delivery system, with better bioavailability, prolonged drug exposure, and decreased dosing schedule. his approach highlights the potential of nano-enabled fatty acid conjugation in advancing therapeutic interventions for HIV-1/HCV coinfection. Further in vivo studies are warranted to validate its clinical applicability.

Keywords: Emtricitabine, Nanoformulation, Extended-release delivery, Fatty acid conjugates, HIV-1/HCV coinfection, Antiviral therapy

Acridine Derivatives as Promising Anticancer Agents: Mechanisms and Therapeutic Potential

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Abstract:

Acridine and its derivatives have emerged as a significant class of heterocyclic compounds with promising anticancer potential. These molecules exhibit a planar tricyclic structure, enabling them to intercalate into DNA and disrupt essential cellular processes such as replication and transcription. Acridine-based compounds have demonstrated cytotoxic activity against a wide range of cancer cell lines, including breast, lung, colon, and leukemia. Their anticancer mechanisms are primarily associated with DNA intercalation, inhibition of topoisomerase I and II enzymes, induction of apoptosis, and generation of reactive oxygen species (ROS). Additionally, several acridine derivatives have shown the ability to target specific molecular pathways involved in tumor progression, angiogenesis, and metastasis. Recent advancements in medicinal chemistry have led to the development of novel acridine hybrids and conjugates with improved selectivity and reduced toxicity. Furthermore, nanoformulation approaches and targeted drug delivery systems are being explored to enhance the therapeutic efficacy of acridine-based agents. Despite their potential, challenges such as systemic toxicity, poor solubility, and resistance mechanisms remain significant barriers to clinical translation. Ongoing research is focused on structural modification and optimization strategies to overcome these limitations. Overall, acridine derivatives represent a promising scaffold in anticancer drug discovery, offering opportunities for the development of more effective and targeted cancer therapies.

Keywords: Acridine derivatives; Anticancer activity; DNA intercalation; Apoptosis

Development and Evaluation of Antifungal Nasal Herbal Gel Formulation

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Abstract:

Fungal infections of the nasal cavity, particularly in immunocompromised individuals, have become a growing clinical concern, necessitating the development of effective and safer therapeutic alternatives. The present study focuses on the formulation and evaluation of a nasal herbal gel with antifungal potential. Herbal extracts known for their antifungal activity, such as *Curcuma longa* (turmeric), *Azadirachta indica* (neem), and *Ocimum sanctum* (holy basil), were selected and incorporated into a gel base using suitable gelling agents. The formulation was prepared using the extraction method followed by incorporation into a mucoadhesive gel system to enhance nasal residence time and drug absorption.

The developed formulations were evaluated for various physicochemical parameters, including pH, viscosity, spreadability, gel strength, and homogeneity. In vitro antifungal activity was assessed against common fungal strains such as *Candida albicans* and *Aspergillus niger* using standard microbiological methods. The optimized formulation exhibited acceptable physicochemical properties, good mucoadhesive strength, and significant antifungal activity compared to the control. Stability studies indicated that the formulation remained stable under different storage conditions.

The results suggest that the developed nasal herbal gel could serve as a promising alternative to conventional antifungal therapies with reduced side effects and improved patient compliance. Further in vivo studies and clinical evaluations are recommended to establish its therapeutic efficacy and safety profile.

Keywords: Herbal nasal gel; Antifungal activity; Mucoadhesive formulation; Phytotherapy

Development and Evaluation of Folate-Receptor Targeted Liposomes for the Treatment of Breast Cancer

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Abstract:

Breast cancer is one of the most prevalent malignancies worldwide and remains a major cause of mortality among women. Conventional chemotherapy is often associated with limitations such as non-specific drug distribution, systemic toxicity, and poor therapeutic outcomes. To overcome these challenges, the present study focuses on the development and evaluation of folate-receptor targeted liposomes as a novel drug delivery system for breast cancer treatment.

Folate receptors are highly overexpressed on the surface of many breast cancer cells, making them an ideal target for selective drug delivery. In this study, liposomes were formulated using phospholipids and cholesterol, followed by surface modification with folic acid to achieve targeted delivery. The prepared formulations were evaluated for particle size, zeta potential, entrapment efficiency, and in vitro drug release. Additionally, targeting efficiency and cytotoxic potential were assessed using suitable breast cancer cell lines.

The optimized formulation exhibited nanoscale particle size, high drug entrapment efficiency, and controlled drug release profile. Enhanced cellular uptake and increased cytotoxicity were observed in folate-receptor expressing cancer cells compared to non-targeted formulations, indicating improved targeting efficiency. This targeted liposomal system minimizes drug exposure to normal tissues, thereby reducing systemic toxicity and improving therapeutic efficacy.

In conclusion, folate-receptor targeted liposomes represent a promising and effective approach for breast cancer therapy. This strategy offers improved drug delivery, enhanced selectivity, and reduced side effects, highlighting its potential in advancing targeted cancer treatment.

Keywords: Folate receptor targeting; Liposomes; Breast cancer; Targeted drug delivery

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