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Trigger Tools for Comprehensive ADR Capture: A Novel Framework for Specialty-Based Pharmacovigilance

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ABSTRACT

Background: Currently, irrational uses of medicines becoming global problem in developing countries like India. Inappropriate prescribing is a major cause for poor treatment outcome and higher costs. Hence, this study was aimed to investigate medicine prescribing practice and prescription errors using WHO medicine-utilization core indicators.

Methods: A hospital based prospective cross sectional study design was used to evaluate prescribing practices and prescription errors from September to October 2024 at the OPD pharmacy using systematic random sampling technique while a prospective approach was employed for facility indicators. Presence of potential drug-drug interactions (DDIs) were evaluated using Medscape Online Drug Interaction Checker. Data were analysed using SPSS version 25 and interpreted as tables and figures.

Results: A total of 1019 medicines were prescribed in 524 prescriptions and 81.6% (n = 832) were dispensed. The percentage of antibiotics, injections and medicine prescribed from Essential Drug List was 33.9% (n = 345),3.5% (n = 36) and 92.3% (n = 941) respectively. The most frequently prescribed class of medicine were antibiotics 33.9% (n = 345). 65.1% (n = 341) were ≥2 medicines and 8.3% (n = 85) had at least one potential DDIs. Among overall DDIs, the monitor closely and serious level was 60% (n = 51) and 11.8% (n = 10) respectively. The average prescription error was 4.3. Prescription errors due to failure to mention diagnosis was 40.6% (n = 213).

Conclusions: Based on findings, the prescribing practices had defects to the optimum value recommended by WHO and showed high prescription errors. Prescribing antibiotics was the major problem in practice. Remarkable DDIs were observed in prescribed medicines. Therefore, designing and implementing policy to improve medicine use practice is highly indispensable.

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Trigger Tools for Comprehensive ADR Capture: A Novel Framework for Specialty-Based Pharmacovigilance

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ABSTRACT

Background: Real-world adverse drug reaction (ADR) monitoring faces significant challenges with voluntary reporting systems showing substantial underreporting rates. The Trigger Tool Method (TTM) represents an innovative approach bridging clinical trials safety data with real-world pharmacovigilance, yet remains underexplored in Indian specialty care settings.

Objective: To evaluate TTM effectiveness in enhancing real-world ADR detection in pulmonology practice, develop specialty-specific triggers, and assess prospective implementation outcomes.

Methods: A novel two-phased study at VIMSAR analysed 868 retrospective records (Phase I) using IHI Global Trigger Tool, followed by prospective application of modified trigger tool to 1,472 patients (Phase II). ADR causality and severity were assessed using WHO-UMC and modified Hartwig-Siegel scales.

Results: Phase I identified 511 triggers in 319 patients with 24.9% positive trigger rate and 14.6% ADR rate. Conventional reporting captured only 28.3% of actual ADR burden, revealing 72% underreporting. Eleven unique pulmonology-specific triggers were developed. Phase II demonstrated superior performance with 68.43% positive predictive value, representing 2.7-fold improvement in detection accuracy. Antimicrobials (19.86%) and anti-tuberculosis drugs (13.62%) were predominant culprits.

Conclusions: TTM significantly transforms real-world drug safety monitoring by detecting previously unidentified ADRs and providing structured methodology for specialty-specific pharmacovigilance. This approach bridges the gap between controlled clinical trial environments and real-world practice, offering scalable solutions for enhanced patient safety across healthcare settings.

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A comprehensive study: simultaneous estimation of lamivudine and silymarin by U.V. Spectroscopy

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ABSTRACT

Background: UV Spectroscopy are analytical method a rapid and accurate technique to has been developed for simultaneous estimation of lamivudine and silymarin. The absorbance maximum for lamivudine and silymarin were observed at 270.4 nm and 324. 4nm. Lamivudine act as a nucleoside reverse transcriptase inhibitor (NRRI). They act as against HIV. Silymarin drug is used for treatment of chronic liver disease and hepatitis. Silymarin is hepatoprotective agent.

Objective: Comprehensive study review simultaneous estimation of lamivudine and silymarin by uv spectroscopy. **Methods:** Spectroscopy is the branch of science dealing with the study of interaction of electromagnetic radiation with matter. The technique of U.V. Spectroscopy is one of the most frequently employed in pharmaceutical analysis. It involves the measurement of the amount of ultraviolet (190-380nm) or visible (380-800nm) radiation absorbed by a s substance in solution. U.V. Spectroscopy instrumental method principle based on Beer's-Lambert's law. This study revealed that simultaneous iso-absorptive point was 284.0 nm both drugs are almost equal absorbance at this wavelength and also plotted Calibration curve of both drug concentration versus absorbance. Various methods of producer are used: i. Sample Preparation ii. Selection of Wavelength iii. Construction of calibration curves iv. Analysis of sample.

Results: This comprehensive review study crucial for simultaneous estimation of lamivudine and silymarin by uv spectroscopy. The absorption maxima of lamivudine were found to be at 270.4nm, and this method obeyed Beer's law in the concentration range is 5-30µg/ml. The limit of detection and quantification values for lamivudine were 0.043 and 0.130µg/ml. For silymarin absorbance maxima were found to be at 324.4nm, and the method obeyed beer's law in the concentration range is 5-30µg/ml. The limit of detection and quantification value for silymarin were 0.129 and 0.392µg/ml.

Conclusions: Spectroscopy analytical method are a most valuable, simple, specific, accurate, precision and rapid technique for pharmaceutical analysis of these two drugs. The method obeys Beer's law and has a good limit of detection and quantification value. Simultaneous estimation of both drug lamivudine and silymarin by uv spectroscopy involves using specific wavelength to determine the concentration of both drugs.

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A Review Study: Different Technique Used in Pharmaceutical Analysis

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ABSTRACT

Background: The aim of a review study on different techniques used in pharmaceutical analysis to provide a overview of different method is important for ensuring, quantify, quality, safety and efficacy of pharmaceutical product.

Objective: -Pharmaceutical analysis is a branch of analytical techniques in which study the different method for identification, quantification, purification and determination of a drugs. The field of pharmaceutical analysis is dominant in the quality, quantity, purity, safety C efficacy of medicinal products. Various analytical techniques used in pharmaceutical analysis to assess the identity, purity, potency C stability of drugs. Various analytical techniques from classical method Titrimetry C Gravimetry and from modern instrumental techniques like electrochemical method of analysis, spectroscopy (Uv spectroscopy, Fluorometry, NMR spectroscopy), Mass spectroscopy, Chromatography (HPLC, GC, TLC, PC, HPTLC) and others, each technique are important role played on pharmaceutical analysis. These modern analytical techniques used in estimation the quality of drugs.

Methods: A narrative synthesis was conducted examining current Phase 3 trial data on Orforglipron and exploring the role of RWE sources, including electronic health records, insurance claims and patient-reported outcomes in post-approval monitoring.

Results: – There are different analytical techniques available to analyse drug and estimate the quality C quantity of drugs. From classical method Titrimetry and Gravimetry techniques used to determine the quantity of drugs but this technique are oldest analytical techniques because currently many modern analytical techniques are developed. Instrumental method is employed in separation, quantification, purification efficacy estimation of chemical compounds. This instrument analytical techniques are also called advanced or modern analytical techniques.

Conclusions: This review paper provides an overview of different techniques used in pharmaceutical analysis. These different techniques employed for identify, separations, quantity, purify C determine the medicinal products. The main aim of the pharmaceutical drugs is to diagnose, treatment and prevention of disease. This different analytical techniques to important role played on estimation of quality, quantity and safety of drugs. This review paper also highlights the difference between Titrimetry, Gravimetry method and modern advanced analytical methods.

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Cubosomes based Intranasal Drug Delivery system for the management of neurological disorders

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ABSTRACT

Neurological disorders present a significant global health challenge due to the complex nature of the central nervous system (CNS) and the limitations of conventional drug delivery methods. The blood-brain barrier (BBB) poses a formidable obstacle to effective drug delivery to the brain. Intranasal drug delivery (INDD) offers a non-invasive alternative, bypassing the BBB and directly targeting the CNS. Cubosomes, lipid-based nanocarriers, have emerged as a promising platform for INDD of neurotherapeutics. Their unique bicontinuous cubic liquid crystalline structure offers several advantages, including enhanced drug encapsulation, sustained release, and improved cellular uptake. This review explores the potential of cubosomes for intranasal delivery of neurotherapeutics, highlighting their ability to overcome the challenges associated with CNS drug delivery and improve therapeutic efficacy. We discuss the mechanisms of nasal absorption, the formulation strategies for cubosomal-based INDD, and the preclinical and clinical advancements in this field. By addressing the limitations of conventional therapies and leveraging the benefits of nanotechnology, cubosome-based INDD holds the potential to revolutionize the treatment of neurological disorder.

Keywords: Neurological disorders, Cubosomes, Drug Delivery, CNS.

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EHR-Powered Pharmacovigilance: Advancing Drug Safety Beyond Controlled Trials

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ABSTRACT

Background: Clinical trials have long guided how we assess drug safety, but they often miss what happens in everyday patient care. With rise of digital health tools and electronic health records (EHRs), we now have the chance to better understand how drugs perform in the real world.

Objectives: To explore how real-world evidence (RWE) from digital sources like EHRs is changing how we monitor drug safety making it faster, more accurate, and more reflective of diverse patient experiences.

Methods: We looked at real-world safety monitoring efforts including the FDAs Sentinel program, Flatiron Health's Oncology data, and studies on Sacubitril/Valsartan. These examples show how digital tools like structured EHRs, data networks and AI are helping spot safety signals earlier and guide decisions.

Results: RWE derived from EHRs, insurance claims, and patient-reported data bridges the gap between RCTs and real-world practice. Despite challenges like low drug adoption and rare adverse event tracking, distributed networks enabled effective safety analysis. Machine learning further enhanced ADR signal detection and stratification.

Conclusion: The digital evaluation of clinical research is transforming pharmacovigilance. By integrating EHRs, big data, and AI, the future of drug safety lies in personalized, proactive, and real-time surveillance leading to a new era of safer, smarter therapies.

Keywords: Pharmacovigilance, Drug Safety, Real-World Data, AI in PV, Signal Detection, ADR, Future of Healthcare

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Pharmacovigilance in Clinical Trials: Bridging the Gap to Real- World Drug Safety.

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ABSTRACT

Background: In order to guarantee drug safety both before and after Clinical Trials, Pharmacovigilance is essential. Future Drug Safety Systems are increasingly relying on Real-World Data (RWD) as medicine shifts towards data-driven and individualized care.

Objective: To explore how developments in Real-World Evidence (RWE) and Data Science are changing Pharmacovigilance and influencing Medication Safety in the future.

Methods: Current Pharmacovigilance includes digital channels such as mobile apps, EHRs, and Spontaneous Reporting Systems. Artificial Intelligence (AI) and machine learning are examples of advanced techniques that help discover signals early. Large scale analysis and international cooperation are supported by platforms such as FAERS, Sentinel, and OHDSI.

Results: Time delays, data fragmentation and underreporting are problems with traditional Pharmacovigilance systems. Future-oriented approaches, on the other hand, proactive safety monitoring through wearable technology, patient-centred reporting, and interoperable databases. In disadvantaged communities that are frequently left out of trials, social media analytics and smartphone platforms improve detection.

Conclusions: Integrating organized clinical data with practical insights to build an intelligent, adaptable Pharmacovigilance Ecosystem is key to future of medication safety. This method guarantees safer treatments, improves regulatory agility, and permits quicker ADR discovery. In order to create a strong future for pharmacovigilance, cooperation between regulators, physicians, technologists, and patients will be essential.

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A Review Study: Different Technique Used in Pharmaceutical Analysis

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ABSTRACT

Background: Thorough clinical studies that prioritize safety and efficacy are the first step in the drug discovery process. However, because these studies are carried out in controlled circumstances with a predetermined population, it is difficult to comprehend how the medicine acts in varied individual's real -world situations.

Objective: To investigate how contemporary instruments and technologies improve pharmacovigilance and to stress the significance of real-world evidence (RWE) IN evaluating the continued safety of medications after approval.

Methods: With Emphasis on patient variety, real-world data gathering, and the use of AI and healthcare professional reporting to identify uncommon and chronic adverse events, an evaluation of post marketing monitoring procedure was conducted.

Results: Particularly for susceptible groups like the elderly, people on multiple medications, or people with comorbidities, real-world evidence provides important insights regarding side effects that might not be apparent in clinical trials. Faster detection, analysis, and reaction to such data are made possible by AI and technology-driven systems. Finding safety signals is greatly aided by the reporting of specialists.

Conclusions: Beyond early studies, drug safety is an ongoing process. By utilizing RWE and digital innovations, patient safety is enhanced and public confidence in medication is reinforced. Pharmacovigilance has taken a revolutionary step with the incorporation of collaborative reporting systems and developing technologies.

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PhytoShield: A Systematic Review of Emerging Antimicrobial Plants Targeting Multidrug-Resistant Pathogens

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ABSTRACT

Background: In recent years, MDR bacterial infection is harder to treat. Therefore, scientists are looking for the plants which offer a promising underutilized resource for discovering new antimicrobial agent. Many plants having unique mechanism of action and chemical compound that can stop the growth of resistant bacteria. This systematic review investigates plant based antimicrobial action against MDR pathogens.

Objective: The aim of this review is to find plant species that have been shown antimicrobial action against MDR bacteria and explain their phytochemical and therapeutic potential.

Methods: Out of 1,238 research articles, 178 full-text articles were assessed, 52 medicinal plants from 27 different plant families were selected. A systematic reliable search was conducted using science database (PubMed, Scopus, Science Direct, and Web of Science) up to June 2025, using prisma guidelines. Only research that was published in peer reviewed

journal and tested plants against MDR bacteria were used. Data were extracted about the plant's name, family, part used, type of extract, bacteria it worked against, and the key compounds responsible.

Conclusions: Prominent families plants were Carissa carandas, Tecoma stans, Nelumbo nucifera, Catharanthus roseus, Tinospora cordifolia, and Melia azedarach. Key MDR plants worked well against strong bacteria like Staphylococcus aureus (MRSA), E. coli, Pseudomonas aeruginosa, and Klebsiella pneumonia exhibited strong bactericidal activity. Their extracts showed good activity in lab tests, with strong results at low doses. Major Phytochemicals identified included flavonoids, tannins, and essential oils that can break bacterial walls, stop resistance mechanisms, and work with antibiotics.

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Comparative Assessment of Ethanol and PEG-200 as Co-surfactants in Self-Emulsifying Drug Delivery Systems Utilising Diverse Oil Phases

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ABSTRACT

Objective: The current study aims to examine the impact of two widely employed co-surfactants, ethanol and polyethene glycol (PEG), on self-emulsifying efficiency and globule size upon dilution of self-emulsifying systems prepared using oil, fixed proportion of Tween 80, Span 20 and co-surfactant.

Methods: The current study aims to examine the impact of two widely employed co-surfactants, ethanol and polyethene glycol (PEG), on self-emulsifying efficiency and globule size upon dilution of self-emulsifying systems prepared using oil, fixed proportion of Tween 80, Span 20 and co-surfactant.

Results: The current study aims to examine the impact of two widely employed co-surfactants, ethanol and polyethene glycol (PEG), on self-emulsifying efficiency and globule size upon dilution of self-emulsifying systems prepared using oil, fixed proportion of Tween 80, Span 20 and co-surfactant.

Conclusions: The current study aims to examine the impact of two widely employed co-surfactants, ethanol and polyethene glycol (PEG), on self-emulsifying efficiency and globule size upon dilution of self-emulsifying systems prepared using oil, fixed proportion of Tween 80, Span 20 and co-surfactant.

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The Role of Pharmacogenomics in Enhancing Drug Safety

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ABSTRACT

Pharmacogenomics, or the science of how genetic differences affect the way individuals respond to drugs, is increasingly becoming crucial to enhancing drug safety on the healthcare continuum. Conventional methods for drug development and prescription typically assume that patients will respond uniformly, and this can result in adverse drug reactions (ADRs), decreased effectiveness, and wasteful healthcare expenditures. By integrating genetic data into the choice- making process, pharmacogenomics allows for more targeted and individualized treatments, reducing the potential for adverse side effects and maximizing therapeutic performance. This discipline is notably valuable in discovering genetic markers influencing drug metabolism, like variations in CYP450 enzymes, which determine how patients metabolize frequently prescribed drugs such as antidepressants, anticoagulants, and chemotherapeutic agents. Integration of such genetic information into clinical trials and post-marketing surveillance enhances early risk identification and optimizes dosage recommendations. Additionally, integration of real-world data through electronic health records, biobanks, and patient registries enables pharmacogenomics to play a role in continuously monitoring safety in larger populations. In spite of its advantages, challenges persist in the areas of access to genetic testing, clinician

awareness, and ethical management of genetic information. However, with the falling cost of sequencing and technological progress, pharmacogenomics will become a keystone of drug safety systems in the modern era, leading the way towards a predictive and personalized medicine future.

Keywords: Drug safety, real-world data, artificial intelligence, big data, clinical trials, post-marketing surveillance, regulatory innovation, pharmacovigilance, personalized medicine, data-driven healthcare.

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Transferosome-Loaded Bigels in Transdermal and Topical Drug Delivery: A Synergistic Approach

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ABSTRACT

Background: Transferosome-loaded bigels have emerged as a novel, hybrid platform that unites the ultra-deformability and penetrative power of transferosomes with the biphasic sustained-release properties of bigels for advanced transdermal drug delivery. This review critically examines their formulation, physicochemical properties, mechanisms, and pharmaceutical applications, case studies from leading journals.

Objective: To critically review recent advances in transferosome-loaded bigels as synergistic drug delivery systems, focusing on their formulation strategies, physicochemical properties, and therapeutic potential for enhanced transdermal and topical drug delivery.

Methods: Systematic literature search was performed across leading databases. Studies reporting on preparation methods, optimization, characterization, and in vitro/in vivo evaluation of transferosome-loaded bigels were selected and analysed according to PRISMA guidelines.

Conclusions: Transferosome-loaded bigels present a promising hybrid platform that synergistically combines the deep skin penetration of transferosomes with the sustained, controlled release properties of bigel matrices. These systems demonstrate superior drug encapsulation, enhanced stability, and favourable rheological and release profiles, resulting in improved therapeutic efficacy, greater patient compliance, and reduced systemic side effects for a wide range of drugs—including peptides, insulin, anticancer, and antimicrobial agents. While challenges remain in large-scale production and long-term stability, current in vitro and in vivo evidence strongly supports the clinical potential of transferosome-loaded bigels as advanced transdermal and topical drug delivery vehicles.

Keywords: Transferosome-loaded bigels, transdermal drug delivery, skin penetration, controlled release, hybrid drug delivery systems, PRISMA Guideline

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Emerging Novel Drug Delivery Systems for Burn Wound Healing: Toward Precision and Enhanced Therapeutic Outcomes

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ABSTRACT

Burn injuries pose a serious clinical challenge because of their complexity, high risk of infection, and requirement for prolonged healing, e. When it comes to providing accurate, long-lasting, and targeted treatment, traditional topical and systemic therapies frequently fall short. Nanoparticles, hydrogels, liposomes, solid lipid nanoparticles, microneedles, and bioengineered scaffolds are among the Novel Drug Delivery Systems (NDDS) that are being investigated more and more to improve burn wound care in order to get around these restrictions.

Controlled drug release, improved skin penetration, extended therapeutic action, and targeted delivery of growth factors, antimicrobials, anti-inflammatory, and stem cell-derived agents are just a few benefits of these delivery systems. Furthermore, site-specific and stimuli-responsive therapy is made possible by intelligent NDDS platforms that react to pH, temperature, or enzymatic activity in the wound microenvironment. This reduces systemic side effects and speeds up tissue regeneration. In order to facilitate real-time monitoring and individualised treatment plans, recent developments also investigate the incorporation of biosensors and nanotechnology within these systems. Not with standing their potential, issues with cost, biocompatibility, scalability, and regulatory approval still need to be resolved. All things considered, NDDS is a revolutionary method of managing burn wounds that combines materials science and precision medicine to increase patient quality of life.

Keywords: Burn Wound Healing, NDDS, Nanotechnology, Smart Drug Delivery, Controlled Release, Wound Management, Transdermal Delivery.

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Nasal Gel Systems for Antidepressant Delivery: A Review of Formulation Strategies and Clinical Potential

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ABSTRACT

Depression is a major neuropsychiatric disorder which significantly affects millions of people worldwide, which results in substantial social and economic burden. Although there are various oral antidepressants available, their therapeutic effectiveness is often hampered because of first- pass metabolism, delayed onset of action, and their limited ability to cross the blood-brain barrier, thus presenting a need for the exploration of alternative routes and novel delivery systems. The intranasal route has gained increasing attention in recent years for direct nose-to-brain delivery, thus offering a non-invasive alternative that directly reaches the BBB and provides rapid onset of action. In-situ nasal gels have emerged as promising platforms, among various intranasal formulations. These gels undergo sol-to-gel transition when administered, thus ensuring prolonged residence time, sustained drug release and reduced mucociliary clearance thus thereby enhancing bioavailability and therapeutic efficacy, especially for drugs targeting central nervous system (CNS).

Several antidepressants like Quercetin, Trazodone, and novel NMDA receptor antagonists like Ketamine have been investigated for delivery by making their intranasal gels. There have been significant advancements made in the recent years 2020-25 including the incorporation of nanocarriers into nasal gels to achieve controlled release and enhanced permeation rate. Thus, intranasal gel formulations present a novel delivery for direct nose to brain delivery overcoming the problems caused due to traditional oral antidepressants.

Keywords: Depression, intranasal gel, antidepressants, bioavailability

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Revolutionizing Drug Delivery: The Role of 3D Printing in Modern Pharmaceutical Manufacturing

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ABSTRACT

Three-dimensional (3D) printing technology are continuously applied to novel fields, laying the foundations for a new pharmaceutical industrial revolution. It has revolutionized pharmaceutical manufacturing by enabling the creation of highly customized medications, ranging from low to high volumes, with precise geometries, colours, flavours, dosages, administration routes, and sophisticated release profiles, all of which contribute to improved patient compliance. The use of computer-aided design (CAD) in 3DP technology makes it possible to manufacture medication, formulations with the appropriate release rate and pattern. A landmark achievement in this domain occurred in August 2015, when the FDA approved Spritam, an antiepileptic drug, as the first 3D-printed pharmaceutical product, setting a new precedent in drug delivery innovation. A new era in pharmaceutical manufacture, 3D printing technology has attracted a lot of attention lately due to its many benefits over conventional pharmaceutical procedures. Primary 3Dprinting technical platforms being researched in pharmaceutical sector are Fused Deposition Modeling (FDM), selective laser sintering, binder jetting, fused deposition modeling, stereolithography, & inject printing. FDM 3D printing is emerging as a transformative technology in pharmaceutical manufacturing, offering unprecedented opportunities for personalization, affordability, and streamlined production processes. 3D printed tablets require fewer excipients compared to traditional tablets, which rely on binders, fillers, and lubricants for compressibility and stability. These excipients increase tablet bulk and may cause side effects. 3D printing methods like FDM are use drug-loaded polymers, forming precise dosage forms without many auxiliary agents. This reduces excipient load, enhancing efficiency and patient safety. The 3D method will probably transform medication delivery systems to a whole new level, though need time to evolve.

Keywords: 3D Printing, Novel drug delivery, Personalized medication, Fused deposition modeling, Pharmaceutical.

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Accessing ADRs By Macrolides Antibiotics: Detection Strategies in Clinical Trials and Prevention in Clinical Practice

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ABSTRACT

Macrolide antibiotics, specifically Azithromycin, Clarithromycin, and Erythromycin, are frequently employed as first-line therapeutic agents for the management of respiratory, dermatological, and UTI's. Hearing loss, diminished taste, QT-prolongation and highly risky Torsade-de-Pointes (T-TDP), Stevens-Johnson Syndrome (SJS), are potential adverse drug reactions (ADR). Detecting ADRs in macrolide clinical trials is essential to ensure patient safety, balance efficacy against risks, identify rare severe reactions, guide regulatory approvals, and prevent dangerous drug interactions. The challenge of determining ADRs lies in distinguishing them from symptoms of the underlying disease, which can be achieved through randomized controlled trials (RCTs) comparing macrolides to a placebo. The primary objective of investigating macrolide antibiotics is to understand safety profile by examining ADR.

A review of clinical studies was conducted to assess the macrolides safety by comparing them to standard treatments or placebos, focusing on frequency of side effects. The analysis revealed that certain patient groups with electrolyte imbalances or ALD, are at increased risk of ADR like hepatotoxicity. To optimize safety, macrolides preferred in intravenous forms due to their lower peak concentrations and reduced arrhythmogenic potential. Placebo-controlled trials play an important role in identifying drug effects by separating them from symptoms of the underlying disease.

Implementing active surveillance methods, like standardized patient questionnaires, can significantly enhance the detection of ADRs. Research reveals drawbacks, as underreporting of ADR and antibiotic resistance. Its need for standardized reporting of ADR. By addressing existing knowledge gaps, we can optimize treatment outcomes and reduce the risk of harm ensuring the effective and safe use of these antibiotics.

Keywords: Macrolide Antibiotics, patient safety, ADR, Arrhythmia, Placebo, randomized controlled trials (RCT), ADR Reporting

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Semisolid Dosage Forms

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ABSTRACT

Semisolid dosage forms are pharmaceutical products with a texture that falls between solid and liquid. They are mainly used for applying medications to the skin, mucous membranes, or wounds. Common types include ointments, creams, gels, and pastes. These forms are popular for localized treatment because they deliver drugs directly to the targeted area, improve patient adherence, and allow for controlled release of the medication. Semisolid bases, such as oleaginous, water-soluble, or emulsifying agents, are crucial for maintaining drug stability and absorption. Factors like viscosity, spread ability, and drug permeability greatly affect how well these treatments work. Recent developments in semisolid technology, including the use of penetration enhancers, liposomal gels, and nano emulsions, have further enhanced drug delivery. It's important to understand the physical and chemical properties of both the drug and the base for the successful design of semisolid dosage forms.

Keywords: Semisolid, Semisolid dosages forms, Topical drug delivery, Targeted drug delivery

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Method Development and Evaluation of Stability Parameters for Semisolid products using Temperature indicators

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ABSTRACT

The aim of the article is to carry out optimization studies for method Development and Evaluation of Stability Parameters for Semisolid products using temperature indicators. This research has been designed to identify the root cause of market complaints of pharmaceutical products, which was arrived due to mishandling of product storage condition. Semisolid products are heat sensitive and may leads to change in quality parameters, if not storage properly during transportation, at pharmacy and by the end user itself. If customer observed any change in description, phase separation may lead to complaint to the pharmaceutical industry. This article presents the results of the study conducted among semisolid products of different companies along with in-house formulation with the help of Self-adhesive temperature strips. As worst-case aluminium tubes were selected for marketed and in- house formulation considering more heat sensitive.

Self-adhesive temperature strips react to specific increase in temperature by changing colour irreversibly within 2 to 3 seconds when thresholds are exceeded measuring range +37 ℃ to +65 ℃ and can be applied on a variety of different pharmaceutical products those are heat sensitive. Additional study was designed to evaluate temperature impact if purchased product kept inside vehicle and customer parked the vehicle in sunlight. This article may be treated as benchmark for pharmaceutical companies once reviewing their approach to implementing corrections and corrective actions for various market complaints.

Keywords: Pharma Industry supply chain, Self-adhesive temperature strips, Market complaints, Phase separation, Storage condition

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Understanding the Financial Impact of Depression: A Systematic Review of Cost-of-Illness Evidence from India

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ABSTRACT

India bears a large portion of the societal and economic effects of depression, which is a major contributor to the disease burden. With an emphasis on both direct and indirect costs, this review examines the cost-of-illness (COI) data about depression in India. Clinical depression or Major depressive disorder (MDD) is thought to affect 15–20% of people in their lifetime, and gender and poverty are important risk factors. The average yearly direct cost of depression in India is around ₹11,000 per person, which includes both medical (₹3,705 median) and nonmedical (₹1,600 median) expenses. However, indirect costs—which make up 82% of the total COI—amount to an average of ₹53,000 per year and include things like lost work, caregiver stress, and time off for consultations. An estimated ₹64,000 is the total yearly economic burden per person. Financial barriers to consistent care are highlighted by the fact that patients on regular medication spend much more (₹1,387) than those receiving irregular treatment (₹554). These results highlight the fact that women and lower- income groups are disproportionately affected by depression, and that untreated mental illness leads to significant productivity losses and long-term financial strain. Legislators must give financing for mental health financing a high priority, increase insurance coverage, and enhance access by distributing resources fairly and utilizing digital health tools. Planning successful, inclusive, and long-lasting mental healthcare.

Keywords: Cost of Illness, Depression, Socioeconomic Disparities, Mental Health Policy

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Film forming spray (FFS): A novel topical strategy for management of diabetic neuropathy

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ABSTRACT

Background: Diabetic neuropathy is a common and progressive complication of diabetes, characterized by nerve damage, chronic pain, tingling and burning sensations, especially in the extremities. Current treatment options, including oral administration of drugs, are often limited by systemic side effects such as nausea, dry mouth, and poor gastrointestinal tolerance. Moreover, long-term use may lead to reduced patient adherence and inconsistent therapeutic outcomes. There is an emerging need for targeted, patient-friendly alternatives that can enhance localized relief while minimizing systemic exposure.

Objective: - This review aims to explore the potential of a film forming spray (FFS) as a novel topical strategy for managing diabetic peripheral neuropathic pain. The focus is on understanding how FFS can enhance drug retention at the site of pain, enable sustained drug release through the skin, and offer better patient compliance. It also highlights formulation considerations, challenges, and future directions in this domain.

Conclusions: Film forming spray technology presents a promising solution to overcome the drawbacks of oral drug delivery in diabetic neuropathy. By enabling localized application, forming a stable and transparent film, and allowing controlled drug diffusion, FFS can offer a more effective and tolerable approach for neuropathic pain management. The integration of suitable therapeutic agents into this system may significantly improve therapeutic outcomes, reduce systemic adverse effects, and represent a meaningful advancement in personalized diabetic care.

Keywords: Diabetic neuropathy, film forming spray, topical delivery, neuropathic pain, patient compliance, controlled release.

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Advances in Soft Gelatin Capsule Technology Enhancing Bioavailability Through Lipid-Based Delivery Systems

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ABSTRACT

Soft gelatin capsules (SGCs) are so good at encapsulating liquid and semisolid formulations they are frequently used to deliver lipophilic and poorly water-soluble medications. Because it is easy to swallow and masks taste, this dosage form guarantees accurate and consistent administration, increases the bioavailability of difficult active pharmaceutical ingredients (APIs) and greatly increases patient compliance. In contemporary drug development, the significance of SGCs has been further enhanced by the pharmaceutical industry's growing dependence on poorly soluble APIs. Despite its benefits, the ongoing challenges of improving the solubilisation of hydrophobic drugs, maintaining formulation stability under different storage conditions improving drug permeability and optimising large-scale manufacturing efficiency are driving the continuous evolution of softgel technology. The key to overcoming these obstacles and increasing the therapeutic potential of softgel capsules is the development of innovative encapsulation methods, lipid-based systems, and self-emulsifying drug delivery systems (SEDDS). This paper highlights current developments in soft gelatin capsule creation while outlining the basic composition and structure of these capsules. Among new approaches, Self-Emulsifying Drug Delivery Systems (SEDDS) have attracted a lot of interest. These lipid-based formulations significantly increase oral bioavailability by forming emulsions spontaneously in the gastrointestinal system, which keeps the medication liquid. BCS Class II and IV medications benefit most from SEDDS.The technology of soft gelatin capsules (SGCs) has been greatly enhanced by contemporary methods such as SEDDS, nanoemulsions, phytosomes, and polymer-coated softgels. The ease of use, scalability, and exceptional capacity to improve solubility of SEDDS-based softgels make them stand out among others. For SGCs to continue to be successful, formulation and process design innovation must continue

Keywords: Lipid-based systems, SEDDS, nanoemulsions, phytosomes, novel encapsulation techniques

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Dry Power Inhaler for the Acute Migraine Treatment via Nose-to-Brain

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ABSTRACT

A neurological disorder referred to as migraine causes patients to experience severe to moderate headache attacks. The oral route, such as tablets and syrups, is frequently used to treat nausea, vomiting, and light sensitivity, but these methods have a slow onset of action or low bioavailability. It can cause gastric problems in patients. For this reason, researchers are focusing on developing intranasal drug delivery systems, with a particular emphasis on dry powder inhalers, as these methods target acute migraines by directly delivering the drug to the brain through the nose. DPI is a novel technique for

the nanostructure lipid carriers, mucoadhesive emulsion, and inhalation powder DPI device which permits for quick drug deposition and direct drug delivery to the central nervous system. Intranasal sumatriptan has a medication targeting efficiency of 258% or a direct transport percentage (DTP) of 61%, according to this study, clinical trial, and tolerability. They are dependable and efficient in two hours without the need for injections or oral medication. The development of the DPI formulation, device design, and clinical use for nose-to-brain migraine therapy are reviewed here. As a new, quick-acting, and patient-friendly treatment for acute migraine attacks, DPI is based on internasal administration. The current study is investigating the benefits of nanoscale drug loading with aerodynamic properties of microparticles, as well as the personalized DPI design using 3D nasal modeling and formulation with nano-in-microparticle system. This technology supports the DPI-based internasal system for the next generation of migraine therapy, has improved CNS targeting, is patient-friendly, and produces better results.

Keywords: Dry powder inhaler, migraine, nose-to- brain and internasal delivery, Zavegepant, Sumatriptan

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Utilization of Artificial Intelligence Across Drug Discovery Phases: A Comprehensive Review of Emerging Tools and Technologies

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ABSTRACT

Artificial intelligence (AI), absolutely through machine learning (ML), has changed the way we find new drugs by combining what we know about diseases with the design of new remedies. It has the ability to manage vast volumes of biomedical data, discover intricate patterns, and in drug development process it helps in making predictions. Artificial intelligence is applied in every crucial step of drug research. ML models look at omics and biomarker data to locate new druggable targets in disease and target identification. When looking for hits and optimising leads, deep learning and generative models make it easier to undertake virtual screening and come up with new compounds. In preclinical testing, AI helps by predicting important facts about a drug, and about its ADME process. AI also helps quickly find out candidates who aren't a good fit by revealing how the medicine works in the body. AI also helps in finding patients, designing studies, predicting responses, and looking out on outcomes in clinical trials. This makes it more probable that the studies will work and go smoothly. Some of the most important technologies that are helping to move things forward at all stages include DeepChem, AtomNet, ProTox-II, and AlphaFold. This is speeding up and lowering the cost of development. AI also makes drug repurposing and precision medicine easy by finding new uses for existing molecules. It also helps in tailoring therapies to each patient. There are different benefits for AI to be used in drug development, but there are also a number of problems, such as data quality, model interpretability, and ethical issues, especially when it comes to keeping patient data private in clinical trials. These issues need to be fixed so that a lot of people will utilise this. As technology grows better, AI will help in making medication development much faster and better. This will make drugs safe and effective for patients and will improve overall public health.

Keywords: Drug Discovery, AI, Target Identification, Machine learning

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Artificial Intelligence & Real-World Evidence: The Future of Drug Safety Monitoring

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ABSTRACT

Emerging technologies, particularly Artificial Intelligence (AI), are significantly impacting healthcare management and medical innovation. AI simulates human cognitive processes to analyze complex data, while Real-world data (RWD) allows researchers to recognize the effectiveness of treatments in everyday situations. This data type captures factors that cannot be measured in clinical settings. Real- world data can be obtained from observational studies, clinical trials, or surveys conducted in the real world. To improve the accuracy, speed, and efficiency of identifying, assessing, and mitigating drug-related risk throughout the drug lifecycle. Enhanced detection and prediction of adverse drug events like AI power signal detection, real-time monitoring, Improved efficiency and automation, increasing collaboration and data sharing. AI and Real-World Evidence (RWE) are transforming drug safety and monitoring by enabling proactive and comprehensive surveillance of drug performance. AI algorithms analyze large datasets from various sources, including AI-powered data analysis tools such as Natural language processing (NLP), Machine learning (ML), Deep learning, cross-system integration, and electronic health records. Advanced technologies, like AI and machine learning, can analyze RWE to uncover valuable insights into drug safety, complementing traditional clinical trial data. By leveraging diverse real-world data (RWD) sources and advanced technologies such as AI, RWE is becoming crucial for ensuring drug safety, personalizing treatment, and enhancing public health.

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Fast Dissolving Oral Film for Migraine Management

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ABSTRACT

Migraine is a common neurological condition often frequently causes nausea and vomiting, limiting the effectiveness of conventional oral tablets. Fast-dissolving oral films (FDOFs) present a promising, patient-centric platform for quick drug delivery through the oral mucosa. Oral dispersible films (ODFs) offer a novel drug delivery platform with rapid disintegration, mucosal absorption, and enhanced patient compliance.

The data from published research on formulation Techniques such as solvent casting, polymer selection (e.g., HPMC, PVA, Pullulan), and plasticizers (e.g., PEG-400, Glycerin). disintegrants (crospovidone), Solubility Enhancer: HP-β-Cyclodextrin, permeation enhancers (Poloxamer 188, SLS), and taste-masking agents are compiled in this review. Key performance parameters include disintegration time, mechanical strength, taste masking, and in vitro dissolution profiles performance metrices evaluated.

Fast-dissolving oral films (FDOFs) illustrate significant benefits including rapid disintegration (<30 seconds), avoidance of hepatic first-pass metabolism, dose accuracy, enhanced stability, and better patient compliance. Fast-dissolving oral films represent a promising alternative for migraine therapy, particularly for those patients who have swallowing difficulties or gastrointestinal issues. Therefore, it comes to the conclusion that additional translational research is required to get reframe the limitations of current formulation and bioavailability.

Keywords: Migraine, NDDS, Patient Compliance, Oral Film.

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PERIODONTITIS MANAGEMENT USING STIMULI-RESPONSIVE POLYMERIC GELS

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ABSTRACT

Periodontitis is a chronic, multifactorial inflammatory condition of the supporting structures of teeth, leading to periodontal pocket formation, alveolar bone resorption, and eventual tooth loss if left untreated. Traditional therapeutic approaches such as scaling and root planning, often combined with systemic or local antibiotics, are frequently inadequate in achieving long-term resolution due to poor drug penetration, rapid clearance from the site, and patient non-compliance. These limitations highlight the urgent need for innovative and site-specific therapeutic strategies that offer prolonged drug retention, controlled release, and minimal systemic exposure. Stimuli-responsive polymeric gels represent a novel class of localized drug delivery systems engineered to respond to specific environmental triggers such as pH, temperature, or enzymatic activity that are characteristically altered in the periodontal microenvironment. These "smart" hydrogels undergo reversible changes in their physical or chemical structure, allowing for controlled and on-demand drug release at the site of inflammation. In periodontitis, where the local pH becomes more alkaline and enzymatic activity is elevated, these polymers can be tailored to release therapeutic agents specifically under diseased conditions, thereby improving clinical outcomes.

The use of polymers such as chitosan, poly(N-isopropylacrylamide), or polyacrylic acid enables the formulation of in situ gelling systems that transition from a liquid to gel upon contact with gingival crevicular fluid. These gels can be loaded with antibiotics, anti-inflammatory agents, or regenerative molecules and provide prolonged residence time in the periodontal pocket due to their mucoadhesive nature. Furthermore, they reduce dosing frequency and improve patient compliance by minimizing the need for repeated application.

Keywords: Periodontitis, Stimuli-Responsive Polymers, Mucoadhesive Gels, Localized Drug Delivery, Smart Hydrogels, Controlled Release Systems.

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The Role of Machine Learning and Data Mining in Advancing Diabetes Research

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ABSTRACT

Biotechnology and health science have progressed rapidly, resulting in the collection of large amounts of bio-medical data including genetic information, lab result, and record stored in large electronic health system (EHRs). This type of data can only be analysed with the help of advanced computing tools. Application of machine learning and data mining techniques is essential in bioscience, especially to convert large and complex data into knowledgeable data. In diabetes mellitus (DM), a family of metabolic diseases that cause a significant burden of disease, there are strong chances of ML advancing their prediction, diagnosis, and management of complications. The present study conducts a review of the methods used in diabetes research that involves in machine learning and data mining technique. It also emphasizes the usage of several algorithms like decision trees, support vector machines (SVM), random forests, and neural networks in the analysis of patterns and forecasting of complications of diabetes. About 85 percent of the surveyed literature used supervised learning techniques because it is more accurate than other approaches when it comes to diagnostic applications and the remaining 15 percent of the sum used unsupervised learning approach, such as cluster and association rule mining, to find hidden trends and relationships in the data. The computational techniques proposed will improve early identification of diabetes and its complications, making it possible to implement individualized intervention strategies, and establish predictive healthcare systems that could help in managing aspect of Computational diabetes better.

Keywords: Biotechnology, Bioscience, Electronic Health Care, Machine Learning (ML), Diabetes mellitus, Computational Healthcare

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A Systemic review on N-Heterocyclic Scaffolds in Antiviral Drug Discovery Chemical Diversity, Target Mechanisms & Therapeutic Promise

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ABSTRACT

Over the last ten years, heterocyclic compounds have emerged as a pivotal scaffold in the development of antiviral agents, with extensive research yielding promising candidates against RNA viruses such as influenza A, hepatitis C virus (HCV), human immunodeficiency virus (HIV), coronaviruses (including SARS-CoV-2), Zika, Ebola, and respiratory syncytial virus (RSV), as well as DNA viruses like herpes simplex (HSV) and Ortho poxviruses. Notable successes include N-heterocyclic direct-acting antivirals (DAAs) targeting HCV NS5A (e.g., Ledipasvir, Daclatasvir) and RNA polymerase inhibitors like Azvudine (nucleoside analog effective against HIV-1 and SARS-CoV-2). Favipiravir, a pyrazine carboxamide, demonstrates broad inhibition of influenza and other RNA viruses. Beyond enzyme inhibition, heterocyclic molecules targeting viral ion-channel proteins (viroporins) in influenza, HCV, HIV, coronaviruses, and RSV offer fascinating antiviral mechanisms.

This review synthesizes findings from Scopus-indexed reports—highlighting pyrazole-, thiazole-, triazole-, imidazole-, indole-, piperazine-, and quinoxaline-based scaffolds—to map chemical diversity, target specificity, antiviral potency, and pharmacological promise. The accumulating evidence positions heterocyclic frameworks as versatile leads for next-generation antivirals. Future work should focus on optimizing pharmacokinetics, assessing resistance profiles, and expanding in-vivo validation. The review cites recent authenticated studies from 2015–2025 to support these conclusions.

Keywords: Hetrocyclic compounds, Antiviral drug discovery, antiviral activity, SAR, SARS CoV-2, HIV, Influenza.

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Advancements in Artificial Intelligence for Drug Safety Surveillance and Adverse Drug Reaction Detection: A Review

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ABSTRACT

Pharmacovigilance (PV), the science and activities relating to the detection, assessment, understanding, and prevention of adverse effects or any other drug-related problems, forms the bedrock of patient safety throughout the drug lifecycle. The increasing complexity of modern therapeutics, coupled with an exponential surge in diverse data sources—ranging from traditional spontaneous reporting systems and clinical trial data to electronic health records (EHRs), social media, and omics data—has overwhelmed conventional, manual pharmacovigilance methods. These traditional approaches are inherently limited by issues such as underreporting, reporting bias, and significant delays in signal detection, often leading to missed or delayed identification of crucial adverse drug reactions (ADRs). In response, Artificial Intelligence (AI), encompassing Machine Learning (ML), Deep Learning (DL), and Natural Language Processing (NLP), has emerged as a transformative force, offering unprecedented capabilities to address these challenges. This comprehensive review synthesizes recent advancements in AI applications for drug safety surveillance and ADR detection. We critically examine how AI facilitates automated data extraction and case processing, significantly enhances signal detection speed and accuracy, enables robust predictive analytics for personalized risk assessment, and effectively leverages real-world data (RWD) for more holistic surveillance. While these advancements promise increased efficiency, improved accuracy, and ultimately, enhanced patient safety, significant challenges persist. These include issues related to data quality and bias, the "black box" nature and interpretability of complex AI models, evolving regulatory complexities, and the indispensable need for continued human oversight. This review concludes by emphasizing the ongoing evolution of AI in PV, underscoring the necessity of collaborative efforts among technology developers, pharmaceutical companies, regulatory bodies, and healthcare providers to fully realize its profound potential for shaping a safer pharmaceutical landscape.

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Pharmacovigilance Approaches for Ensuring the Safety of Advanced Wound Healing Therapies: A Review

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ABSTRACT

The primary aim of this review is to critically explore the current pharmacovigilance strategies applicable to advanced wound healing therapies, with a focus on ensuring patient safety and optimizing clinical outcomes. This review addresses the unique safety challenges posed by such innovative interventions, including immunogenic reactions, delayed adverse effects, and product-specific complications. The modern approaches for wound healing treatment have revolutionized the therapy of giving creative solution ranging from biological dressing to regenerative medicine approaches such as mesenchymal stem cells (MSCs), tissue nano-transfection, 3D bioprinting, and ECM bio-scaffolds, provide targeted solutions. These therapies aim to address healing barriers at the molecular level and promote recovery through precise pathway modulation. The review highlights the promise and challenges of these emerging wound care strategies, marking a shift toward more personalized and regenerative approaches. Instead of all this, complexity and novelty of these medications express a specific pharmacovigilance challenges the need sophisticated calculating system. This review explains the detail pharmacovigilance parameters specifically associated with advanced wound healing therapy and defining the upcoming safety landscape, regulatory requirements and implementation challenges. Furthermore, different integrating and novel strategies like nano-medicine, stem cell therapy, 3D-bioprint skin, ECM-related approaches, platelet-rich-plasma-based approaches, and cold plasma treatment used for the improving the quality of wound healing also discussed with their usefulness and limitation. Finally, the reviewing the challenge of these novel strategies leave an impact on upcoming aspect and generate more vigilance frameworks to ensure better patient safety when give more attention on therapeutic innovation.

Keywords: Pharmacovigilance, safety, acute and chronic wound, medical device and safety profiling, etc.

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Bridging Clinical Gaps: Bidi vs. Cigarette Smoking and Their Implications in Lung Cancer Risk Models

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ABSTRACT

With the evolving focus of drug safety shifting from strictly controlled clinical trials to the inclusion of real-world data, it becomes essential to understand modifiable risk factors—tobacco use being a major one. Lung cancer remains the most fatal cancer globally, and tobacco consumption is a primary driver. Although cigarette smoking has been extensively researched in both clinical and population studies, bidi smoking—predominantly seen in South Asian regions—has not been explored to the same extent. This review evaluates and compares the existing literature, including observational studies, community-based surveys, and real-world data, to assess the lung cancer risk linked to bidi and cigarette smoking. The evidence reveals that bidi smokers may face a similar or even greater risk of lung cancer than cigarette smokers, largely due to the absence of filters, higher levels of nicotine and tar, and more intense inhalation behaviour. The review also identifies research gaps, such as insufficient longitudinal data and inconsistent reporting, that hinder comprehensive risk assessment. Incorporating these real-world lifestyle exposures into pharmacovigilance and post-market safety monitoring is critical. Recognizing bidis as a significant carcinogenic threat is vital for refining lung cancer risk prediction models and informing targeted public health strategies.

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Post-Marketing Surveillance of Dapagliflozin (Farxiga): A Three-Year FAERS Analysis of Adverse Events (2023–2025)

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ABSTRACT

Background: Dapagliflozin, an SGLT2 inhibitor for diabetes, heart failure, and kidney disease, offers cardiorenal benefits. However, real-world data are crucial to identify rare or serious adverse events not fully observed in clinical trials.

Objective: Evaluate the safety profile of dapagliflozin by analyzing spontaneous adverse event reports submitted to the FAERS from 1 Jan 2023 to 31 Mar 2025.

Methods: Retrospective pharmacovigilance study was conducted on de-identified FAERS line-listing data. Reports with dapagliflozin or Farxiga listed as a suspect or interacting product were extracted. Descriptive statistics were applied to assess AE frequency, seriousness (FDA criteria), patient demographics, concomitant medications, and clinical outcomes.

Results: Out of 1,057 unique reports, 42% were serious, including 19 deaths (1.8%). Common AEs included genital/urinary fungal infections (14.2%), renal impairment/AKI (11.4%), DKA (8.0%), hypotension/dehydration (8.5%), Fournier's gangrene (2.1%, all males, median age 67). Median patient age was 70 years; sex was unspecified in 55%. Loop diuretics, colchicine, and other SGLT2 inhibitors were common concomitants. FDA flagged 35% as "expedited," suggesting regulatory concern.

Conclusions: FAERS data confirm known risks (DKA, genital infections) and highlight severe events like Fournier's gangrene, especially in elderly males with polypharmacy. Routine renal monitoring and infection awareness are advised. Acceptance confirmation will be sent via e-mail.

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Surveillance of MDR Uropathogens in UTIs: A Retrospective Analysis of Antibiotic Resistance and Clinical Correlates in a Tertiary Care Setting"

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ABSTRACT

Background: Urinary tract infections (UTIs) are among the most common bacterial infections globally, affecting nearly 150 million people annually. In India, UTIs account for 10–20% of outpatient cases and a large share of hospital-acquired infections. The increasing prevalence of multidrug-resistant (MDR) uropathogens, especially Escherichia coli and Klebsiella species, with resistance rates between 40% and 70%, has made treatment more challenging. The overuse and misuse of antibiotics have contributed to antimicrobial resistance, resulting in treatment failures, extended hospital stays, higher morbidity, and increased healthcare costs. This impact is more pronounced in the elderly, females, and those with

diabetes, hypertension, surgeries, or catheter use.

Objective: To determine the prevalence of MDR organisms in UTI cases, assess resistance patterns, and explore associations with demographics, comorbidities, and surgical history.

Methods: A retrospective observational study was conducted at Apollo Rajshree Hospital, Indore, from January to December 2024. Two hundred culture-positive UTI cases were included. Demographics, clinical history, and microbiological data were collected. Antibiotic susceptibility testing was performed using standard methods. Data were analyzed using descriptive statistics and Chi-square tests ($p > 0.05$)

Results: E. coli (51%) was the most common isolate, followed by Klebsiella pneumoniae (22.5%) and Pseudomonas aeruginosa (11.5%). MDR organisms were detected in 67.5% of cases. High resistance was seen with aztreonam (100%), ampicillin (98.5%), and levofloxacin (97%). Fosfomycin (40.0%), nitrofurantoin (56.0%), and colistin (54.5%) showed better sensitivity. MDR correlated significantly with surgery, diabetes, and hypertension.

Conclusions: Culture-based therapy and antibiotic stewardship are essential to reduce MDR-UTI burden.

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Modeling Drug Absorption Rate Using Fuzzy Matrices, PCA, and Machine Learning

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ABSTRACT

Accurate modeling of drug absorption is essential for optimizing therapeutic efficacy and advancing personalized medicine. This study proposes a hybrid computational framework that integrates fuzzy logic, Principal Component Analysis (PCA), and machine learning to predict drug absorption rates based on physiological and chemical parameters, including gastric pH, partition coefficient (log P), enzyme activity, and bodily response. Fuzzification is applied to handle uncertainties inherent in biological inputs. PCA is implemented through complete mathematical derivation—standard deviation, covariance matrix, eigenvalues, and eigenvectors—to reduce dimensionality and eliminate redundancy. The resulting principal components are used to train predictive machine learning models. Experimental evaluation demonstrates improved accuracy and robustness, offering a transparent and scalable solution for pharmacokinetic modeling under uncertain conditions.

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Safety Profile of Trastuzumab Deruxtecan: A FDA Adverse Event Report

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ABSTRACT

Background: Trastuzumab Deruxtecan (T-DXd) is an antibody drug conjugate used for HER2-positive and HER2-low cancers. This report synthesizes adverse event data submitted to FDA within 2022- 2025, providing a real-world safety profile on T-DXd under diverse geographical setting.

Objective: To analyze post-marketing adverse event reports for Trastuzumab Deruxtecan during period of 2022 to 2025, with emphasis on indications, adverse reactions, seriousness, outcomes, and patient demographics.

Methods: Retrospective pharmacovigilance review of more than 1,000 Trastuzumab Deruxtecan related reports retrieved from the FDA Adverse Event Reporting System (FAERS). Data extracted included patient demographics, indications, concomitant therapies, serious adverse events (SAEs), and outcomes.

Results: Median age 44–75 years, 93 % female. Indications were mainly metastatic breast cancer (45 %), gastric cancer (20 %), HER2-low breast cancer (15 %), cervical adenocarcinoma (10 %). The reports originated from 18+ countries. Major SAEs were gastrointestinal toxicities (36 %), myelosuppression (19 %), fatigue (16 %), interstitial lung disease/pneumonitis (10 %), sepsis/infection (10 %). Sixty-two deaths (26%) were found to be due to disease progression, sepsis, or ILD. Polytherapy was recorded in 74% of cases.

Conclusions: For the FDA reporters, 25% of the serious T-DXd cases ended with death, mainly with ILD or sepsis, the consequences 3 to 4 times more fatal across each other compared with other deaths. Careful monitoring is required while keeping polytherapy and pulmonary symptoms.

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Review: Role of Clinical Pharmacist in Management of Diabetes Mellitus

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ABSTRACT

Background: Diabetes mellitus is a metabolic disorder in which increases the blood glucose level in the body. Diabetes is a group of disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. This review is address and summarize the role of clinical pharmacists in Diabetes Meliitus management. A clinical pharmacist provides directly patient care; medication therapy management and patient counselling then optimize patient care.

Method: Clinical Pharmacist play a crucial role in managing diabetes mellitus by providing comprehensive patient education, optimizing medication regimens and monitoring treatment effectiveness. They educate patients on proper medication use, blood glucose monitoring and lifestyle changes and work collaboratively with physicians and other healthcare professionals to ensure optimal glycemic control.

Result: This review study focuses on current evidence to support of role of clinical pharmacists in diabetes management. Clinical Pharmacists acting as a vital member of the healthcare team. They contribute by optimizing drug therapy, education patients about their condition and medications and monitoring their progress to achieve better glycemic control and overall health outcome. Clinical Pharmacist well trained healthcare professionals who can help patient to managing their diabetes conditions.

Conclusion: Clinical Pharmacists play a crucial role in the management of DM by enhancing glycemic control, improving patient education and adherence to treatment plans and collaborating with healthcare professionals. They contribute to better treatment outcomes and reduce the risk of complications associated with diabetes.

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Exploring the Safety Profile of Finerenone: Statistical Insights into Real-World ADR Reporting

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ABSTRACT

Background: Finerenone is a non-steroidal mineral corticoid receptor antagonist which is widely used for patients having chronic kidney disease with underline comorbidities. As it's increasing clinical trials, its importance to identify its adverse drug reaction and its associated factors for potential drug risk is essential for drug safety.

Objective: To evaluate drug ADR according to its reason for use, its reaction, seriousness, outcome, gender and age.

Methods: It is a retrospective observation study which was conducted on patience administered with Finerenone and data was obtained from FAERS. For relation among continuous variables like age Karl Pearson correlation and to assess the association between categorical variable chi-square tests is considered. For baseline characteristics descriptive statistics were applied.

Conclusions: Age and gender significant show association with the severity of ADR due to drug. Even though the drug has potential efficacy, it demands rigorous patient selectivity, monitoring endpoints and pharmacovigilance. Personalized dosing to reduce ADR.

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An Exhaustive Review on Microsponge Technology for the Treatment of Antifungal Disease

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ABSTRACT

Microsponge technology is emerging as a new controlled drug delivery technique in dermatology to overcome the limitations of conventional topical antifungal treatments for superficial fungal infections. Traditional formulations often struggle with rapid drug release, local pain, poor skin retention, and frequent reapplication. These problems reduce the effectiveness of treatment and patient compliance. For instance, in several trials, clotrimazole and ketoconazole have been encapsulated as microsponges to enhance skin penetration, regulate release, lessen side effects, and extend the duration of medicine presence at the infection site. Furthermore, this technique improves formulation stability and reduces dosing frequency, both of which improve patient adherence. Microsponge-based antifungal delivery systems can therefore be seen as a practical and patient-friendly alternative to conventional topical formulations, providing consistent drug levels, fewer side effects, and better treatment outcomes. This opens up new possibilities for the effective treatment of fungal infections in the skin. This review aims to demonstrate how microsponge carriers might enhance the convenience, efficacy, and safety of antifungal therapies.

Keywords: Microsponge, Dermatology, Controlled Drug Delivery, Antifungal.

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Exploring Innovative Antibiotic Alternatives: Combating the Soaring Global Problem of Antibiotic Resistance

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ABSTRACT

Rising incidences of antibiotic-resistant bacterial strains present for humanity a new and critical challenge. Broad-spectrum antibiotics, known for many years as the primary tools to combat bacterial diseases, are becoming increasingly ineffective. As a result, the search for effective interventions against antibiotic-resistant infections has generated significantly increased research attention and clinical interest. Superbug infections are fast becoming rampant; therefore, it is high time to look for another option than ordinary antibiotics. This review article focuses on strategies being developed to prevent or treat such infections that are considered resistant. These alternatives including, bacteriophages, antimicrobial peptides, and bacteriocins, are emphasized for targeting pathogens while leaving the rest of the body's benefits intact. Furthermore, new approaches, including a gene editing tool called CRISPR-Cas9, nanoparticles and the use of genetically modified bacteriophages, are considered based on their distinct activity and ability to fight resistance. The promise of these alternatives lies in their effectiveness against a broad range of pathogens, their ability to overcome or minimize resistance and the potential to maintain the health of the host microbiota. Together, these novel techniques are set to revolutionize current approaches to treating and controlling infectious diseases. Factors such as safety concerns, challenges with production and acceptance, regulatory hurdles and adjacent inclusion to current healthcare practices are also addressed. This paper elucidates the continued need and global efforts to develop and seek new wave treatments to combat antibiotic resistance.

Keywords: Antibiotic Resistance, microbial infection, bacteriophages, antimicrobial peptides, bacteriocins

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Adverse Drug Reactions, Comparison Between Etrasimod and Ozanimod: What FAERS Data Reveal

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ABSTRACT

Background: 'Etrasimod' and 'Ozanimod' are oral sphingosine-1-phosphate receptor modulators that are used for autoimmune diseases like ulcerative colitis and multiple sclerosis. While clinical trials support their safety, comparative real-world analyses remain limited.

Objective: To perform a comparative evaluation of adverse drug reactions associated with 'Etrasimod' and 'Ozanimod' using real-world data and assess the influence of age and gender on ADR to guide safer clinical decision-making.

Methods: FAERS reports were analyzed for both drugs, 'Etrasimod' and 'Ozanimod.' Descriptive statistics outlined ADR frequencies; chi-square tests and t-tests compared demographics and ADR distribution. Logistic regression was planned to model the risk of serious ADRs. Demographic sub-analyses were performed to explore associations between age, sex, and specific ADRs.

Results: Ozanimod showed significantly higher reports of serious ADRs, including MS relapse, therapeutic failure, and dose omission. Etrasimod had a milder ADR profile with fewer severe outcomes. Statistically significant differences were observed in age (mean: Ozanimod 53.8 vs. Etrasimod 42.3 years; $p = 0.00013$) and sex distribution ($p < 0.00001$). ADRs such as "Drug Ineffective" and "Condition Aggravated" showed strong age and sex associations.

Conclusion: Etrasimod demonstrates a safer ADR profile in younger and female patients, making it a preferable option in such populations. Ozanimod may be less suitable for older patients or those at higher risk of relapse and treatment failure. These findings emphasize the importance of drug selection based on demographic characteristics to optimize safety and efficacy.

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Molecular Docking: Insights into 8-Hydroxyquinoline-Isatin Hybrid Derivatives: As a Promising Scaffold for Antituberculosis Drug Development

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ABSTRACT

Background: Tuberculosis (TB) In 2023, there was a significant increase in TB case notifications, with approximately 179 cases per lakh population, resulting in about 0.2 million cases. Despite extensive efforts to develop new anti-TB drugs, only a few compounds have been tested in humans over the past fifty years. Isatin hybrids have attracted attention for their potential as antituberculosis agents. Quinoline contains a variety of natural chemicals, as well as commercially accessible medicines, including clinically authorized anti-TB medications such as bedaquiline, ciprofloxacin, and levofloxacin. Previous research led to the development of a hypothetical SAR (Structure-Activity Relationship). The compound was designed based on SAR and docked against the InhA enzyme (PDB code: 3fng).

Materials and Methods: We designed 8-hydroxyquinoline-isatin hybrid analogues, retrieved them from PubChem, and conducted docking using AutoDock Vina. Docking scores of -10.6 (QI-1) and -10.4 (QI-19) were obtained, which are slightly better than those of standard antitubercular agents (Isoniazid -6, Bedaquiline -9.2). Hydrophobic interactions revealed that all leads formed hydrogen bonds with Tye158, Gly96, and Ala198, along with additional π–π stacking (QI-19 with Phe41) and π-alkyl interactions (Ile122, Val65).

Result: Binding patterns were further analysed and validated through structural superimposition and RMSD analysis. ADME evaluation using Molinspiration indicated favourable pharmacokinetics and low toxicity. Overall, despite moderate docking energies, the high-quality interactions and drug-like profiles of the 8- Hydroxyquinoline-Isatin compounds provide a promising foundation for developing new antituberculosis drugs.

Conclusion: The molecular docking and ADME studies suggest that 8-hydroxyquinoline–Isatin hybrids are promising candidates for antitubercular drug development. Their strong binding affinity to InhA enzyme and favourable pharmacokinetic profiles support further in vitro and in vivo evaluation as potential anti-TB agents.

Keywords: 8-hydroxyquinoline, Isatin, anti-tuberculosis, molecular docking.

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Revolutionizing Osteoporosis Therapy via R-HCl Loaded Nanoparticles

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ABSTRACT

Osteoporosis is a gradual bone condition marked by decreasing bone mineral density (BMD) and an increased risk of fracture, especially in postmenopausal women. The disorder is primarily caused by an imbalance in the remodeling of bones, where osteoclast-mediated resorption is greater than osteoblast-mediated formation. Modern therapy procedures employ both pharmacological and non-pharmacological techniques; nonetheless, concerns such as poor bioavailability, systemic adverse effects and low patient adherence limit their efficacy. Although the selective estrogen receptor modulator (SERM) raloxifene hydrochloride (R-HCl) has demonstrated promise in the treatment of osteoporosis, its practical usefulness is limited by its low solubility and first-pass metabolism. Sublingual formulations and nanostructured lipid carriers (NLCs) are two innovative drug delivery strategies that show promise for improving therapeutic results and medication bioavailability. The pathophysiology of osteoporosis, current treatment concerns and advancements in nanocarrier-based drug delivery techniques are all covered in this article. The potential of combining vitamin D and R-HCl is examined, as is the function of NLCs in enhancing drug retention and permeability. The focus of future research will be on improving these technologies for better osteoporosis care.

Keywords: Osteoporosis, Nanostructured Lipid Carriers, Drug Bioavailability, Postmenopausal Osteoporosis, Osteoclasts and Osteoblasts

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Post-Marketing Safety Analysis of Amiodarone Using FAERS Database: A Pharmacovigilance Study

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ABSTRACT

Background: Amiodarone is a commonly used antiarrhythmic drug with a well-documented risk of serious adverse drug reactions (ADRs). Post-marketing surveillance provides crucial insights into its real-world safety profile.

Objective: To evaluate the pattern, seriousness, and clinical outcomes of ADRs related to amiodarone reported in the FAERS (FDA Adverse Event Reporting System) database.

Methods: A retrospective analysis was performed using FAERS data from January 2011 to March 2025. Reports listing amiodarone as the suspect drug were analyzed for demographic details, indications, types of ADRs, and outcomes.

Results: A total of 2,021 reports were identified. The population included 55.2% males, 32.2% females, and 12.6% with unspecified gender. Serious adverse events made up 96.2% of the reports. Common ADRs included drug ineffectiveness (20.1%), off-label use (9.6%), drug interactions (8.8%), hyperthyroidism (7.6%), and dyspnea (6.2%). Atrial fibrillation (37.0%) and hypertension (12.4%) were leading indications. Outcomes included 337 deaths (16.7%), 1,262 hospitalizations (62.5%), and 517 life-threatening events (25.6%). The median delay in reporting to the FDA was 142 days.

Conclusion: The study highlights the significant burden of serious ADRs associated with amiodarone, particularly thyroid and respiratory toxicities. These findings support the need for stringent monitoring, improved pharmacovigilance, and patient counselling during long-term therapy.

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Enhancing Post-Approval Drug Monitoring Through AI Technologies

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ABSTRACT

The continuous monitoring of drug safety after market approval is critical component of pharmacovigilance. Tradition relying on reporting systems face challenges such as under reporting data overloadand delayed signal detection.in recent years, the integration of Artificial Intelligence (AI) in pharmacovigilance has opened new avenuesto improve the efficiency, accuracy and responsiveness of drug safety surveillance.AI technologies, including natural language processing (NLP), machine learning (ML), and predictive analytics, have enabled real time analysis of large scale data from diverse sources like electronic health records, social media and patient registries. These tools not only facilitate faster identification of adverse drug reactions (ADRs) but also allow early signal detection, risk prediction and decision support for regulatory reactions. Smart pharmacovigilance systems powered by AI can continuously learn and adapt, reducing human bias and workload while maintaining regulatory compliance. Morever, AI's potential to uncover hidden patterns in unstructured data has transformed post marketing surveillance into a proactive rather than reactive process. This abstract aims to highlight the transformative role of AI in enhancing post approval drug safety and underscores the need for ethical frameworks, transparency and collaboration between regulators, healthcare professionals and technology experts. As the field evolves, AI-driven pharmacovigilance is poised to become an integral part of public health saftey worldwide.

Keywords: Pharmacovigilance, Artificial Intelligence, Drug Safety, Post-Marketing Surveillance, Machine learning, Adverse drug reactions, Signal Detction, Regulatory Compliance

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A New Era for Drug Safety: From Trials to Continuous Real-World Monitoring

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ABSTRACT

Drug safety is a very important issue for patient care and health care results. In the past drug safety has been looked at via clinical trials which take place before a medicine is made available to the public. These are very designed studies which look at what a drug does and how it affects safety. Also, clinical trials include a small number of patients which are in a controlled environment and which only go on for a short while. Thus, they do not report how a drug will perform in the real-world setting. In recent years in health care, we have seen a large-scale transition to the use of real-world evidence which we use to better determine drug safety once the drug is out and used by a larger more diverse group of people. As health care systems grow and data ecosystems do indeed grow, we see the emergence of real-world evidence as a transformational approach to pharmacovigilance. RWE is obtained from real world data which includes electronic health records, insurance claims, pharmacy data, mobile health apps and patient registries. This type of info helps researchers identify side effects, monitor long term safety and report back on what we are seeing in the real world which is often different from what is seen in a clinical setting. This study looks at the transformation of the drug safety field which we see play out from pre-approval clinical trials through to post marketing surveillance using real world data. This study covers the full arc of drug safety from the early lab work and clinical trial stages to the post marketing use by the general public. It reports on the use of real-world evidence from health and patient data which we are seeing to improve drug safety. Also, we see how global agencies are supporting the use of RWE. Also brought up are new techs like artificial intelligence, machine learning, and blockchain which are playing a role in identifying safety issues sooner and more accurately. Also brought up are issues of data privacy, fairness, and that the data used is reliable.

Keywords: Real-World Evidence, clinical trials, Drug safety, Pharmacovigilance, Data Privacy

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Physical Characterization, Phyto-chemical and Acute Toxicity Study of Parthenium Hysterophorus Ethanolic Extract

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ABSTRACT

Parthenium hysterophorus is an invasive herbaceous plant and considered as noxious weed. The allergenic nature of this weed showcase this as poisonous for human and other living organism, Sesquiterpenes lactones which are responsible for allergenic nature of weed confirmed as phyto-chemical in ethanolic extract of Parthenium hysterophorus which is procured from AMSAR Pvt. Ltd. In the screening the main phytoconstituents observed like Sesquiterpenes lactones by Baljet test along with presence of alkaloids by Hager's test, carbohydrate by Moilsh's test, Flavonoids by sulfuric acid test and saponins by foam test. The powdered extract characterized as bulk drug and found bulk density 0.6 gm/cm 3, Tapped density 0.86 gm/cm 3 which are required to know for as pre-formulation and angle of repose is recorded 38 which reflects the powdered extract flow falls in fair to passable range. The microscopy study of the powdered extract performed using Labomed Lx 400 model at 40x and observed presence of pollens, pollen sacs, corolla and Trichomes. Further for acute toxicity study healthy adult male albino rat weigh and assigned a number to each and kept in separate cage at room temperature. Kept animal on fasting (without food and water) for approx. 14-16 hour before dosing. Sample solution of ethanolic extract of Parthenium hysterophorus according to 200 mg/kg, 400 mg/kg and 600 mg/kg body weight in distilled water and observed for 14 days in interval of 3,7 and 14 in which toxic symptoms includes Food avoidance, Sedation and minimum movement, Irritations and restlessness observed respective to dose.

Keywords: Ethanolic extract, Sesquiterpenes lactones, Acute toxicity study

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D-Optimal Mixture Design Assisted Formulation Optimization of Desonide Loaded Emulgel for Topical Application

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ABSTRACT

Background: Desonide has restrict skin penetration due to low solubility. Microemulsions improved both drug solubility and permeability. Incorporating them into gels offers better skin retention and sustain release.

Objective: This research targets the development of a microemulsion formulation with critical quality attributes, i.e., optimal particle size distribution, drug content, and controlled release characteristics. The aim is to enhance the topical delivery of desonide.

Methods: For the selection of oil, S_{mix} ratio phase titration method was used. Ternary phase diagrams were prepared. D-optimal mixture design elected oil, S_{mix} & water as independent variables and particle size, PDI, zeta potential, % transmittance and CDR % as response variables.

Result: The optimized microemulsion was transparent with a PS of 18 nm, PDI of 0.42, zeta potential of 13.00 mV, transmittance of 92.25 %. This microemulsion was combined with a 2% carbopol 971 P gel base. The resulting gel was clear, pH 6.2, spreadability of 23.379 g.cm2/sec, CDR (%) of 94.03% in 24 h. followed Higuchi drug release kinetics. Ex vivo drug permeation through porcine skin was 27.83 % in 10 h., which shows 1.8 times increment in permeation flux.

Conclusions: The developed gel formulation possessed all desired quality attributes. The in vitro and ex vivo study data proved its suitability as a better alternative to current products in the efficient treatment of dermatological conditions.

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Drug Safety in Children

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ABSTRACT

Drug safety is the study of detection, understanding and prevention of side effects which allows the people to understand about the risks, uses and benefits of a drug. The Real-World Data from patients and other healthcare persons to identify new information about the uses of medicines and its side effects experienced by patients, to correct it for future safety and modifications. These data are real world data which gives information about adverse effects in variable population which is not possible in clinical trials. Studies conducted to show the factors affecting drug response in children including difference between physiology of adults and children, children dosage given, paediatric age groups classification, variations in drug response, and past tragedies. Precautions and warnings information should be properly labelled as per real world data (RWD) which is important in field of pharmacovigilance and study of drug safety. The health and drug safety issues in children and infants can be a more critical and important. Also to handle adverse drug reactions and related diseases caused by any drug, preventing them for future.

Keywords: Drug safety, Pharmacovigilance, Adverse drug reactions, Paediatric pharmacology, Clinical trials, post-marketing surveillance

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Revolutionizing Pharmacovigilance: Insights From Artificial Intelligence Applications

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ABSTRACT

Background: Pharmacovigilance is the critical aspect of the drug which concerned with the drug safety. It is the science and activities which focus on detection, assessment, understanding and prevention of adverse drug reactions (ADRs) or any other problems associated with medicine and vaccines. As healthcare data expands rapidly due to which conventional pharmacovigilance methods/ approaches face critical challenges like manual processing, incomplete reporting, and delayed signal detection. These inefficiencies may lead to compromise in patient safety and delay in regulatory actions.

Objective: It is used to explore how artificial intelligence technologies are can be utilised to elevate the pharmacovigilance activities by refining the efficiency, accuracy, and timely detection of safety signals.

Methods: This work is based on the comprehensive review of recent literature and scientific articles focused on the studies and advancement of AI application in Pharmacovigilance. Core databases such as Google Scholar, ScienceDirect, and PubMed were searched using keywords like “AI in pharmacovigilance”, “Machine learning in drug safety” and “NLP in ADR detection”, “AI-supported ADR Detection”, “Deep Learning in Healthcare Safety”.

Results: Artificial Intelligence (AI) is an advanced tool encompassing technologies like machine learning, natural language processing (NLP), and data mining, is transforming the pharmacovigilance by promoting data analysis, accelerating adverse drug reaction (ADR) detection, and improving the overall efficiency of drug safety monitoring systems. Artificial Intelligence supports quick identification of safety signals, it facilitates faster case triage and documentation, and improves ADR prediction accuracy through analysis of structured and unstructured data from diverse sources including electronic health records, literature, and social media. Although AI enhances the efficiency, expandability, and accuracy of pharmacovigilance processes, challenges like data privacy, and regulatory acceptance remain in place.

Conclusions: The implementation of artificial intelligence in pharmacovigilance represents a major advancement, facilitating early and evidence-based methods to improve drug safety on a global platform.

Keywords: Pharmacovigilance, Artificial Intelligence, Adverse Drug Detection, Safety Signal.

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Formulation Optimization of Fenugreek Extract Loaded Nano-Structured Lipid-Drug-Carrier for Effective Delivery

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ABSTRACT

Background: Fenugreek (Trigonella foenum-graecum) extract possesses significant pharmacological potential, but its therapeutic efficacy is restricted by poor aqueous solubility, limited intestinal permeability, and rapid hepatic metabolism. Encapsulation within SLNs offers a promising strategy to enhance bioavailability through improved dissolution, absorption, with extended-release properties.

Objective: The present work focused on designing, optimizing, and evaluating SLNs for the oral delivery of fenugreek extract (FE) to achieve enhanced systemic exposure, superior GI absorption, and controlled release kinetics.

Method: A Box-Behnken statistical design was implemented to optimize FE-SLN formulations by systematically varying lipid (Compritol 888 ATO), surfactant (PVA), and homogenization speed as processing parameter. Critical Quality attributes including particle size, size distribution, surface charge, encapsulation efficiency, and release behaviour were analysed. The final formulation was further characterized by advanced analytical techniques (TEM, DSC) and evaluated for ex vivo intestinal permeation.

Result: The optimized FE-SLNs demonstrated favourable characteristics: average diameter 460 nm, uniform distribution (PDI 0.233), surface charge (-14.1 mV), and encapsulation (47.56%). In vitro studies showed sustained drug release (79.66% over 12h). Permeation assessments revealed significantly enhanced absorption compared to pure extract, with permeability coefficients increasing from 2.9×10^{-3} cm/h (pure extract solution) to 6.3×10^{-3} cm/h (developed formulation).

Conclusions: Conclusion: The developed FE-SLN system successfully exhibiting optimal physicochemical properties and enhanced absorption potential. The sustained release profile following Higuchi kinetics suggests these nanoparticles could serve as an effective platform for oral administration of natural bioactives.

Keywords: Keywords: Trigonella foenum-graecum, lipid nanoparticles, bioavailability enhancement, experimental design, sustained release, intestinal absorption.

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Formulation And Optimization of Saxagliptin-Loaded Microspheres Using Box-Behnken Design For Enhanced Entrapment Efficiency

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ABSTRACT

In order to improve entrapment efficiency and regulate particle size, the current study focusses on the formulation and optimisation of saxagliptin-loaded microspheres utilising a Box-Behnken factorial design (BBD). Guar gum, ethyl cellulose, and sodium alginate were the three polymers chosen as independent variables; each had three coded values (-1, 0, +1). To examine how these factors affected the two main responses particle size (Y2) and % entrapment efficiency (Y1) seventeen experimental runs were created. The medication was evenly dispersed throughout all formulations, and microspheres were made using a W/O/W double emulsion solvent evaporation process. Design-Expert® software was used to conduct statistical analysis, producing quadratic polynomial models for each response. According to ANOVA results, there was no discernible lack of fit and the models for both particle size and entrapment efficiency were statistically significant ($p < 0.05$). Guar gum demonstrated strong quadratic effects, but sodium alginate and ethyl cellulose were shown to significantly alter both responses. Formulation F1 produced the lowest particle size (35.65 nm) and greatest entrapment efficiency (75.65%). It was discovered that the optimised formulation closely matched the predicted values, proving the BBD approach's dependability in formulation parameter optimisation. This work demonstrates that factorial design is a useful technique for developing formulations and can aid in the methodical optimisation of important quality characteristics of drug delivery systems in microspheres.

Keywords: Saxagliptin, Microspheres, Box-Behnken Design, Entrapment Efficiency, Particle Size, Ethyl Cellulose, Sodium Alginate.

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Gastro-Retentive Sustained Release Mups (Multi-Unit Particulate System) of Rivaroxaban for Oral Administration

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ABSTRACT

Background: Higher doses of rivaroxaban have poor dissolution profile and can cause gastrointestinal bleeding. Gastro-retentive formulation can sustain the drug release in the stomach and can minimize both risks.

Objective: This study focuses on the development and evaluation of gastro-retentive multi-unit particulate systems (MUPS) by utilizing fluidized bed coater, for the oral delivery of rivaroxaban, a direct oral anticoagulant (DOAC).

Methods: The method involves coating of three layers comprising the drug layer, effervescent layer, and polymer layer, each layer containing specific ingredients. These solutions were magnetically stirred, filtered, and coated onto sugar spheres using a fluidized bed coater. The coated pellets were evaluated for parameters like particle size, friability, in vitro drug release, DSC, SEM, and capsule filling. The method is designed in order to optimize the coating process and to assess the quality of pellets and enhance the drug delivery of rivaroxaban.

Results: Batch N-IV (4% Eudragit NM 30D) achieved 84.8% sustained drug release over 24 h with minimal burst (20.85% at 1 h), fitting the Korsmeyer-Peppas model (R^2=0.9875, n=0.6676). This formulation floated rapidly (4.15 min lag time) for >24 h, and exhibited excellent physical properties (friability: less than 1%; Carr's index: 0.842%; Hausner ratio: 1.008), with high drug loading (17.11 mg/250 mg pellets), and high coating efficiency (98.6%).

Conclusions: Compared to immediate-release formulations, the MUPS-based approach improved gastric retention, provide sustain release and improve dissolution profile along with a reduction in dosing frequency, offering a robust and scalable solution for rivaroxaban delivery.

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Development of a Cost-Effective Effervescent Probiotic Tablet Using Bacillus clausii Spores as a Low-Cost Alternative to Enterogermina Suspension

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ABSTRACT

The present study focuses on the development of a cost-effective effervescent probiotic tablet containing Bacillus clausii spores as a novel alternative to conventional probiotic suspensions like Enterogermina. Commercial formulations are often expensive, require cold chain storage, and come in single-use vials, limiting their accessibility in low-resource settings. This project proposes a shelf-stable, portable, and patient-friendly effervescent tablet, formulated to deliver ≥2 billion CFU of Bacillus clausii per dose.

The formulation includes citric acid and sodium bicarbonate as effervescent agents, mannitol as filler, and natural flavors for improved palatability. The spores are cultured, harvested, and dried using lyophilization or spray drying to retain viability. Tablets are prepared via direct compression and packaged in moisture-resistant

containers.The product undergoes physical (effervescence time, weight uniformity), microbiological (CFU count, contamination), and chemical (pH, moisture content) evaluations. Stability studies are conducted as per ICH guidelines, indicating an expected shelf life of 12–18 months. The projected cost is ₹10–₹15 per dose —significantly lower than current market options.The proposed effervescent format offers a novel, child-friendly, and scalable solution for probiotic delivery, with strong potential for use in pediatric, rural, and travel-based healthcare settings.

Keywords: Bacillus clausii, Probiotic, Effervescent tablet,Cost-effective formulation, Gut microbiota

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Preparation And Characterization of Moxifloxacin-Based Gel-Forming Eye Drops for Targeted Ocular Therapy

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ABSTRACT

Background: Moxifloxacin hydrochloride is a broad-spectrum fluoroquinolone antibiotic frequently employed in ocular infections such as bacterial conjunctivitis. Despite its efficacy, conventional eye drops suffer from limited precorneal residence time, rapid drainage, and inadequate corneal penetration, leading to suboptimal therapeutic levels and poor patient adherence.

Objective: The present research aimed to formulate an ion-sensitive, sol-to-gel in situ ophthalmic delivery system for moxifloxacin hydrochloride to improve ocular retention and prolong drug release.

Methods: Following a comprehensive screening of polymeric systems, gellan gum was selected as the ion-activated gelling agent, synergistically combined with hydroxypropyl methylcellulose (HPMC) to enhance viscosity and mucoadhesion. Formulations were evaluated for clarity, pH, uniformity of drug content, in vitro drug release behavior, antimicrobial efficacy, hemocompatibility, isotonicity, and ocular irritation potential.

Result: Upon exposure to simulated tear fluid, the optimized formulation underwent rapid gelation, forming a transparent and stable gel matrix with strong mucoadhesive properties. Sustained drug release was observed over 8 hours, with a cumulative release of approximately 89.7%. Microbiological assays confirmed retained antibacterial activity. Hemolysis and isotonicity studies demonstrated compatibility with red blood cells and lacrimal secretions, respectively. HET-CAM assay confirmed the formulation to be non-irritant and safe for ocular use.

Conclusions: The formulated in-situ gel provides a safe and well-tolerated approach for delivering moxifloxacin to the eye, ensuring sustained release, better ocular absorption, and increased patient convenience by minimizing the need for frequent dosing.

Keywords: In-situ gel, Moxifloxacin hydrochloride, Ocular drug delivery, Gellan gum, Sustained release

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Formulation And Evaluation of Lornoxicam Co–Crystal Tablet with Ibuprofen in Treatment Of Arthritis

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ABSTRACT

This study investigates the use of the solvent evaporation technique for developing co-crystals of Lornoxicam with Ibuprofen to improve solubility, flowability, and drug release characteristics. Among the methods explored, solvent evaporation proved to be the most effective for producing co-crystals with enhanced physic chemical properties. Saturation solubility studies showed that while pure Lornoxicam had a solubility of 5.98 mg/mL, theco-crystal formulation LXM-IBF CFIII achieved 13.52-foldincrease, indicating significant improvement. Crystals obtained through the solvent drop method demonstrated superior flow properties compared to those prepared via co-grinding or solvent evaporation. In vitro drug release studies revealed that pure Lornoxicam released 86.3% of its content within 360 minutes, whereas LXM-IBF CFIII released upto98.2%. This formulation followed a non-Fickian release mechanism, confirmed by a high regression value (R2= 0.999) and a release exponent (n = 0.793), indicating both diffusion and erosion-based release. in protection and faster recovery times, with the 10 mg/kg dose offering the highest protective efficacy. Additionally, the role of electrolytes in matrix tablet formulation was evaluated. Sodium carbonate was identified as the most effective retardant for drug release. Formulation F4, containing an optimal level of sodium carbonate, demonstrated sustained drug release over 12 hours, supporting its use in twice-daily dosing. Overall, this research confirms the potential of co crystallization and matrix modification techniques to enhance the bioavailability and therapeutic performance of poorly soluble drugs like Lornoxicam.

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Integrating Network Pharmacology with Phyto-Synthesized Gold Nanoparticles: A Green Nanotechnology Approach for Targeted Drug Delivery

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ABSTRACT

The convergence of network pharmacology and green nanotechnology offers a transformative pathway for targeted drug discovery and delivery. Network-based approaches, utilizing systems biology tools such as protein-protein interaction mapping and gene expression profiling, enable the identification of disease-specific

molecular targets with high precision. When coupled with gold nanoparticles synthesized through eco-friendly phyto synthesized gold nanoparticles (phyto- AuNPs), this strategy becomes a powerful platform for the development of personalized nanomedicine. Phyto-AuNPs, produced using plant extracts, exhibit superior biocompatibility, structural stability, and surface modifiability. These properties make them ideal nanocarriers for drug molecules and herbal bioactives, enhancing their bioavailability, controlled release, and site-specific delivery. Functionalization of phyto-AuNPs based on computationally predicted targets allows precise therapeutic modulation while minimizing off-target toxicity. Additionally, the incorporation of polymers enhances colloidal stability and prevents nanoparticle aggregation. This integrative framework is particularly promising in addressing complex diseases such as cancer, neurodegenerative disorders, and inflammatory conditions. Case studies demonstrate how phyto-AuNP-based nanoconjugates, guided by network-based target prediction, improve therapeutic efficacy and reduce systemic side effects. The synergy between traditional medicinal systems, computational biology, and green nanotechnology establishes a novel paradigm for the next generation of smart, sustainable, and precision-driven therapeutics.

Keywords: Network pharmacology, Green nanotechnology, Drug target identification, Herbal nanomedicine, Gold nanoparticles, Targeted drug delivery

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Nasal sprays are future for Allergic Rhinitis

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ABSTRACT

Nasal sprays are a common method for managing allergic rhinitis, which is a frequent inflammatory condition of the nasal lining. Symptoms include nasal congestion, sneezing, a runny nose, and itching. There are several types of nasal sprays, each with unique functions and effects. The main options are intranasal corticosteroids, antihistamine sprays, decongestants, anticholinergic sprays, and mast cell stabilizer sprays. Intranasal corticosteroids, like fluticasone propionate and mometasone furoate, are considered the first choice because they have a strong anti-inflammatory effect and effectively reduce many nasal symptoms. Antihistamine sprays, such as azelastine, work by blocking histamine, which helps relieve sneezing and a runny nose. Decongestant sprays like oxymetazoline quickly alleviate nasal congestion but should only be used for a short time to avoid rebound congestion. Anticholinergic sprays, like ipratropium bromide, mainly help with excessive nasal secretion. Mast cell stabilizer sprays, such as cromolyn sodium, are particularly effective when used preventively. Prescription combination products that include both steroid and antihistamine ingredients are available for patients who don't respond well to single drugs. Most nasal sprays are generally well tolerated. However, possible side effects can include nosebleeds, local irritation, dryness, and, in rare cases, systemic effects with long-term use. Using the proper technique and sticking to the treatment plan is vital for effectiveness and minimizing side effects. In summary, nasal sprays offer an effective and targeted therapy for allergy sufferers, enhancing quality of life and overall functioning when used correctly.

Keywords: Nasal Spray, Allergy, Allergic rhinitis, Inflammatory

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Advances in Natural polymer Enabled Gastro Retentive Floating Oral Drug Delivery System

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ABSTRACT

Gastroretentive drug delivery systems offer a practical approach for drugs that are unstable in the intestinal environment or have a short window for absorption. Drugs' stomach residence duration and bioavailability are increased via floating drug delivery systems (FDDS), a subtype of GRDDS. Applications of FDDS that show enhanced therapeutic efficacy and patient compliance in the delivery of non-steroidal anti-inflammatory medicines (NSAIDs), such as naproxen sodium, are Particular attention is paid to the utilisation of natural polymers, which have potential benefits over synthetic ones and are biocompatible and sustainable, such as xanthum gum and Limonia acidissima. Applications of Floating Drug Delivery System that show enhanced therapeutic efficacy and patient compliance in the delivery of non-steroidal anti-inflammatory medicines (NSAIDs), such as naproxen sodium, are emphasised.

Keywords: Floating tablets, Natural polymers, Limonia acidissima, Xanthan gum, Naproxen sodium, Sustained release.

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Type 2 Diabetes: The Bitter Side of Sugar

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ABSTRACT

Type 2 diabetes is a major public concern which has affected millions of people globally. It is one of the categories of diabetes mellitus, a metabolic disorder. In people with type 2 diabetes, the body either doesn't produce insulin or it become insulin resistant. This study approaches risk factor and symptoms, so that they can be eliminated for the conservation of patient's life. Earlier diagnosis and treatment can be called a safer approach to dealing with type 2 diabetes. According to the WHO, the 2021 report on diabetes and kidney diseases due to diabetes has led to over 2 million deaths. The rising privilege of patient with type 2 diabetes is due to lifestyle genetic and environmental factor. Metformin, an antidiabetic agent used in type 2 diabetes patient, basically reduces glucose level in the body. This study explores the pathophysiology and rases awareness through effective strategies like community screening and health and education campaign. The advantage of this study is to reshape the lifestyle of patient to manage their type 2 diabetes and introduce them to the prevention techniques because:

Small lifestyle changes = Big health results.

Keywords: Diabetes, Insulin, metformin, symptoms, pathophysiology.

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Oncology Drug Development: Molecular Target and Novel Chemotypes

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ABSTRACT

Cancer is becoming a major public health issue worldwide. Various new approaches have been carries out for the cancer treatment which involve the specific target of the cancer disease. There is an evidently need to improve the speed and productivity of oncological drug development. Various strategies are traditionally applied for the development of standard cytotoxic chemotherapy. The targeted therapy in oncology is the fundamental dependency of tumour cells on biological pathways to which drugs inhibiting those pathways can be applied. There are various approaches to determine the dose based on maximum tolerability and Quality determined by objective tumour response might not be appropriate for targeted agents, since many of them have a various therapeutic index and prevent the growth of tumours without causing cytotoxicity. Traditionally, standard cytotoxic chemotherapy has relied on strategies such as determining drug dosage based on maximum tolerability and assessing treatment efficacy through objective tumour response with the rise of targeted therapies, traditional approaches to cancer treatment are becoming less applicable. These therapies function by disrupting specific molecular pathways that tumour cells rely on for survival and proliferation. Unlike conventional cytotoxic agents, many targeted treatments can inhibit tumour progression without directly killing cancer cells. Consequently, they often possess a wide therapeutic index, and their effectiveness may not be adequately captured by standard measures used for cytotoxic responses. Different methods for establishing dosage based on maximum tolerability and effectiveness according to objective tumour response may not be appropriate for targeted therapies, as many of these agents suppress tumour growth without displaying cytotoxic properties and possess a wide therapeutic range.

Keywords: Cancer, Cytotoxicity, Chemotherapy, Tumour, Cells, Maximum tolerability.

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CRISPR: A Genome Editing Breakthrough in Drug Discover

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ABSTRACT

CRISPR-Cas9 has revolutionized the Landscape of genetic engineering and drug discovery with its precise, efficient, and cost-effective genome editing capabilities. Derived from a bacterial defense system, the CRISPR mechanism allows for specific gene modification by utilizing guide RNA and Cas9 nuclease to introduce double-stranded breaks in DNA. This technology has opened new avenues in pharmacology, especially for target identification, functional genomics, and Disease modeling. In the context of drug discovery, CRISPR plays a pivotal role in valid, therapeutic targets, generating disease model Is for screening drug resistance mechanisms. The technique has been particularly useful in oncology, rare genetic disorders, and neurological diseases, where gene function studies are critical. Recent advancements (2020-2025) have extended CRISPR's role to include base editing, prime editing, and even CRISPR-based diagnostic platforms, expanding its scope beyond gene knockout. Despite its advantages, CRISPR is associated with challenges such as off-target effects, delivery system limitations, and ethical concerns regarding germline editing. Nonetheless, the rapid progress in refining editing tools and the integration of CRISPR with Al-based drug screening systems reinforce its growing clinical and pharmaceutical potential.

Keywords: CRISPR, genome editing, drug discovery, Case9, pharmacogenomics

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Edible Vaccines: A Promising Frontier in Immunization and Public Health

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ABSTRACT

This review article explores the concept, development techniques, advantages, limitations, and recent advancements in edible vaccines, with a focus on their potential application in public health. This article highlights the scientific foundation of edible vaccines, their mechanism of action through the gut-associated lymphoid tissue, and the plant systems used for antigen production. Edible vaccines represent an innovative approach to immunization, where transgenic plants produce antigens that trigger an immune response when consumed. This technology combines plant biotechnology with immunology, offering a cost-effective, needle-free, and easily distributable alternative to traditional vaccines. The article further explores current progress in clinical trials, potential applications against infectious diseases like hepatitis B, cholera, and measles, and the ethical and biosafety considerations associated with genetically modified organisms with advancements in plant biotechnology and molecular farming, edible vaccines hold great promise, particularly in improving global immunization coverage in low-resource settings.

Keywords: Edible vaccines, Plant-based vaccines, Oral immunization, Transgenic plants, Genetic engineering.

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The Application and Advances of AI in Drug Regulations – A Pharmaceutical Perspective

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ABSTRACT

Artificial intelligence (AI) is revolutionizing healthcare, profoundly transforming areas from diagnostics to drug development. It is one of the top technologies creating the future of drug discovery, clinical trials, and real-world evidence. Its ability to analyze broad amounts of data and detect perception is promoting innovations that improve patient outcomes and reevaluate the future of medicine. Still, its incorporation into medicine regulation remains original, with varying degrees of handover and performance across different nonsupervisory bodies worldwide. Artificial Intelligence in clinical trials is used to enhance patient recruitment & selection, streamline trial design and conduct, personalize medicine and drug discovery, and many others. Different types of artificial intelligence (AI), such as Machine Learning, Deep Learning, and Generative AI, all play a crucial role in clinical trials as well as in real-world evidence. The real- world data is collected from different sources such as electronic health reports, mobile apps, digital health technologies like wearables, patient registries, etc. The conclusion is that in the new era of drug regulation, the combination of Machine Learning (ML) & Artificial Intelligence (AI) is fundamentally transforming the pharmaceutical domain, offering revolutionary opportunities to enhance drug regulation & ensure public safety. AI's ability to analyse board and complex data sets from real-world evidence, clinical trials & drug discovery is leading to a more efficient, data-driven regulatory process & streamlined.

Keywords: Artificial Intelligence, Machine learning, Real world data, Clinical data monitoring, Deep learning, electronic health records, Medical innovation, Automation, Data Sharing.

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Driving Industrial Resilience with Smart Digital Manufacturing Technologies

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ABSTRACT

In an era of increasing global uncertainty and disruption, the integration of supply chain resilience and smart manufacturing has emerged as a strategic imperative for industrial sustainability and competitiveness. Supply chain resilience is the capability of a system to anticipate, support and recover from unexpected disturbances, ensuring continuity and adaptability. Smart manufacturing, enabled by Cutting-edge technologies like the artificial intelligence (AI), Internet of Things (IoT), robotics, and data analytics, transforms traditional production systems into agile, data-driven environments. The convergence of these two domains allows for real-time monitoring, predictive decision-making, and dynamic reconfiguration of production and logistics networks. This synergy not only enhances operational flexibility and responsiveness but also reduces risk exposure and downtime. This paper explores the interrelationship between supply chain resilience and smart manufacturing, highlighting the role of digital technologies in creating adaptive, transparent, and robust industrial ecosystems capable of withstanding modern supply chain challenges.

Keywords: Artificial intelligence, Robotics, data Analytics

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The Heart Epidemic: A Review on India's Alarming Rise in Cardiac Issues

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ABSTRACT

Cardiovascular diseases (CVDs) are a growing health concern in India, accounting for 25% of all deaths, with an increase of 2.26 million to 4.77 million in the past 35 years. The "heart epidemic" is fueled by a combination of factors, including urbanization, sedentary lifestyle, unhealthy diet, increasing prevalence of risk factors such as hypertension, diabetes, obesity, dyslipidemia, smoking, with the noteworthy contributions of stress and genetic disposition. This review aims to highlight the alarming rise in cardiac issues in India and discuss potential preventive methods such as low-cost diagnosis, cardiac rehabilitation, awareness of ASCVD risk score, and the urgent need for prevention of CVDs. As the studies show that CVDs aren't an older generation issue anymore, focusing on Pediatric Cardiology will also help in the prevention of congenital heart diseases (CHD) and premature death. As the rising cases of heart attacks and heart arrest have been seen, this poster focuses more on awareness issues about cardiac screening and the need for hands-on training on Cardiopulmonary Resuscitation (CPR) and its significance to every citizen for life-threatening emergency conditions, and other life-saving preventive measures.

We Indian's are well aware of the causes and consequences of the heart epidemic, but the real issue is ignorance. This review aims to encourage collective action to address this growing health challenge, as we have evolved from pills to precision surgery, but still prevention remains the best medicine.

Keywords: Heart Epidemic, Pediatric cardiology, Cardiac Screening, Congenital Heart Diseases

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"Pharmacogenetics and Personalized Healthcare: A Genomic Revolution"

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ABSTRACT

Pharmacogenomics include studying genetic variations with respect to a patient's response to drugs, is a cornerstone of personalised medicine. By integrating genomic information into clinical decision-making, pharmacogenomics enables the

customization of drug therapies to enhance efficacy, minimize adverse drug effects and enhance overall efficacy and results. This approach moves beyond the traditional "one dose fits for all" paradigm, allowing for tailored therapeutic strategies based on a patient's genetic profile. Advances in genomic technologies, bioinformatics, and data analytics have accelerated the implementation of pharmacogenomics in areas such as oncology, psychiatry, cardiology, and infectious diseases. However, challenges remain in translating genomic data into routine clinical practice, including ethical considerations, data privacy, cost, and the need for healthcare provider education. This review highlights the key concepts of pharmacogenomics, current applications in personalised medicine, and the potential to revolutionize future

healthcare by enabling more precise, predictive, and preventive treatment approaches.

Keywords: Bioinformatics, Oncology, pharmacogenomics, Genetics.

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Tobacco Use Pattern and Related Awareness Among Medical and Non-Medical Students in Indore Region

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ABSTRACT

Background: Tobacco epidemic is a serious threat to health and ranks second in the world in terms of death. According to the WHO, tobacco is the cause of death of around 8 million people a year globally. For college students, knowledge about the effects of the use of tobacco and laws related to tobacco use is important, as their behaviour regarding the use of tobacco is mainly responsible for exposure to tobacco products to some extent.

Objective: To assess patterns of tobacco usage and knowledge related to the effects of tobacco among medical and non-medical students in the Indore region.

Methods: This cross-sectional descriptive study was conducted among the medical and non-medical students studying in different colleges in Indore, Madhya Pradesh. A Google Form was created and administered to the study population via

email. A pretested and pre-validated questionnaire from the Global Adult Tobacco Survey (GATS) was used to determine tobacco usage, habit, and awareness among the study group. The Fagerström Nicotine Dependence Scale was administered to identify the subject's dependency on tobacco. Knowledge about second-hand smoking and Laws was also recorded. Demographic details were collected separately by adding additional questions regarding demographic data.

Result: Medical students (54%) show significantly higher tobacco usage than non-medical (45%) students. Nicotine dependency was also found to be higher among medical students as compared to non-medical students. Medical students were more aware of the laws regarding tobacco use and disease occurrence.

Conclusions: Though the ill effects of tobacco consumption are more widely studied and known among medical students, still the usage of tobacco and its products among medical students is higher. This shows that medical knowledge was in vain to affect the tobacco behaviour of medical students.

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CRISPR Revolution: Unlocking The 3D Genome Landscape

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ABSTRACT

The CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats)/Cas (CRISPR-associated) system is a natural immune mechanism in prokaryotes that protects against foreign genetic elements. It has quickly become a revolutionary tool in the life sciences, especially for genome editing to address genetic disorders. With CRISPR/Cas technology, DNA

sequences can be precisely repaired, cut, replaced, or inserted, allowing for effective modification of human stem cells and showing promise in therapeutic applications. Compared to earlier genome-editing tools like ZFN (Zinc Finger Nucleases) and TALEN (Transcription Activator-Like Effector Nucleases), CRISPR offers greater efficiency, precision, and ease of use. Its application in studying the three-dimensional (3D) genome structure enhances our understanding of how linear DNA sequences relate to the 3D arrangement of chromatin. CRISPR/Cas9 can be used to alter or remove CTCF (CCCTC-binding factor) binding sites, enabling the study of changes in genome topology and interactions between chromatin loops. This review highlights the types, features, functions, and therapeutic potential of the CRISPR/Cas system. It also discusses how CRISPR affects 3D chromatin structure by modifying CTCF sites, and briefly addresses the ethical challenges involved in its application, offering insight into future directions and considerations for CRISPR use.

Keywords: CRISPR, genome, Cas system, ZFN, CCCTC-binding factor.

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Digital Twins in Drug Safety: Simulating Patient Responses from Trials to Post-Market

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ABSTRACT

The integration of digital twin technology into drug development and pharmacovigilance is reshaping the landscape of drug safety monitoring across the clinical and post-marketing continuum. A digital twin, defined as a dynamic, data-driven virtual replica of an individual patient, enables simulation of physiological responses to therapeutic interventions. This approach has gained momentum as a powerful tool for predicting adverse drug reactions (ADRs) and enhancing personalized safety profiling. Recent advancements in in silico clinical trials demonstrate the potential of virtual patient models to simulate drug efficacy and safety outcomes prior to real-world administration. These simulations utilize machine learning, physiological modeling, real-time health data from wearables and electronic health records (EHRs), and patient-specific genomic information. During clinical development, digital twins can identify high-risk subgroups, optimize trial designs, and minimize exposure to harmful side effects. Post-approval, they evolve with patient data to support continuous real-world pharmacovigilance. Emerging frameworks highlight the value of digital twins in reducing the dependence on large-scale trials and improving predictive safety assessments. Engineering models, such as graph-based physiological simulations, have shown early success in replicating complex clinical conditions like sepsis. Regulatory agencies are beginning to explore the acceptance of simulation-generated evidence, although challenges remain regarding data standardization, privacy, and validation of model accuracy. This review synthesizes findings from recent literature and proposes that digital twins, supported by advances in AI, federated learning, and blockchain for data integrity, represent a transformative future for drug safety. By bridging clinical trials with real-world evidence, digital twin technology offers a proactive, precise, and scalable approach to safeguarding patient health across the therapeutic lifecycle.

Keywords: Digital Twins, In Silico Clinical Trials, Virtual Patients

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Evaluating Drug Safety Signals Through Pharmacovigilance Databases: Bridging Gaps Between Clinical Trials and Real-World Use

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ABSTRACT

Background: Clinical trials are crucial but limited by small sample sizes, short durations, and a lack of diverse participant populations. These constraints may lead to the underreporting or delayed identification of rare and serious adverse drug reactions (ADRs). Pharmacovigilance databases provide real-world insights into drug safety by capturing post-marketing

data across diverse patient populations.

Objective: To assess the role of pharmacovigilance databases in identifying drug safety signals and bridging the evidence gap between clinical trials and real-world usage.

Methods: A narrative review was conducted using data from established pharmacovigilance databases, including the FDA Adverse Event Reporting System (FAERS), the WHO's VigiBase, and EudraVigilance. Key safety signals identified post-approval were analyzed. Comparisons were drawn between ADRs reported in clinical trials and those detected through real-world surveillance. Case studies involving withdrawn or relabeled drugs were included to highlight critical findings.

Result: Pharmacovigilance databases have successfully identified serious ADRs not detected during pre-approval clinical trials, such as cardiovascular events with COX-2 inhibitors and hepatotoxicity with certain antibiotics. Disproportionality analysis and data mining tools (e.g., reporting odds ratio, proportional reporting ratio) enhanced the detection of signals. Challenges include underreporting, data heterogeneity, and lack of causality assessment, but advanced algorithms and global data sharing have improved early detection.

Conclusions: Pharmacovigilance databases are indispensable tools for post-marketing drug safety surveillance. They provide valuable real-world evidence that complements clinical trial findings, enabling regulatory authorities and healthcare professionals to take timely action. Integrating pharmacovigilance data with electronic health records and

Improving reporting practices can further enhance drug safety monitoring.

Keywords: Pharmacovigilance, Drug safety signals, Real-world evidence, Adverse drug reactions, Clinical trials, FAERS, VigiBase, Signal detection.

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Smart Nanopolymers in Therapeutics as Novel Innovation in Responsive and Targeted Drug Delivery Systems

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ABSTRACT

Smart nanopolymers are at the cutting edge of novel treatment techniques, providing highly flexible and intelligent platforms for disease-specific and precise drug delivery. These advanced polymer-based nanocarriers are designed to react to specific biological stimuli like pH, temperature, redox potential, and enzyme activity, and allow the controlled release of therapeutic agents in a controlled and precise manner. Such responsiveness ensures that the drug is delivered specifically at the pathological site, thereby minimizing damage to healthy tissues and enhance the treatment efficacy. Recent development of polymer science has resulted in stimuli responsive nanostructured systems like dendrimers, hydrogels, nanogels, and polymeric micelles. These carriers exhibit dynamic behaviour in complex physiological conditions and can be tailored to suit the needs of a particular microenvironment of the disease. Surface modification using targeting ligands, antibodies, or aptamers further enhances their ability to recognize and bind to diseased cells, improving cellular uptake and minimizing off-target effects. Other advantages of developing polymeric nanocarriers include the usage of materials that are environmentally friendly and hypoallergic, as biodegradability and biosafety have also gained attention. These properties facilitate sustainable and patient-friendly nanomedicine in addition to their effects on long-term toxicity. The design principles, mode of activity, and biomedical applications of smart nanopolymers are discussed. It indicates the recent technology advancements that contributed to its enhancement in next-generation therapeutics especially in personalized medicine, disease-specific targeting, and safe systemic delivery.

Keywords: Smart nanopolymers, Stimuli-responsive drug delivery, Precision medicine, Targeted nanocarriers, Polymeric nanopolymers

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Neuroprotective Potential of Phenolic Compounds: A Mechanistic Review of Their Therapeutic Role in Neurodegenerative Disorders

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ABSTRACT

Neurodegenerative disorders (NDDs) like Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis, and multiple sclerosis pose a significant global health challenge, marked by the gradual loss of neurons, oxidative stress, inflammation, and protein aggregation. Although there have been therapeutic advancements, existing treatments are primarily symptomatic, underscoring the urgent need for new, disease-modifying therapies. In this regard, phenolic compounds—naturally occurring secondary metabolites in plants—have attracted considerable scientific attention due to their diverse neuroprotective properties. This review thoroughly examines the therapeutic potential of key phenolic classes, including flavonoids, phenolic acids, stilbenes, coumarins, and lignans. The focus is on the molecular mechanisms driving their effects, such as antioxidant activity through Nrf2 signalling, anti-inflammatory modulation of cytokine networks, prevention of apoptosis and excitotoxicity, enhancement of neurotrophic factors like BDNF and NGF, and regulation of autophagy and pathological protein aggregation. Recent progress in delivery methods, including nanocarrier-based systems, synthetic analogues, and synergistic formulations with traditional neuroprotective agents, is discussed in terms of their improved bioavailability and ability to cross the blood–brain barrier. Additionally, evidence from preclinical and clinical studies is incorporated to support translational relevance. The article also highlights future research priorities, including standardized dosing, biomarker development, and multi-omics approaches for personalized therapy. Overall, this review emphasizes the promising role of phenolic compounds as multitarget agents for preventing and treating neurodegenerative diseases and advocates for their progression into clinical applications through rigorously designed longitudinal studies.

Keywords: Phenolic compounds, Neurodegeneration, Oxidative stress, Alzheimer's disease, Flavonoids

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Patient-Friendly Pain Management: Freeze Dried Ibuprofen Nanostrip for Sublingual Delivery

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ABSTRACT

The objective of this project is to develop and evaluate a sublingual freeze-dried nanostrip of ibuprofen as a novel pain management approach.Though Ibuprofen is widely used, causes gastric irritation and undergoes first-pass metabolism, reducing its effectiveness in conventional tablet form. In this project, ibuprofen has to first be converted into a nanosuspension using high-speed homogenization and ultrasonication, with Poloxamer 188 serving as a stabilizer to improve its solubility and particle stability. This nanosuspension has to be incorporated into a pullulan-based film-forming solution, consist of glycerol for flexibility, sucralose for taste masking, and SLS and citric acid to enhance permeability and saliva stimulation. The prepared solution has to be cast, frozen, and lyophilized to produce thin, porous nanostrips intended to dissolve sublingually. The nanostrips has to be undergo evaluation for weight, thickness, folding endurance, surface pH, tensile strength, and moisture uptake, along with drug content uniformity, disintegration time, and in-vitro dissolution profile. Advanced studies like SEM (surface morphology), FTIR/DSC (compatibility), and particle size analysis will further characterize the formulation. This innovative system will help to deliver rapid pain relief, increased bioavailability, and improved patient convenience over Conventional ibuprofen tablets.

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Beyond the Trial Phase: Real-World Detection of Missed Drug Safety Signals

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ABSTRACT

Real-world data (RWD) is revolutionizing pharmacovigilance by providing comprehensive insights into adverse drug reactions (ADRs) beyond clinical trials. This abstract synthesizes findings from studies leveraging diverse RWD sources—including spontaneous reporting systems (FAERS, EudraVigilance) and Electronic Health Records (EHRs) etc. to identify and quantify ADRs, addressing limitations of traditional methods. Our analysis of over 18 million FAERS reports revealed 15 drugs, like Bimatoprost and Atorvastatin highlighting a median onset of 449 days and higher susceptibility in females. Similarly, EudraVigilance data on evolocumab confirmed known side effects (musculoskeletal, flu-like) but also identified new signals such as diarrhea and cardiac events, suggesting increased caution in patients with heart conditions and in women. To overcome the categorical limitations of traditional ADR severity classifications, a quantitative scale was developed i.e. Severity of Adverse Events Derived from Reddit using word embeddings and label propagation. This revealed that male-associated ADRs and those discovered post-marketing are generally more severe, underscoring the vital role of continuous surveillance, especially for polypharmacy. In conclusion, combining and innovating with RWD sources significantly enhances our ability to detect, characterize, and quantify ADRs. These advancements are crucial for

providing more granular insights into drug safety profiles, improving medication management, and ultimately safeguarding public health.

Keywords: Polypharmacy, Electronic Health Records, Label Propogation

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Revolutionizing Oral Drug Delivery: The Potential of Fast Dissolving Films

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ABSTRACT

As an alternative to Conventional drug delivery system, fast-dissolving films have recently attracted attention. The administration technology eliminates the need for liquid by using solid dosage forms that dissolve in the mouth in a few seconds. This administration method uses solid dose forms that dissolve in the oral cavity in a few seconds without the need for water, making it appropriate for both young and old patients who have trouble swallowing. OFDF is one such special and ideal tactic to increase consumer acceptance because of its rapid breakdown and capacity to be delivered without the need for water chewing. Many medications, including analgesics, antihistamines, and cardiovascular drugs, are made to be used orally. In the buccal cavity, which has a mucosal layer that rapidly distributes and absorbs the body, oral films can be made in a variety of ways. This review covers oral film preparation methods, polymer selection for technologies, evaluation standards, and applications. The demand for strong, flavor-masking, "waterless" medication formulations is demonstrated by the recent expansion of the worldwide market for fast-acting oral films. rapid dissolving oral films, a logical development of rapid dissolving drug delivery methods, offer clear advantages over conventional dose forms and orally disintegrating tablets.

Keywords: Fast dissolving drug delivery system, composition of film, study of polymers, Manufacturing methods

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Self-Nano Emulsifying Drug Delivery System (SNEDDS): An Overview

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ABSTRACT

Development in recent drug discoveries program, produces a significant amount of new, lipophilic, poorly soluble pharmacologically active compounds which presents a significant obstacle for pharmaceutical researchers trying to increase the oral bioavailability of these therapeutic molecules. Self-nano emulsifying drug delivery system (SNEDDS) have emerged as a promising approach to overcome these limitations in oral route. SNEDDS are the mixtures of liquids, surface active agents that immediately to form nano sized or micro size emulsions on contact with GIT, enhancing drug solubility. This article explores the fundamental principles of SNEDDS, their formulation strategies and recent advancements aimed at enhancing the bioavailability of BCS Class II and IV drugs. The emphasis is placed on the selection of excipients, characterization techniques such as droplet size analysis, entrapment efficiency etc. The development of SNEDDS, the mechanism underlying spontaneous creation, its subclasses, composition, formulation and characterization

techniques, advantages, disadvantages and future prospects all are included. SNEDDS is a potential formulation for drug delivery. SNEDDS are the lipid-based formulation allows it to promote and improve the lymphatic transport of medications, avoiding hepatic first pass metabolism and increasing bioavailability.

Keywords: SNEDDS, bioavailability, lipophilic, poorly soluble

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Formulation and Evaluation of Herbal Mouth Ulcer Gel by Utilizing Psidium Guajava and Jasminum Officinale

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ABSTRACT

This research focuses on the creation and assessment of an herbal gel for mouth ulcers that incorporates extracts from Psidium guajava and Jasminum officinale. The gel is formulated using the leaves of Psidium guajava and Jasminum officinale. The extraction process for guava and jasmine leaves is conducted through ethanolic extraction, and the herbal mouth ulcer gel is made using a compounding technique. The formulation of the herbal mouth ulcer gel includes guava leaf extract, jasmine leaf extract, Carbopol 934, methyl paraben, propyl paraben, triethanolamine, and the appropriate amount of distilled water. The formulation's physicochemical characteristics, including pH, spreadability, viscosity, homogeneity, patch test results, and clarity, were assessed. The findings indicated that the optimised herbal mouth ulcer gel formulation, which incorporates guava leaf and jasmine leaf extracts, displayed all physicochemical attributes within the acceptable range. This formulation study illustrates that it is feasible to create, develop, and assess an herbal mouth ulcer gel containing extracts from Psidium guajava and Jasminum officinale.

Keywords: Herbal Mouth Ulcer Gel, Jasmine Leaves, Guava Leaves, Gel Base, Natural Remedies.

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Evaluation of pain-relieving property of watermelon peels extract using Eddy's hot plate [Citrullus lanatus]

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ABSTRACT

The current investigation Citrullus lanatus was chosen since it is one of the medicinal plants that is frequently utilised in the ayurvedic medical system. Watermelon is a member of the Cucurbitaceae family. The Eddy's hot plate method was used to assess the analgesic potential of an aqueous extract of Citrullus lanatus peels (AECL). Significant analgesic action was obtained by the aqueous extract of Citrullus lanatus in a dose-dependent manner. Each aqueous extract of Citrullus lanatus doses—250, 500, and 1000 mg/kg—exhibited analgesic effects. The result was interpreted after 90 mins of drug administration and reaction times for three of doses were found to be 5.15, 8.92, and 10.82 minutes, respectively. These times were equivalent to the 12.36-minute reaction time for diclofenac sodium (5 mg/kg). Citrullus lanatus seeds' shows analgesic, anti-inflammatory, and antioxidant properties (gill et al) Hence, it was concluded that the aqueous extract of Citrullus lanatus has good analgesic potential capability and could be used as a substitute for traditional NSAIDs.

Keywords: Eddy's hot plate, Citrullus lanatus peels, diclofenac sodium, analgesic

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"RedReveal: A pH-Responsive Toothpaste for Early Identification and Healing of Oral and Peptic Lesions" (What Your Mouth Can't Say)

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ABSTRACT

Novelty: A Ulcer Detecting pH sensitive toothpaste which helps in early detection of mouth and peptic ulcer.

The present invention relates to a novel, multifunctional toothpaste formulation designed to serve both therapeutic and diagnostic purposes in proactive oral healthcare. This innovative composition is specifically engineered to include a pH-responsive chromatic indicator, enabling real-time visual detection of oral health abnormalities. The chromatic system utilizes natural, phytochemical-based compounds most preferably anthocyanins derived from Clitoria ternatea (commonly known as butterfly pea) which exhibit distinctive and reversible colour changes in response to alterations in the oral pH environment. Such deviations in pH are often early indicators of underlying pre-ulcerative, inflammatory, or

pathogenic conditions within the oral cavity. The incorporation of this smart, colour-changing feedback mechanism allows users to visually monitor their oral biochemical status during routine brushing, thereby facilitating early detection and self-assessment. This empowers individuals to seek timely preventive care and mitigates the progression of oral disorders such as aphthous ulcers, mucosal irritation, and microbial infections. Beyond diagnostic capability, the formulation is enriched with a synergistic blend of herbal bio-actives known for their anti- inflammatory, antimicrobial, antioxidant, and mucosal-regenerative properties. These actives contribute to both the immediate alleviation of symptoms and long-term oral tissue protection. The entire composition remains non-invasive, user-friendly, and suitable for daily use without causing any discomfort or side effects. By combining conventional oral hygiene with intelligent health monitoring, the invention transforms tooth brushing into a dynamic, personalized healthcare experience. It holds

significant promise for widespread application in both individual and community-level oral health management, particularly in preventive dentistry and consumer-driven health awareness.

Keywords: Smart toothpaste, pH-responsive indicator, Clitoria ternatea, Anthocyanins, Oral diagnostics, Herbal bio-actives Preventive dentistry, Colorimetric oral health monitoring, Mucosal healing agents, Anti-inflammatory herbal actives

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Design and Evaluation of an Herbal Transdermal Patch for Arthritis, Including Mustard Oil and Capsaicin Extract

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ABSTRACT

Millions of people worldwide suffer from arthritis, a chronic inflammatory disease that significantly impairs quality of life and causes severe pain. The aim was to prepare and evaluate a unique herbal transdermal patch using mustard oil and capsaicin extracts. The preliminary study evaluated the anti-inflammatory activity in vitro. The herbal transdermal patch was formulated for the treatment of arthritis using the extract of capsaicin and mustard oil. The study also sought to evaluate the extracts' in vitro anti-inflammatory activities in order to shed light on their possible therapeutic value. Water, alcohol, and mustard oil were used to extract capsaicin, and its anti-inflammatory properties were then assessed. The herbal transdermal patch was formulated and compared with naproxen as a model. Parameters like folding endurance and weight fluctuations. Analysis of the transdermal patch was done on moisture content and tensile

strength. Rhodamine B/Oil Red O dye was used in ex vivo permeation and in vitro drug permeability experiments. After fourteen days, the water-extracted capsaicin showed less potency, and fungal growth was noted. In contrast to the oil extract, the alcohol extract exhibited reduced potency.

Keywords: Arthritis, Capsaicin, Mustard Oil, Herbal Transdermal Patch, Phytochemical Evaluation.

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The Role of Molecular Biology in Cancer Treatment

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ABSTRACT

Background: Cancer is a complex and heterogeneous diseases that require personalized medicine approaches, targeted therapy, Chemotherapy, Radiotherapy and immunotherapy. This review aims to highlight the crucial role of molecular biology in cancer treatment including the identification of genetic mutations, development of targeted therapies and discovery of cancer biomarker. The integration of molecular biology into cancer treatment has improved patients' outcomes and has the potential to further transform the field of oncology.

Method: Cancer is a complex and heterogeneous disease or cancer is a group of more than 100 disease that develop time and involve the uncontrolled body cell growth and cell division. Molecular biology plays a key role in the development of immunotherapy, Radiotherapy, Chemotherapy, Targeted Molecular treatment is a type of cancer treatment in which drug used or other substances to targeted specific molecules that cancer cells need to survive and spread. Molecular biology focusing on the interaction and functioning of molecules and living organisms DNA, RNA, protein. In which study understand the cancer cells structure and function.

Result: Cancer treatment has traditionally relied on conventional therapy but molecular biology has transformed our understanding and approach to cancer therapy. We also discuss the challenges and limitation of these approaches. Recent advances in molecular biology have led to the development of targeted therapy, immunotherapy, and precision medicine approaches, which have significantly improved cancer treatment outcomes.

Conclusion: Molecular biology has played a critical role in advancing cancer treatment and continuous improvements in treatment outcomes. Molecular biology has revolutionized the field of oncology, offering new hope for the treatment and cure of cancer. While there are challenges and limitations to these approaches, future research holds significant promise for the development of more effective and targeted therapies. Molecular biology has revolutionized cancer treatment by enabling the development of targeted therapies, immunotherapies and precision medicine approaches.

Keywords: Heterogeneous disease, Chemotherapy, Targeted Therapy, Immunotherapy, Molecular biology, Oncology

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Development And Evaluation of An Innovative Transdermal Gel Formulation With Fluconazole for The Treatment of Fungal Infection

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ABSTRACT

This research presents a novel transdermal gel formulation that incorporates Fluconazole aimed at addressing fungal infections. Fluconazole, a widely recognized antifungal agent, is typically employed for managing various superficial and systemic fungal infections. However, traditional preparations of this medication frequently struggle to penetrate the skin effectively and may cause localized side effects. This new formulation aims to address these issues by facilitating continuous drug release and improving skin absorption through the transdermal gel. We assessed several parameters, such as viscosity, spreadability, film formation capability, and drying time, for the developed gel. According to the findings from an in vitro release profile, Fluconazole exhibited prolonged antifungal effectiveness for 24 hours. The Fluconazole gel formulation indicated successful penetration. Consequently, we deduce that the innovative transdermal forming gel of Fluconazole may offer a valuable alternative for managing fungal infections on the skin, featuring prolonged drug release and enhanced absorption of the drug into the skin. Additional clinical studies should be adequately performed to assess whether this formulation can aid in decreasing dosing frequency and enhancing patient compliance.

Keywords: Fungal, Pharmaceutical, Skin, Film Forming Gel, Evaluation

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An Overview on: The Healthcare Ecosystem of the Next Generation in the Metaverse

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ABSTRACT

The Metaverse has attracted significant attention as the user interface for the application for the forthcoming generation of the Internet. Its opportunity is expanding, particularly as the development and adoption of Web 3.0 continue to propel advancements in medicine and healthcare. In the Metaverse, we outline the next phase of an integrated health care ecosystem. Our analysis includes a review of the existing body of literature on the Metaverse, an explanation of the technological framework necessary for delivering an engaging encounter, and a technical analysis of both conventional and Metaverse platforms available to the public and actively utilized. We investigate the potential applications of a variety of Metaverse features, including avatar-based meetings, exciting models, and interpersonal relationships, in view of the diversified roles of patients, healthcare providers, and medical organizations. Additionally, we address the current obstacles faced in developing the Metaverse healthcare ecosystem, alongside potential solutions that involve technological innovation, regulatory oversight, and effective governance. This proposed framework and concept for the Metaverse have the potential to alter the traditional healthcare system and contribute to the digital transformation of the

healthcare sector. Just like the early days of AI technology at the beginning of this decade, these capabilities are still in the early stages of development and application in the real world. The development of an integrated healthcare ecosystem in the Metaverse requires more applied research.

Keywords: Metaverse, Web 3.0., Artificial Intelligence, Healthcare Ecosystem

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Development and Evaluation of a Beetroot-Based Cosmeceutical Cream for Skin Brightening

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ABSTRACT

This innovative cosmetic cream formulation harnesses the natural potency of beetroot extract, renowned for its rich betalain content and powerful antioxidant properties. Designed to revitalize dull and tired skin, the product aims to promote an even-toned, radiant complexion while offering protective benefits against environmental stressors. Beetroot,

being a rich source of vitamins (A, C, and folate), helps in detoxifying the skin and improving blood circulation, resulting in a healthy glow. Combined with emollients and stabilizers, this formulation ensures excellent skin compatibility, smooth texture, and enhanced absorption. The formulation is water-based and free from harsh chemicals, making it suitable for all skin types, including sensitive skin. Its natural pinkish hue and hydrating feel provide a luxurious application experience. This cream not only nourishes and hydrates but also aligns with the growing demand for plant-based, eco-friendly skincare solutions, offering consumers an effective and safe herbal alternative in modern cosmetology.

Keywords: Beetroot Extract, Betalains, Antioxidant Cream, Herbal Skincare, Natural Cosmetics, Skin Brightening, Eco-friendly Formulation, Detoxifying Cream, Plant-based Skincare, Water-based Cream, Sensitive Skin Friendly, Vitamin-rich Formulation, Radiant Complexion

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A Review on Collagen Transdermal Patch for The Management of Burns

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ABSTRACT

Burn injuries pose a significant concern to public health around the globe, ranging from superficial to deeper burns. Burns are categorized depending on their depth, damage, severity, and tissue destruction. This system aids in formulating treatment plans. Fish skin has been used in folk medicine for a long time and is now gaining interest in contemporary medicine. It has bioactive materials such as collagen, elastin, as well as glycosaminoglycans which are capable of enhancing cellular as well as tissue healing. Specifically, collagen is vital in new tissue development as it helps in structural support and encourages cell movement. The positive effects of utilizing fish skin for the management of wounds, especially burns, have been confirmed in several studies. Nevertheless, the most common methods of application today are use of the skin as a graft or a dressing, which is inconvenient and not versatile to different wound sizes and shapes. Collagen, in particular, plays a critical role in the formation of new tissue by providing structural support and promoting cell migration. The application of fish skin in wound management has been validated in various studies, showing improved outcomes in burn care. However, most current applications involve direct use of the skin as a graft or dressing, which can be cumbersome and less adaptable to different wound sizes and shapes. Fish skin has been utilized in traditional medicine for centuries and has recently garnered attention in modern medical research. It contains bioactive compounds, including collagen, elastin, and glycosaminoglycans, which are known to promote cellular regeneration and tissue repair.

Keywords: Collagen, Transdermal Patch, burns

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Chewable Nutraceutical Tablet for Cellular Detoxification, Oxidative Stress, Reduction, and Mitochondrial Support

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ABSTRACT

The present invention discloses a novel chewable nutraceutical formulation designed to combat oxidative stress, mitochondrial dysfunction, and chronic inflammation key contributors to a wide range of degenerative and metabolic disorders. The formulation comprises a synergistic blend of plant-derived bioactives including quercetin (100 mg), a flavonoid known for mitochondrial stabilization and inflammation control; sulforaphane (10 mg), a potent Nrf2 activator from broccoli seed extract that induces cellular detoxification enzymes; and berberine (250 mg), an isoquinoline alkaloid with strong AMPK activation properties and anticancer potential. The composition further includes lycopene (10 mg) for lipid and DNA antioxidant protection, gingerol (20 mg) for gastrointestinal comfort and anti-inflammatory action, and zinc gluconate (10 mg) to support immune modulation and cellular repair. These actives are delivered in a sugar-free chewable tablet flavored with natural berry or citrus and sweetened with xylitol and stevia, improving patient compliance and taste acceptability. This formulation is uniquely designed to provide multi-pathway cellular protection, particularly beneficial in conditions involving chronic oxidative burden such as cancer, neurodegenerative diseases, and metabolic syndrome. The use of bio-enhancing and bioactive ingredients in chewable form ensures enhanced absorption, palatability, and patient adherence. This composition is plant-based, non-GMO, and suitable for long-term daily use across diverse population groups.

Keywords: Quercetin, Sulforaphane, Berberine, Nrf2 activator, AMPK activator, Mitochondrial support, Oxidative stress

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Growth of E-Pharmacies in India: Challenges and Opportunities

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ABSTRACT

The Indian pharmaceutical retail sector has witnessed a paradigm shift with the emergence of e-pharmacies, driven by increased internet penetration, smartphone usage, and a growing demand for convenient healthcare solutions. This research paper explores the rapid growth trajectory of e-pharmacies in India, examining key drivers such as digital health initiatives, COVID-19-induced behavioural changes, and venture capital investments. It critically assesses the regulatory, infrastructural, and operational challenges impeding sustainable growth, including data privacy concerns, supply chain inefficiencies, and the absence of a uniform legal framework. The study adopts a method approach based on secondary data analysis to present a comprehensive view of the e-pharmacy ecosystem. Furthermore, the paper identifies emerging opportunities for market players, such as rural market penetration, AI-driven personalized medicine, and collaborations with telehealth platforms. The findings aim to inform policymakers, entrepreneurs, and investors about the strategic imperatives required to build a robust, consumer-centric, and ethically compliant digital pharmaceutical market in India.

Keywords: E-Pharmacy, E- Commerce, Digital Healthcare, Regulatory Challenges, HealthTech Start-ups

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Pharmacovigilance in Oncology Drug Trials: Enhancing Safety and Managing Adverse Events

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ABSTRACT

Pharmacovigilance is the critical aspect of the drug which concerned with the drug safety and prevention of ADRs associated with medicines. It has played a significant role in ensuring the safe and effective use of cancer medications, used in chemotherapy, Radiation therapy and targeted therapies. Due to the high toxicity and narrow therapeutic windows of these drugs, Pharmacovigilance in oncology helps to prevent, detect and manage drug-induced adverse reactions; and prevents avoidable medical prescription orders. In the field of Oncology, clinical research plays a vital role in the development of novel drugs for use in chemotherapy. These emerging therapies often exhibit safety profiles that differ significantly from those seen with traditional chemotherapeutic agents. Pharmacovigilance is essential in this context, focussing on the identification and voluntary reporting of adverse drug reactions (ADRs) that arise during the course of treatment. Adverse drug reactions are the fifth leading cause of death in hospital and are responsible for almost 5% of hospital admissions. ADRs are almost always associated with antineoplastic therapy due to by both patients and healthcare providers. This work is based on the review of recent journal, literatures and scientific articles that focuses on about pharmacovigilance in oncology and estimate the adverse reactions caused by oncological drugs. Here Pharmacovigilance has emerged as a crucial component in oncology, significantly enhancing the early detection of adverse drug reactions and supporting evidence-based strategies to ensure safer use of cancer therapies worldwide.

Keywords: Pharmacovigilance, Oncology, Adverse Drug Reaction, Chemotherapy, Radiotherapy

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The Potent Translocators of The Nrf2 Transcriptional Factor Are Pentacyclic Triterpenoids: A Study of Software-Assisted Drug Development

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ABSTRACT

The binding of nuclear factor E2-related factor 2 (Nrf2) and Kelch-like ECH-associated protein 1 (Keap1) is necessary for Nrf2 to be ubiquitinated and broken down. There are substances in this binding with antioxidant qualities. The activation of Nrf2 signaling is thought to be possible for both synthetic and natural pentacyclic triterpenoids (PTs). One potential target for the 16-mer Nrf2 peptide binding site on Keap-1 (PDB: 2FLU) is the

pentacyclic triterpenoid gedunine. This study evaluated the Nrf2 stimulatory activity of seventy-seven PTs from both natural and synthetic sources using online PASS (Prediction of Activity Spectrum of Substances) software. In-silico molecular docking against the 16-mer Nrf2 peptide binding site on Keap-1 came next. This virtual screening revealed that Nrf2 stimulatory PTs dock on Keap-1's 16-mer peptide binding site and may inhibit Keap-1 and Nrf2 from binding to perform their biological roles.

Keywords: Molecular docking, triterpenoids, 16-mer binding sites, Keap1-Nrf2 binding, in-silico predictions

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GlucoSip: A Naturally Balanced Infusion of Cassia Auriculata and Synergistic Herbs, Crafted to Support Healthy Blood Sugar Levels and Metabolic Wellness With Every Sip

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ABSTRACT

In this study, a new polyherbal tea formulation was created to help people with type 2 diabetes mellitus maintain their metabolic health and glycemic control. Cassia auriculata, a traditional medicinal herb with α-glucosidase inhibitory and pancreatic β-cell protecting properties, is the main ingredient in the formulation. Gymnema sylvestre, Trigonella foenum-graecum (fenugreek), Cinnamomum verum (cinnamon), and Glycyrrhiza glabra (liquorice root) are all included in the blend to improve therapeutic synergy. These plants have been shown to have antihyperglycemic and insulin-sensitizing effects. While Piper nigrum (black pepper) increases the bioavailability of active phytoconstituents, Camellia sinensis (green tea) is added to improve thermogenic metabolism and supply strong antioxidant catechins. To enhance palatability without influencing blood glucose levels, stevia rebaudiana is added as a natural, non-glycemic sweetener. Delivered as an infusion tea bag, the improved formulation provides a handy non-pharmacological glycemic support adjunct. Future clinical validation and commercial use of this combination in the nutraceutical and functional food industries are possible.

Keywords: Cassia auriculata, Herbal tea formulation, Antidiabetic activity, Glycemic control, α-glucosidase inhibition

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A review study: Recent development and challenges of leukemia Treatment

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ABSTRACT

Background: Leukemia is a type of cancer in which direct involvement with blood, bone marrow. The diagnosis of leukemia is critical due to their rapid progression and varied survival rate between children and older adults. Recent advancements in leukemia treatment include the rise of targeted therapies and immunotherapies, offering new hope for patients. Challenges including high treatment costs, limited access to treatment, drug resistance and complexity of the disease. This review based on treatment advancement have improved patient outcomes, offering new hope for those affected by this complex and heterogenous group of disease.

Method: This review study employed a comprehensive literature search to identify relevant studies on recent developments and challenges in leukemia treatment. Search strategy: a systematic search of major databases including PubMed, Scopus and Web science. Recent development focuses some important recent treatment therapy for leukemia like: Targeted therapy, Immunotherapy, Noval therapeutic approaches etc. and recent challenges are high treatment costs, drug resistance, limited access to treatment, awareness and education.

Result: Recent developments in leukemia treatment have shown promising results, particularly in targeted therapy and immunotherapy and these advancements, challenges persist, including the development of resistance to targeted therapies and the need for more effective treatments for certain subtypes of leukemia. Ongoing research is focused on addressing these challenges and exploring novel combinations of therapies to improve patient outcomes. The study selection process identifies various record from various databases.

Conclusion: This review study aimed to assess the recent development and challenges of leukemia treatments. This revies highlights the rapid progress being made in leukemia treatment and understand the need for continued research and innovation to improve patient outcomes. The systematic review indicates the prognosis of leukemia disease among children and adults. The current development indicates the immunotherapies-based development and mixture of treatment with various regiments and antibodies are improve their quality. Current challenges high treatment cost and complexity of the disease, cancer treatments can have long-term side effect and researcher are working to minimize their risk.

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"A Modern Approach to Drug Delivery: Oral Thin Films"

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ABSTRACT

Oral thin films (OTFs) are an innovative drug delivery system designed to enhance patient compliance and provide rapid therapeutic effects. These films are thin, flexible strips that dissolve quickly in the mouth without the need for water, making them particularly suitable for paediatric, geriatric patients. OTFs offer several advantages such as ease of administration, precise dosing, faster onset of action, and improved bioavailability of certain drugs. The use of oral thin films is gaining popularity due to their convenience, portability, and the ability to bypass the gastrointestinal tract and first-pass metabolism in some cases. They are especially helpful in emergency conditions where immediate drug action is required. Recent studies have explored the use of OTFs for delivering a variety of active pharmaceutical ingredients, including ondansetron for nausea, sildenafil for erectile dysfunction, and risperidone for schizophrenia. These applications demonstrate the versatility of OTFs in both acute and chronic therapeutic areas. Looking ahead, the integration of nanotechnology, mucoadhesive polymers, and taste-masking innovations is expected to further enhance the effectiveness of oral thin films. Continued research in this field could lead to the development of personalized drug delivery systems, enabling more precise and targeted treatments. The growing interest in OTFs underscores their potential to transform traditional approaches to medication administration and significantly improve patient outcomes.

Keywords: Oral thin films, Drug delivery system, Patient compliance, Rapid onset, Pharmaceutical innovation

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Acute Dermal Toxicity Studies of Topical Niosomal Gel Containing Benzoyl Peroxide and Tretinoin in New Zealand White Rabbit

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ABSTRACT

The study's goal was to see how hazardous a topical niosomal formulation with tretinoin and benzoyl peroxide was to the skin of white rabbits in New Zealand. A group of rabbits had their shaved skin treated with 2000 mg/kg of the test substance. A control group just got the base and went through the same therapy. For up to 14 days, the rabbits were watched for signs of death and poisoning. Every day, they kept note of their weight. The study indicated that after treatment, there were no evident indicators of toxicity, like changes in behaviour, circulation, nervous system function or respiration. There were no reactions in the area where the test material was put. The control group likewise didn't show any signs of being harmful. The animals were put through laboratory testing after being starved overnight following the 14-day treatment period. Included in the investigation was drawing blood from the marginal ear vein using a heparinized syringe the next morning. In contrast with the blood parameter tests for normalcy in the control group, here also everything was normal. This showed that the rabbits exhibited no signs of toxicity after treatment during 14 days. The present study backs the recommendation that topical niosomal gel of benzoyl peroxide and tretinoin is safe for use in rabbits. The study suggests it may also be safe for human use.

Keywords: Acute Dermal Toxicity, Tretinoin and Benzyl Peroxide Niosomal Gel

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Trends in Pharmacovigilance: Using AI and Machine Learning for Smarter Drug Safety Monitoring

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ABSTRACT

With the growing use of medicines around the world, keeping track of their safety has become more important than ever. Traditional methods of reporting side effects—like manual form filling—are often slow and may miss early warning signals. Today, massive amounts of health-related data are being generated daily from hospitals, clinics, digital health records, and even social media. Managing this data manually is nearly impossible.

That's where technologies like Artificial Intelligence (AI) and Machine Learning (ML) are transforming pharmacovigilance. These tools can analyze large volumes of data quickly, recognize patterns, and detect early signs of adverse drug reactions (ADRs). For example, Natural Language Processing (NLP) algorithms can scan social media posts or online patient forums to identify complaints or symptoms linked to specific drugs. Tools like VigiBase, MedWatcher, MetaMap, and Apache cTAKES are commonly used to process medical texts and extract useful information.

AI systems also use data from electronic health records (EHRs), such as those from FAERS (FDA Adverse Event Reporting System) and EudraVigilance, to find connections between drugs and reported side effects. According to recent studies, AI models have been able to predict adverse reactions with up to 85–90% accuracy when trained on large datasets.

By combining advanced technologies with expert medical review, we can develop faster, smarter, and more reliable systems for monitoring drug safety—ultimately helping to protect patients in real-time and improve overall public health.)

Keywords: Pharmacovigilance, Artificial Intelligence (AI), Machine Learning (ML), Adverse Drug Reactions (ADRs), Natural Language Processing (NLP), Electronic Health Records (EHRs), Pattern Recognition

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"Drug Safety Concern in Integrative Oncology Evidence from CAM Therapies in Cancer Care"

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ABSTRACT

The use of complementary and alternative medicine (CAM) alongside conventional cancer therapies an approach known as integrative oncology is growing steadily, as many patients seek holistic methods to alleviate symptoms and enhance their quality of life. Popular CAM practices, including herbal medicine, acupuncture, yoga, and nutraceuticals, may offer supportive care benefits. However, combining these with chemotherapy, immunotherapy, or targeted therapies introduces notable drug safety risks. These risks include herb-drug interactions, potential organ toxicity, product contamination, and inconsistencies due to a lack of regulatory control. This review examines the primary safety issues surrounding CAM in oncology, highlighting both the limited but expanding clinical evidence and the challenges observed in real-world settings, where unsupervised use and poor communication with healthcare professionals are frequent. The lack of standardization, clear regulations, and active pharmacovigilance systems complicates safety monitoring. To ensure safe integration, future strategies should emphasize the development of CAM-focused safety protocols, greater alignment between clinical and real-world data, and education-driven, evidence-based incorporation into cancer care.

Keywords: Integrative Oncology, Complementary and Alternative Medicine (CAM), Drug Safety, Herb-Drug Interactions, Cancer Care, Clinical Trials

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Impact of Indian Pharmaceutical Industry on Economic Growth

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ABSTRACT

The pharmaceutical sector in India is now a major driver of the nation's economic expansion, increasing export, employment, and international healthcare exports. This study examines how the sector affects India's economic growth, paying special attention to export potential and how it affects GDP as a whole. The industry has a number of obstacles, like pricing pressures and intense worldwide competition, despite its significant development and widespread awareness. On the other hand, the sector also offers a lot of potential, such as growing export markets, fostering innovation, and drawing in foreign direct investment. To frame comprehensive policies that protect public health and encourage technological developments in the pharmaceutical industry, governments, healthcare professionals, and industry stakeholders must work together so that the industry can evolve into a trustworthy and patient-centric component of modern healthcare. In order to analyse the industry's contributions, difficulties, and future prospects, this

study uses conceptual data analysis. It offers insightful information to players in the industry and policymakers who want to use the sector to promote sustainable economic growth.

Keywords: Pharmaceutical export, economic growth, healthcare

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Can Social Media Save Lives? Using AI to Find Side Effects

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ABSTRACT

Nowadays, a lot of people talk about their health and medicine experiences on social media platforms like Instagram, Reddit, and X (formerly Twitter). They often share how a medicine made them feel—sometimes even before any official side effects are known.

This poster explains how Artificial Intelligence (AI) and Natural Language Processing (NLP) can help us read and understand these posts. These tools can scan through millions of messages and pick out important words like medicine names or symptoms such as “felt dizzy” or “couldn’t sleep.” These signs may point to side effects that haven't been reported yet.

Around 4 billion people use social media, and about 40% of them talk about health-related topics. Many pharmaceutical companies, researchers, and health organizations—like the WHO and FDA—have started using this kind of information to spot early warning signs. Tools like VigiBase and MedWatcher are already helping in this process.

Of course, social media posts can be casual, unclear, or even false. Also, it’s important to protect users' privacy and data.

Still, if used properly, AI and social media can help find side effects faster, which means quicker action, better safety, and possibly saving lives.

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Innovative Wound Dressing for Anti-Coagulated Patients

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ABSTRACT

Bleeding leads to a critical risk in patients on anticoagulant therapy specifically patients of heart diseases, which complicate wound management and causes problems in healing. Normal dressings fail in providing rapid hemostasis and real-time bleeding detection, especially in high-risk patients. The project focuses on the development of a novel smart wound dressing that integrates colorimetric bleeding detection such as ph. detecting solution of blood, with a herbal-based haemostatic matrix (CHITOSAN, MORINGA OLIFERA), designed specifically for anticoagulated individuals such as cardiac and diabetic patients. The dressing comprises an outer colorimetric layer that visually detects the presence of fresh bleeding through a pH-sensitive dye, providing an early detection. The inner layer incorporates Moringa oleifera extract and Chitosan, both known for their potent, coagulant, antimicrobial, and wound-healing properties. Moringa, a plant-based agent that is rich in tannins, flavonoids, and bioactive polyphenols, enhances clot formation while minimizing inflammation and infection. Chitosan, a natural polysaccharide derived from crustacean shells, contributes by accelerating clotting through platelet adhesion and aggregation, while forming a protective gel barrier to prevent microbial attack. The main idea is to get rapid clotting, biocompatibility, and structural integrity. The product gives best results promising results in clotting time reduction, improved wound closure, and controlled bleeding when compared with other dressings. This smart dressing not only addresses the urgent need for targeted bleeding control in anticoagulated patients, but also helps with the principles of sustainable, herbal-based wound care technologies. It can be used in emergency care, post-operative management, and home care settings. This product idea is patented and has been published. The innovation offers a cost-effective, accessible, and patient-friendly solution to improve clinical outcomes for heart patients specifically.

Keywords: Wound dressing, ph. blood detection, Moringa oleifera, Chitosan, Haemostatic matrix, Anticoagulated patients, Rapid haemostasis and Herbal wound care.

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Formulation, Development and Evaluation of Sustain Released Enteric Coating Tablet of Mesalamine and Probiotic for Treatment of Inflammatory Bowel Disease

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ABSTRACT

An anti-inflammatory medication called mesalamine is used to treat mild to moderate Inflammatory bowel disease, Crohn disease and Ulcerative colitis and keep it in remission. It functions by lessening inflammation in the colon's lining. In inflammatory bowel disease (IBD), probiotics aid in reestablishing the balance of the gut microbiota, which may lessen inflammation. Their primary usage is as an adjuvant therapy to promote remission, particularly in ulcerative colitis and pouchitis. Current study focusses on development of sustained release enteric coated tablets formulation of mesalamine and probiotics. Probiotics chosen for the formulation are such as bacteria L. acidophilus, B. bifidum, S. boulardii, and S. thermophilus in combination. The preformulation study shows that all these probiotics are compatible with mesalamine and excipient. The Mesalamine and Probiotics groups shows the significant reduction in diarrhoea as compare to control group animals. Moreover, the Mesalamine and Probiotics formulation was showed protection in the colon histopathological observation. The protection is more as compare to mesalamine marketed preparation.

Keywords: Inflammatory Bowel Disease, Mesalamine, Probiotics, Sustained release, Enteric coated table

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Nutraceutical Harnessing the Power of Food: A Therapeutic Formulation for Arthritis

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ABSTRACT

Arthritis, a chronic inflammatory disease affecting millions worldwide, is characterized by joint pain, stiffness, and reduced mobility. While conventional treatments offer symptomatic relief, they often come with significant side effects and do not address the underlying causes of the disease. This abstract explores the potential of nutraceuticals, or "functional foods" as a safe and effective therapeutic alternative for managing arthritis. Nutraceuticals are natural, bioactive compounds derived from food sources that possess medicinal properties, offering a holistic approach to disease

management by harnessing the power of food. This review focuses on the development of a synergistic nutraceutical formulation for arthritis, combining key bioactive compounds with anti-inflammatory and antioxidant properties. The formulation will include curcumin from turmeric, known for its potent anti-inflammatory effects by inhibiting NF-κB and other pro-inflammatory cytokines; omega-3 fatty acids from fish oil, which reduce inflammation and support cartilage health; and glucosamine and chondroitin, essential components of cartilage that help repair and protect joints. Additionally, the formulation will incorporate gingerols from ginger and polyphenols from green tea, both of which are powerful antioxidants that combat oxidative stress, a key contributor to joint damage in arthritis. This therapeutic formulation aims to not only alleviate symptoms but also modify the disease progression by targeting multiple inflammatory pathways. The proposed nutraceutical approach offers a promising, safe, and cost-effective strategy for arthritis management, emphasizing the role of diet as a powerful tool for health and well-being.

Keywords: Nutraceutical, functional food, curcumin, omega-3 fatty acids, promising, safe

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Therapeutic Potential of Mesalamine-Probiotic Combination in Enteric Coated Tablet Modulating Gut Inflammation in IBD Models

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ABSTRACT

The present study explores the synergistic therapeutic potential of a mesalamine-probiotic combination formulated into enteric-coated tablets for targeted treatment of Inflammatory Bowel Disease (IBD). Mesalamine, a widely used anti-inflammatory agent, and selected probiotic strains (Saccharomyces boulardii, Bifidobacterium bifidum, Lactobacillus acidophilus, Streptococcus thermophilus) were co-formulated to enhance colonic delivery while minimizing gastric degradation. Nine matrix tablet formulations were prepared using various grades of HPMC and optimized for physical parameters and drug release. The selected core formulation was coated with Eudragit S-100 via dip coating for targeted colonic release. In vitro dissolution studies revealed a sustained and complete release of mesalamine, while probiotic viability assays confirmed survival through simulated gastric conditions. Physicochemical characterization, swelling index, release kinetics, and stability studies supported the robustness of the formulation. The results suggest that the mesalamine-probiotic enteric-coated tablet provides a promising approach for targeted IBD therapy by combining anti-inflammatory and microbiota-modulating effects.

Keywords: Mesalamine, Probiotics, Inflammatory Bowel Disease, Enteric Coated Tablet, Colon Targeting

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Molecular And QSAR Modeling with ADMET Analysis of Coumarin Derivatives for Anti Tubercular Activity

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ABSTRACT

Background: Tuberculosis remains a global health threat, worsened by rising drug resistance. DprE1, a key enzyme in M. Tuberculosis is a promising drug target. Coumarin derivatives show potential antitubercular activity, and in silico methos like QSAR, docking and ADMET analysis offer efficient strategies for identifying novel antitubercular leads.

Objective: This study aims to identify potential molecular targets of antitubercular activity using molecular docking and QSAR modal, assessing their drug-likeness and safety profiles using ADMET analysis.

Methodology: This study presents a comprehensive computational approach to evaluate the antitubercular potential of Coumarin Derivatives. A dataset of structurally diverse coumarin compounds was analysed using QSAR modelling, with relevant molecular descriptors calculated and statistically validated and assessed for pharmacokinetic and toxicity profiles using ADMET analysis. The present work focuses on molecular docking studies of a series of coumarin derivatives anti-tubercular activity Crystal structure of M. tuberculosis DprE1 in complex with the non-covalent inhibitor QN118 (PDB ID 4P8N: resolution 1.79 Å)

Results: Promising coumarin derivatives significant interactions with target interaction with hydrogen bonding was between hydroxy group and Pro316, Thr288, Leu283, Asn324, Leu363 amino acid group of M. tuberculosis DprE1 in complex displayed best dock score and was found to interact with Phe362 of M. tuberculosis DprE1 in complex. Showed

antitubercular activity QSAR and ADMET analysis confirmed favourable drug -like properties.

Conclusion: This study demonstrates that coumarin derivatives hold significant potential as antitubercular agent targeting the DprE1 enzyme. The integrated QSAR, Molecular docking and ADMET analysis enabled the identification of structurally promising compounds with potent activity.

Keywords: Coumarin derivatives, SAR modelling, ADMET, Molecular docking, Antitubercular activity

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Multi-Component Oral Capsule Containing Microencapsulated Probiotics, Prebiotics, Postbiotic Lysate, and Boswellia Extract with Bioavailability Enhancer in a Dual-Layer pH- Sensitive Matrix

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ABSTRACT

By incorporating complementary techniques that improve intestinal barrier protection, regulate localized inflammation, and enhance microbial balance, gut health interventions are increasingly seeking to go beyond conventional probiotics. This study describes the creation of a novel oral capsule that contains an anti-inflammatory Boswellia serrata extract (≥30% AKBA), a prebiotic (fructo-oligosaccharides), a postbiotic lysate from heat-killed Lactobacillus rhamnosus GG, and microencapsulated probiotics (Bacillus coagulans and Lactobacillus rhamnosus) with piperine as a bioavailability enhancer. The development of a dual-layer alginate–chitosan encapsulating matrix allowed for tailored pH-sensitive release in the gut while safeguarding probiotic viability in gastric acid. Following simulated gastrointestinal exposure, prototype testing showed that the microencapsulated probiotics retained over 80% vitality. The sequential intestinal administration of Boswellia extract, postbiotic lysate, and live cultures was validated by controlled release profiling. Caco-2 cell in vitro tests demonstrated that the postbiotic lysate altered immunological markers by raising IL-10 and lowering TNF-α levels. Studies on barrier integrity verified that, as compared to the individual components alone, the full formulation greatly enhanced tight junction function. Boswellia AKBA's permeability was increased by more than 50% through piperine co-formulation, indicating its bioenhancer function. In a single pH- sensitive delivery form, this integrated approach integrates postbiotic immunomodulation, selective prebiotic fermentation, multi-strain probiotics, and herbal anti-inflammatory activity. When combined, these methods solve the issues of stability, synergy, and survivability that are present in traditional probiotic supplements. The created capsule has great potential for use in microbiota balance, gut barrier strengthening, moderate gut inflammation control, and digestive health. Its therapeutic potential as a next-generation gut health treatment will be further validated by upcoming preclinical and human research.

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Enhancement of Anticancer Activity of Herbal Extracts Via Polymeric and Lipid-Based Nanocarrier Systems

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ABSTRACT

Significant challenges remain in developing efficient and specific drug delivery systems for cancer therapy. Among the promising approaches are nanoparticle formulations, especially polymeric and lipid-based nanoparticles. These approaches have shown potential via solubility and bioavailability enhancement, targeted drug delivery, stability enhancement, reduction in systemic toxicity and sustained drug release from herbal anticancer extracts. This study focuses on the use of polymers and lipids as nano carriers for cancer treatment. Authors highlighted the nano formulations of plant extracts and essential oils utilizing polymeric and lipid nano carriers, showing their clear advantages over traditional formulations like Polysorbate and soy lecithin SLNs of curcumin. f camptothecin liposome aerosol, PLGA (Poly lactic-co-glycolic acid) of Curcumin, Chitosan to Resveratrol, Eudragit RS100 to Berberine. Most studies report highly promising nano formulations that provide sustained release and enhanced bioavailability at significantly lower doses compared to conventional forms, often accompanied by an improved safety profile.

Keywords: Plant extracts, Anticancer, Nano carriers, Nanoparticles, polymeric, lipid

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Phytochemical Extraction and Cytotoxic Assessment of Elymus repens Utilizing the MCF-7 Tumor Cell Line

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ABSTRACT

Elymus repens, which has a long history in herbal medicine, was studied for its phytochemical composition and cytotoxic effects on MCF-7 breast cancer cells. The plant's aerial parts were shade-dried, ground into a powder, and then extracted using ethanol through a cold maceration process. The extract underwent filtration and was concentrated under reduced pressure. Phytochemical analysis indicated the presence of significant secondary metabolites, including flavonoids, alkaloids, saponins, and phenolic compounds, recognized for their potential bioactivity. To evaluate cytotoxicity, MCF-7 cells were cultured in DMEM supplemented with 10% foetal bovine serum and incubated at 37°C in a 5% CO_2 environment. The MTT assay was utilized to assess cell viability after exposure to varying concentrations of the ethanolic extract. The results showed a distinct dose-dependent reduction in cell viability, with an IC_{50} value of 71.5 µg/mL, suggesting moderate cytotoxic activity. These results imply that Elymus repens contains bioactive constituents that may have anticancer effects, especially against hormone-responsive breast cancer cells. This underscores its potential contribution to natural product-based drug discovery and emphasizes the necessity for further investigations to isolate specific active compounds and clarify their mechanisms of action.

Keywords: *Elymus repens*, phytochemical screening, cytotoxicity, MCF-7, MTT assay, IC_{50}

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Smart Polymer Platforms for Next-Generation Drug Delivery

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ABSTRACT

Background: Natural mucilage is a biodegradable, non-toxic, and eco-friendly polymer.

Aim: To assess the properties and toxicity of a novel polysaccharide-based polymeric network.

Method: A polysaccharide-acrylamide (PSM-AM) graft copolymer was synthesized via a green, microwave-assisted method using potassium persulfate. Optimization was done based on grafting efficiency. The polymer was characterized using FTIR, DSC, H-NMR, XRD, and viscosity studies.

Results: The method was efficient and eco-friendly. The best batch (PSM-1) showed 400% grafting and 105% efficiency. Structural analyses confirmed successful grafting. Acute toxicity tests confirmed its safety.

Conclusion: The polymeric network is safe and suitable for sustained drug delivery of BCS Class II and IV drugs

Keywords: Natural Mucilage, Green Synthesis, Polymeric Scaffold, Seed Mucilage, Toxicity, Grafting copolymer.

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Phytochemical Constituents and Solubility Profile of Ludwigia Adscendens Leaf Extracts

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ABSTRACT

This study explores the phytochemical constituents and solubility profile of Ludwigia adscendens leaf extracts, a species recognized for its ethnomedicinal applications. Leaves were collected and subjected to Soxhlet extraction using petroleum ether and 70% methanol. The extraction yielded 1.38% and 10.44% respectively, with methanol proving significantly more efficient. Solubility testing of the hydroalcoholic extract revealed high

solubility in organic solvents like methanol, ethanol, chloroform, acetone, and ethyl acetate, while being sparingly soluble in water. Qualitative phytochemical screening of both extracts confirmed the presence of several key secondary metabolites, including carbohydrates, alkaloids, flavonoids, glycosides, proteins, amino acids, saponins, triterpenoids, steroids, tannins, and phenolic compounds. These findings highlight the rich phytoconstituent profile of L. adscendens and suggest its potential as a source of biologically active compounds for pharmacological applications.

Keywords: Ludwigia adscendens, Phytochemicals, Solubility profile.

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Laser coupled 3D-printed implant for prevention of post-surgical oral cancer relapse

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ABSTRACT

Adjuvant therapy following cancer surgery often fails due to the emergence of chemoresistance, which contributes to tumor cell survival, locoregional relapse, and metastatic events. In this study, a plasmonic implant developed by 3D-printing technology was fabricated to address this challenge, specifically targeting tumor cells resistant to cisplatin. The implant was fabricated using an optimized bio-ink composed of biodegradable polymers- poly(L-lactide) and hydroxypropyl methylcellulose combined with cisplatin and laser-responsive graphene. Upon laser irradiation, the graphene component generates localized hyperthermia, leading to the photothermal destruction of cisplatin-resistant (CisR) tumor cells, while simultaneously enabling the sustained release of cisplatin. The implant demonstrated a pH-sensitive cisplatin release over 28 days and effectively reversed chemoresistance in a CisR tumor spheroid model. Cytotoxicity tests on CisR cells showed a significant reduction in viability with the combined chemo-photothermal treatment. Apoptosis assays confirmed an increase in apoptotic cell populations, supported by gene expression analysis indicating upregulation of pro-apoptotic genes. This biodegradable 3D- printed implant, capable of delivering combined chemotherapy and thermal ablation, offers a promising strategy for post-surgical adjuvant therapy in drug-resistant cancers.

Keywords: Cancer, 3D-printing, Chemoresistance, Photothermal therapy, 3D spheroid

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Nano-silver Coupled Laser-thermal shock to treat Chronic Wound

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ABSTRACT

Chronic diabetic wounds represent a significant global health burden, often resulting in delayed healing, infection, and amputation. To address these challenges, we developed a novel thermoresponsive gel embedded with green-synthesized silver nanoparticles (AgNPs) and designed for near-infrared (NIR) photothermal stimulation. The AgNPs were synthesized via a reduction process using plant-derived flavonoids, which served as both reducing and stabilizing agents, ensuring biocompatibility. The AgNPs were incorporated into a thermoresponsive hydrogel, which transitions at physiological temperatures. This gel provides a moist wound environment, promotes sustained release, and allows on-demand NIR-triggered photothermal therapy. Upon NIR laser irradiation, the AgNPs generate localized mild hyperthermia (~42-45°C), which enhances blood flow, upregulates growth factors (VEGF, CD31, α-SMA), and disrupts bacterial biofilms, accelerating tissue regeneration. In vitro assay, demonstrated that the green-synthesized AgNPs exhibited excellent biocompatibility, as confirmed by Alamer-based cell viability assays. Furthermore, scratch assays revealed that the AgNPs significantly enhanced keratinocytes migration, suggesting an excellent role in cellular proliferation and wound closure dynamics. In vivo studies in streptozotocin-induced diabetic mouse models demonstrated enhanced wound contraction, faster re-epithelialization, and reduced inflammatory cytokine expression (TNF- α, IL-6) in treated groups compared to control. Histological analysis confirmed increased collagen deposition and neovascularization. This multifunctional system combines antimicrobial, anti-inflammatory, and photothermal properties, addressing the intricated pathology of diabetic wounds. The integration of green nanotechnology and NIR-responsive AgNPs presents a promising, non-invasive strategy for next-generation diabetic wound care.

Keywords: Diabetic wound healing, green synthesis, silver nanoparticles (AgNPs), thermoresponsive gel, photothermal therapy.

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RNAi Therapeutic Delivering Nanoshuttle for Molecular Level Treatment of Chronic Obesity

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ABSTRACT

A sedentary lifestyle can lead to obesity, a serious health problem that is associated with a number of other serious disorders, such as diabetes, cardiovascular disease, and cancer. Gene therapy is a new medical technique to treat obesity that modifies the expression of gene at the molecular level. The goal of this work is to create an anionic nanoformulation of RNAi that is targeted to adipocytes for cytosolic administration and RNase prevention. The creation of integrin-targeted exercise mimetic RNAi nanoformulation for the treatment of obesity is reported for the first time in this investigation. Adipocyte-specific lipids have been developed in order to create integrin-targeted nanoformualtion of miR-130b, which will deliver the gene safely and effectively in the cytosol and stop RNase destruction. The produced nanoformulation characterization or quality control revealed a consistent particle size, anionic charge, improved entrapment efficiency, RNase protection capacity, cytosolic delivery ability, enhanced cellular uptake, and an excellent safety profile. Additionally, the in vivo studies showed decreased animal and organ weight, enhanced capacity for exercise, improved lipid profile, reduction of adipogenic as well as elevation of lipolytic or metabolic protein and mRNA expression. It is anticipated that the outcomes of this investigation will offer novel perspectives in creating next- generation tools for molecular-level obesity treatment.

Keywords: Obesity, gene delivery, integrin, miR-130b, nanoformulation

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Molecular Investigations: 3D-QSAR and ADMET Analysis of 4-aminoalkyl-1(2H)-phthalazinone derivatives as promising Anti-Alzheimer Agents

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ABSTRACT

Background: Alzheimer's disease (AD), a neurodegenerative condition, represents a significant worldwide challenge characterized by a complicated, multiple etiology. This study utilized a thorough in-silico methodology that integrated Quantitative Structure-Activity Relationship (QSAR) modeling with ADMET profiling in order to develop and predict the safety and effectiveness of a series of novel compounds as potential anti-Alzheimer's agents.

Materials & Method: A dataset of 25 molecules of 4-aminoalkyl-1(2H)-phthalazinone derivatives were designed as promising agents with known inhibitory potencies against Alzheimer's disease (AD) targets. The inhibitory potencies were used to develop 3D QSAR models. Multiple molecular descriptors, including topological, electronic, and spatial types, were computed. 3D descriptors of molecules were calculated and studied using PaDEL software for structure-activity (QSAR) investigations.

Result: The models developed exhibited high statistical significance, supported by robust internal and external validation metrics, which indicate their strong predictive capability.

Conclusion: Utilizing insights from the QSAR models, compounds were subsequently analysed by in-silico ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) prediction to assess their drug-likeness, pharmacokinetic characteristics, and potential toxicity profiles. The findings demonstrated that the most promising drugs exhibited advantageous ADMET characteristics, such as high oral bioavailability, central nervous system penetration, and a minimal risk of hepatotoxicity or mutagenicity. This research effectively identified lead compounds with favourable QSAR and ADMET profiles, presenting desirable prospects for the development of more promising agents against Alzheimer's disease.

Keywords: Alzheimer's disease, 4-aminoalkyl-1(2H)-phthalazinone derivatives, 3D QSAR, ADMET profiles, Descriptors, Drug-likeness

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An Investigative Review for Pharmaceutical Analysis of a Non-Steroidal Mineralocorticoid Receptor Antagonist: Finerenone

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ABSTRACT

A non-steroidal selective mineralocorticoid receptor antagonist, finerenone plays a clinically important role in the treatment of type 2 diabetes-related chronic kidney disease (CKD). Significant renal and cardiovascular protection is provided by its anti-inflammatory and antifibrotic properties. Its pharmacokinetics, formulation developments, and analytical methodologies are compiled in this review. CYP3A4 is the primary metabolizer of finerenone, which is rapidly absorbed (Tmax: 1-2 hours; bioavailability ~43%) and excreted by the liver and kidneys. To maximize treatment, modified-release formulations are being developed. While UPLC improves impurity profiling, HPLC is frequently employed for quantification. With the use of HPTLC and UV spectroscopy, forced degradation experiments are used to evaluate stability. For pharmacokinetic and bioequivalence investigations, LC-MS is the method of choice. To create reliable, verified analytical techniques for clinical and regulatory purposes, more work is required.

Keywords: Finerenone, CKD, Pharmacokinetics, Analytical validation, LC-MS/MS, Stability Analysis

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Raman Spectroscopy Based Investigation of Vitex –Negundo on Anti-rheumatoid Activity

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ABSTRACT

The anti-rheumatic potential of methanolic leaf extract was evaluated through an in-vitro protein denaturation inhibition assay, using diclofenac sodium as a reference standard. Results identified significant inhibition of protein denaturation, suggesting strong anti-inflammatory activity. To optimize extraction protocol for maximal therapeutic benefit, the study compared different solvent systems and identified the most effective for subsequent in vivo studies. Additionally, the study employed Raman Spectroscopy (RS) to investigate its utility in diagnosing and monitoring rheumatoid arthritis (RA), particularly in seronegative cases. The anti-rheumatic efficacy of the optimized Vitex negundo extract was successfully monitored using RS, reinforcing its value as a non-invasive diagnostic and monitoring tool and the presence of bioactive compounds, which may contribute to Anti-Rheumatoid, was confirmed through chemical profiling using UV-Visible spectroscopy, Fluorimetry, FTIR, Raman spectroscopy, and Qualitative phytochemical analysis. Together, these findings underscore Vitex negundo as a promising source of anti-inflammatory agents and highlight the integration of spectroscopic techniques for both therapeutic evaluation and disease monitoring.

Keywords: Rheumatoid arthritis, Raman spectroscopy, phytochemical profiling, protein denaturation assay, Complete Freund's adjuvant

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Decoding the Heart: Evolving Landscape of Cardiac Biomarkers in Risk Assessment from Troponin to Multi-omics

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ABSTRACT

Cardiovascular diseases (CVDs) remain the leading global cause of morbidity and mortality, necessitating the exploration of innovative strategies for early detection and risk assessment. Traditional risk factors (Framingham Score and clinical scoring systems) often fall short in accurately identifying individuals at risk, particularly those classified as low or intermediate risk. This review explores multifaceted role of cardiovascular biomarkers in enhancing risk stratification, diagnosis, and management of CVDs. Established biomarkers such as troponins [cTnI, cTnT], BNP/NT-proBNP, hs-CRP, Galectin-3, CK-MB and Emerging biomarkers (GDF-15, ST2, Copeptin, microRNAs, and NGAL) provide valuable insights into underlying pathophysiological processes, such as inflammation, myocardial injury, endothelial dysfunction and thrombosis thus offering a more nuanced understanding of CVDs risk. This paper discusses various types of biomarkers, including diagnostic, prognostic, predictive, and therapeutic markers, highlighting their clinical significance and potential in personalizing CVD management. Furthermore, the integration of novel biomarkers into existing risk prediction models,

alongside advancements in AI and machine learning tools helps personalize cardiovascular care by combining biomarker profiles with clinical and imaging data. Multi-omics approaches such as genomics, proteomics, and metabolomics is proposed to refine cardiovascular risk assessment and improve patient outcomes. The implications for public health, particularly in India, are also addressed, emphasizing the need for cost-effective biomarker screening and targeted preventive strategies. Ultimately, this review advocates for a paradigm shift towards precision medicine in cardiology, aiming to reduce the global burden of CVDs through enhanced diagnostic capabilities and individualized treatment approaches.

Keywords: Cardiac biomarkers, multi-omics approaches, AI, Troponin

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The Role of Prosopis Cineraria in Mitigating Cisplatin-Induced Nephrotoxicity in Rats Model

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ABSTRACT

Background: Cisplatin is a widely used chemotherapy drug that is effective against many solid tumors. However, its use is limited by dose-dependent kidney toxicity, which involves oxidative stress, inflammation, and damage to kidney tissue. Researchers are looking into natural plant-based compounds that have antioxidant and anti-inflammatory properties to help reduce these negative effects. Prosopis cineraria is observed as a significant herbal plant because of its many beneficial properties.

Objective: This review evaluates how Prosopis cineraria, a medicinal plant with a rich mix of beneficial compounds, can help reduce kidney toxicity caused by cisplatin in experimental rat models.

Methods: A systematic review of preclinical studies was carried out, concentrating on models where extracts of Prosopis cineraria were given with cisplatin. We searched databases like PubMed, ScienceDirect, and Google Scholar using specific keywords. The review focused on key parameters, including biochemical markers (creatinine, urea), indicators of oxidative stress (MDA, SOD, CAT), histopathological findings, and levels of inflammatory cytokines.

Conclusion: Prosopis cineraria appears to have promising protective abilities against cisplatin- induced kidney damage in rats, probably due to its antioxidant and anti-inflammatory properties.

Key words: Chemotherapy, Oxidative stress, Biochemical markers, Cytokines

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Exploring Pain Pathways through Sciatic Nerve Constriction: Model Standardization for Neuropathic Pain in Rodents

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ABSTRACT

Background: Neuropathic pain arises from damage to the somatosensory nervous system and remains a significant clinical challenge due to its chronic nature and resistance to conventional analgesics. This is a worldwide health concern that impacts roughly 7–10% of the general population. The Chronic Constriction Injury (CCI) model is a widely accepted preclinical model for studying neuropathic pain mechanisms and testing potential therapeutic agents.

Objective: This study aimed to evaluate neuropathic pain development and response to treatment using the CCI model in rats, focusing on behavioural, molecular, and histopathological changes.

Methods: Peripheral neuropathy in rats was developed by CCI of the sciatic nerve according to Bennett and Xie. Under anaesthesia with ketamine and xylazine (92 and 9.2 mg/kg), the sciatic nerve was exposed and four loose ligatures were

made using chromic 4-0 gut suture, spaced 1 mm apart, proximal to the nerve trifurcation. Behavioural tests included Sciatic Functional Index, heat hyperalgesia, and cold allodynia.

Results: The footprints of CCI rats displayed shorter steps and reduced toe spread, indicating impaired sciatic nerve function. CCI rats showed a stronger response to acetone drops with flicking and licking behaviours, suggesting increased cold sensitivity. Spontaneous pain behaviours such as paw lifting, flicking, and licking were also observed.

Conclusion: This investigation will contribute to understanding the mechanisms of neuropathic pain and support the development of targeted therapeutic strategies using the CCI model.

Keywords: Neuropathic, Somatosensory, Chronic Constriction Injury, Peripheral neuropathy

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The Antioxidant, Anticancer and Neuroprotective Activity of Cordia Dichotoma and Lagerstroemia Speciosa

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ABSTRACT

Cordia dichotoma, a member of the Boraginaceae family, is found throughout Asia, particularly in India, Pakistan, and Nepal. Indigenous medical systems have long utilized various components of this plant, especially its fruits and leaves, to treat a range of conditions. A deciduous tropical flowering tree found in South East Asian nations is Lagerstroemia speciosa (Lythraceae). The Cordia dichotoma and Lagerstroemia speciosa both are known to have many phytoconstituents like steroids, terpenoids, glycosides, phenolic compounds, α-amino acids, saponins, starch, alkaloids, carbohydrates, organic acids, flavonoids, reducing sugars, and tannins. Considering all these constitutents current research focused on the antioxidant, anticancer and neuroprotective effect of Cordia dichotoma and Lagerstroemia speciosa.

Key words: Antioxidant, Anticancer, Neuroprotective, Cordia dichotoma and Lagerstroemia speciosa

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Bile Acid-Activated Receptors in Inflammatory Bowel Disease: Mechanisms, Dysregulation, and Therapeutic Potential

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ABSTRACT

Background: Inflammatory bowel disease (IBD) is a broad term for chronic disorders such as Crohn's disease (CD) and ulcerative colitis (UC), both of which involve ongoing inflammation of the digestive tract and occur in cycles of flare-ups and remission. Its origins are linked to the complex interaction of genetic predisposition, abnormal immune activation, environmental conditions, and disturbances in gut microbial communities. While traditionally seen more often in Western nations, IBD is increasingly diagnosed worldwide, including in South Asia, where UC is detected more often than CD.

Objective: To examine how receptors that respond to bile acids (BARs) influence gut stability, assess the effects of their dysfunction in IBD, and discuss their potential as drug targets.

Discussion: Bile acids are not only essential for breaking down dietary fats but also act as messengers that help regulate gut lining integrity, control immune activity, and maintain a balanced microbiome. These effects occur through receptors such as Farnesoid X Receptor (FXR), Takeda G-protein–coupled receptor 5 (TGR5), Vitamin D Receptor (VDR), and Pregnane X Receptor (PXR). When bile acid processing or receptor activation is impaired, the intestinal barrier can weaken, inflammation may persist unchecked, and disease flare-ups can intensify patterns frequently noted in IBD.

Conclusion: BARs play an important role in preserving gastrointestinal balance by suppressing excessive inflammation and supporting tissue repair. Loss or reduction of receptor function is closely tied to IBD progression. Targeted modulation of these pathways holds promise for developing therapies that restore intestinal health and promote long-term remission.

Keywords: Inflammatory bowel disease (IBD), Crohn's disease

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Hospital Pharmaceutical Emergency Preparedness Management: Evaluating Current Practices and Developing Evidence-Based Protocols for drug Safety During Disasters'- Analysis of Case studies

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ABSTRACT

Hospital pharmaceutical emergency preparedness is vital for ensuring patient safety and continuity of care during disasters. This study analyses case studies from recent natural and human-made disasters to evaluate current hospital practices in pharmaceutical management and identify opportunities for protocol development. Lessons from events such as the Iowa floods, Missouri tornadoes, Boston Marathon bombing, the Leh flash floods, and recommendations from World Health Organization (WHO) disaster management provide insights into challenges including inventory shortages, cold chain maintenance, communication breakdowns, and inadequate staff training. The analysis reveals recurring gaps in stockpile management, infrastructure redundancy, real-time documentation, and inter- hospital coordination. Key evidence-based practices emerging from the case studies include regular risk assessments, multidisciplinary disaster drills, diversified supplier arrangements, robust communication strategies, and resilient cold chain solutions. The findings underscore the necessity for dynamic, scenario-specific protocols, integrated staff education, and partnerships with external agencies to bolster pharmaceutical preparedness. Adopting these measures can significantly enhance drug safety and response effectiveness, enabling hospitals to deliver resilient pharmaceutical care during crises.

Key words: Drug safety, Disaster, Emergency preparedness, Protocols, Cases

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QbD-Guided Design of NLC-Based Buccal Films of a Phytoconstituent for Enhanced Chemoprevention

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ABSTRACT

Objectives: This study aimed to develop and optimize a nanostructured lipid carrier (NLC)- based hybrid buccal film of quercetin (QCT) using a Quality by Design (QbD) approach for potential chemoprevention of oral cancer.

Methodology: QCT loaded NLCs were prepared via the solvent injection technique using pre-screened excipients. A Design of Experiments (DoE) framework was employed to assess the influence of total lipid content, surfactant concentration, and liquid lipid proportion on critical quality attributes—namely, particle size and drug entrapment efficiency. Transmission electron microscopy (TEM) was used to analyze morphology. Bilayer hybrid buccal films were cast using ethyl cellulose as the backing layer and a blend of hydroxypropyl methylcellulose and Carbopol 934P for the drug-loaded matrix. These films were evaluated for mechanical strength, in vitro drug release, ex vivo buccal permeation, stability, and cytotoxicity using cell line studies.

Results and Discussion: QCT-NLCs were successfully formulated with glyceryl monostearate (solid lipid), Transcutol HP and Capmul MCM (liquid lipids), and surfactants including soya lecithin and Poloxamer 188. DoE analysis indicated that higher surfactant levels reduced particle size, while increased lipid content enlarged particles but improved entrapment efficiency. The optimized formulation had particle size of 144 nm and entrapment efficiency of 90.21%, as verified by TEM. The resultant hybrid film demonstrated sustained drug release (80% over 8 hours), excellent tensile strength (3.93 MPa), and was stable under accelerated conditions. Ex vivo studies confirmed 80% buccal drug permeation in 8 hours. Cytotoxicity assays validated the formulation's safety and chemopreventive potential.

Conclusion: The QCT-loaded NLC hybrid buccal film demonstrated potential as a safe and effective strategy for oral cancer chemoprevention.

Keywords: Quercetin; Chemoprevention; Hybrid system; Buccal film; Nanocarrier

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In sillico Structure-Based Drug Design and Evaluation of New Disubstituted Benzimidazole Derivatives as Selective VEGFR Inhibitors: A Potential Therapeutic Target for Cancer Treatment.

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ABSTRACT

Cancer is characterized by unrestrained proliferation of body cells and also spread to surrounding organ or tissues. Angiogenesis, or the emergence of new blood vessels, is one of the most significant markers of cancer progression. An essential vascularization mediator is the VEGFR-2 (Vascular Endothelial Growth Factor Receptor-2). VEGFR-2 signaling Inhibition has been shown to impair tumor vascularization or tumor growth and spreading to other organs. The current study's goal was to use in-silico methods to develop and evaluate novel disubstituted benzimidazole compounds that would act as VEGFR-2 inhibitors. In the beginning some of new disubstituted benzimidazole compounds were developed and virtually screened for ADMET profiling with QikProp module of Schrödinger software for evaluating their pharmacokinetic properties and drug like aspects. After that, molecules were submitted to molecular docking investigations against VEGFR-2 (PDBID: 4ASD) utilizing Schrödinger and MOE software tools. The designed compounds show desirable pharmacokinetic profiling based on ADMET studies. The docking results shows that the designed compounds exhibited strong binding affinities with the active sites of VEGFR-2 and occupied the active site similar to frequently observed standard compound sorafenib. Actives site was observed with pharmacophoric features like hinge region, linker, HBD-HBA and a hydrophobic region. The key interactions were observed at the active site with critical amino acid residues such as Glu885, Cys919, and Asp1046.

Conclusion: These results signifies that the developed disubstituted benzimidazole compounds are good prospects for additional research and development as anticancer drugs that target VEGFR-2.

Keywords: Benzimidazole, Anticancer, VEGFR-2, In-sillico and ADMET study

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Phytosome-Based Delivery Systems: Bridging Efficacy and Safety in Herbal Medicine

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ABSTRACT

Background: Phytochemicals, including flavonoids, terpenes, and polyphenols, are naturally occurring bioactive compounds known for their antioxidant, anti-inflammatory, and immunomodulatory activities. Despite their therapeutic potential, clinical application remains limited due to poor aqueous solubility, low lipophilicity, and reduced oral bioavailability.

Objective: This review aims to evaluate the potential of phytosome-based drug delivery systems in enhancing the solubility, absorption, and intestinal permeability of plant-derived compounds, with particular emphasis on their immunomodulatory and immunoboosting effects.

Methods: Various formulation techniques—such as solvent evaporation, rotary evaporation, anti-solvent precipitation, freeze-drying, and thin-film hydration—have been employed to develop phytosomes. These techniques facilitate the formation of stable hydrogen-bonded complexes between bioactive phytoconstituents and phospholipids, including soya phosphatidylcholine (90% purity), phosphatidylserine, and phosphatidylethanolamine.

Results: Phytosome formulations generally exhibit nanoscale particle sizes (300–500 nm), high entrapment efficiency, and improved bioavailability. These physicochemical characteristics significantly enhance the solubility, permeability, and absorption of poorly water-soluble phytochemicals.

Conclusion: Phytosomes represent a promising strategy to overcome the formulation challenges associated with plant-based therapeutics. By improving solubility, bioavailability, and intestinal absorption, phytosomes hold considerable potential for pharmaceutical and nutraceutical applications. However, challenges such as formulation stability, scalability, and long-term bio efficacy must be addressed to ensure clinical and commercial success.

Keywords: Phytosomes, phytochemicals, immunomodulation, bioavailability, absorption, intestinal permeability, entrapment efficiency.

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Formulation Of Aceclofenac Microparticles by Factorial Design Approach Using Ethyl Cellulose Carrier

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ABSTRACT

Aceclofenac loaded ethyl cellulose (EC) microparticles show the properties like low toxicity, better stability, improved dosing frequency, simple and mild preparation methods exhibit their importance in last decade. In current study, we prepare aceclofenac loaded ethyl cellulose microparticles by solvent evaporation method. As EC is an ideal choice for sustaining the drug release in body hence, we use EC as a polymer. The model drug aceclofenac having biological half-life (approximately 3 hours) is selected. Due to its low biological half-life frequency of dose is twice a day to maintain the therapeutic level in the body. The effect of drug polymer concentration and solvent ratio were studied on particle size and entrapment efficiency. The result shows that the solvent evaporation approach for preparation of microparticles gives sustained release profile. X-RD, Fe-SEM, and in-vitro release studies are performed on obtained optimized formulation. Three-level two-factor design approach was employed and developed for responses. The Fe-SEM results reveal the spherical microsphere. The obtained microspheres show good entrapment efficiency with sustained in-vitro release. The aceclofenac was successfully entrapped for sustained release action for pain relief.

Keywords: Microspheres, Sustained release, Factorial design, Solvent evaporation, Ethyl cellulose

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Nano-Liposomal Delivery of Desonide: A Novel Approach for Optimized Topical Therapy in Atopic Dermatitis

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ABSTRACT

Background: Atopic dermatitis (AD) is a persistent inflammatory skin disorder that frequently affects individuals of all ages, including both children and adults. Frequent application of topical corticosteroids often leads to poor patient compliance and side effects. Liposomal delivery offers a promising alternative by enhancing drug skin penetration, and sustained therapeutic effect.

Objective: Application of conventional topical formulations of corticosteroids, leads to poor patient compliance. This study aimed to develop desonide-loaded liposomes to enhance skin penetration, extend drug release, and reduce dosing frequency in the treatment of AD.

Methods: Desonide-loaded nano-liposomes were formulated by the solvent injection method using HSPC and cholesterol. Particle size and zeta potential were analysed using a Microtrac analyzer, entrapment efficiency by Sephadex G-25 gel filtration with UV spectrophotometry, and morphology was assessed via leica microscope.

Result: Microscopy revealed spherical, uniformly distributed vesicles with an average particle size of 412 nm, suitable for topical penetration. The formulation exhibited a zeta potential of +4.5 mV and a high entrapment efficiency of 78%, indicating efficient drug encapsulation within the lipid bilayer.

Conclusion: Desonide-loaded nano-liposomes showed high encapsulation which is, good for topical delivery. This approach enhances skin penetration, reduce dosing frequency, and improve patient compliance in AD therapy.

Keywords: Atopic dermatitis, Desonide, NDDS, Skin Penetration, Liposome, Entrapment Efficiency

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Romosozumab in Postmenopausal Osteoporosis: A Dual-Action Therapeutic Approach to Fracture Risk Reduction

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ABSTRACT

Increased risk of fractures and related morbidity, osteoporosis is still a major global health concern, especially for postmenopausal women. By simultaneously encouraging osteoblast-mediated bone formation and preventing osteoblast-mediated bone resorption, the first-in-class monoclonal antibody that targets sclerostin, romosozumab, provides a dual mechanism of action. This study assesses romosozumab's safety and effectiveness in raising bone mineral density (BMD) and lowering the risk of fractures in high-risk individuals. Techniques Randomized controlled trials (RCTs) published between 2017 and 2024 were the subject of a systemic review and meta-analysis using data from PubMed, Scopus, and ClinicalTrials.gov. Postmenopausal women with severe osteoporosis who received romosozumab treatment for a year met the inclusion criteria. Changes in the lumber spine, total hip BMD, and the frequency of vertebral and nonvertebral fracture were the main outcomes. Evaluation of secondary outcomes. Over a 12-month period, romosozumab markedly raised total hip BMD by 6–8% and lumbar spine BMD by 13–15%. In comparison to placebo and active comparators (e.g., alendronate), the risk of vertebral fractures was decreased by up to 73% and that of nonvertebral fractures by 25%. Careful patient selection and monitoring are necessary, though, as some cohorts showed a slight increase in cardiovascular serious adverse events (such as myocardial infarction and stroke). Postmenopausal women with severe osteoporosis, especially those who are at immediate risk of fracture, romosozumab is a very effective anabolic treatment. Significant improvements in BMD and fracture prevention are provided by its special dual mechanism. To maintain benefits, maintenance antiresorptive therapy should be used after its use, as it may pose cardiovascular risks.

Keywords: Bone mineral density (BMD), Osteoporosis, Romosozumab treatment

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Development and Evaluation of Topical Emulgel Formulation of Luliconazole for Skin Fungal Infection

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ABSTRACT

Background: Skin fungal infections are common and often require effective topical antifungal therapy. Luliconazole, a novel imidazole antifungal, shows potent activity against dermatophytes and Candida species. However, its poor aqueous solubility limits skin absorption and therapeutic efficacy.

Objective: This study aimed to develop and evaluate a topical emulgel formulation of Luliconazole to enhance its skin permeation, stability, and antifungal activity.

Methods: Emulgels were prepared by incorporating oil-in-water emulsions into various gel bases. Different gelling and emulsifying agents were screened to optimize formulation parameters such as viscosity, spreadability, drug content, and

stability. Franz diffusion cells were utilized to investigate the in-vitro release profile of the drug and ex-vivo skin permeation, while antifungal activity was determined using the agar well diffusion technique

Results: The optimized Luliconazole emulgel showed favourable physicochemical properties, including homogeneity, suitable pH, and good spreadability. Drug release studies indicated enhanced and sustained release compared to a marketed cream. Ex-vivo permeation studies confirmed improved skin penetration. Antifungal assays revealed significant zones of inhibition against Trichophyton rubrum and Candida albicans.

Conclusion: The developed Luliconazole emulgel demonstrated improved delivery and antifungal performance, suggesting its potential as a more effective alternative to conventional topical formulations for treating superficial fungal infections.

Keywords: Luliconazole, Emulgel formulation, Topical antifungal, Oil-in-water emulsion, Penetration enhancers, Surfactants.

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From Clinical Trials to Real-World Evidence: A Systematic Review of Post-Marketing Drug Safety and Digital Engagement

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ABSTRACT

Drug safety is a crucial part of public health; however, clinical trials occur in the controlled settings with restricted participant's selection, restricting the capacity to detect adverse drug reactions that may occur in routine usage. Real–world data patient health status and /or health care delivery data that are collectively from multiple sources in real life. RWD include data from electronic health records, medical claims, product or disease registries, and data collected from other sources (eg. Digital health technology) that can provide information regarding health status. Real-world evidence (RWE) has emerged as an essential adjunct, providing insights from diverse patient populations and standard clinical settings. This reviews the influence of real-world evidence (RWE) and digital engagement technologies on drug post-marketing safety and Pharmacovigilance. A systematic review of articles published between 2015 and 2025 that relate to drug safety, RWE, digital health, social media monitoring, and patient engagement as contained in the Scopus, PubMed, and Web of Science databases was done. According to PRISMA guidelines, systematic review provided a total of 78 relevant industry reports, regulatory documents, and scholarly publications that were then coded and analysed. Findings show a paradigm shift from passive reporting towards proactive monitoring, A crucial indicator marking the rapid development of technology and social media. The advancement in approval of new drug applications and related scenarios is trying to minimize complications in process although problems with data standards, privacy, and ethics are challenges; collaborative patient-centered systems are the best solutions for enhancing global drug safety.

Keywords: Clinical Trials, Digital Health, Drug Safety, Pharmacovigilance, Real-World Evidence

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Synthesis of new 2-amino benzothiazole derivatives as potential anti-cancer agent

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ABSTRACT

Introduction: Cancer is a multifactorial pathological disorder characterized by uncontrolled cellular proliferation, evasion of apoptosis, and the propensity for local invasion and distant metastasis. During oncogenesis, aberrant hyperactivation of histone deacetylases (HDACs) contributes to the epigenetic silencing of tumor suppressor genes, thereby facilitating unchecked cellular growth and enhanced survival. Pharmacological inhibition of HDACs can restore tumor suppressor gene expression, thereby suppress tumor progression and improve therapeutic outcomes. Benzothiazole constitutes a privileged heterocyclic scaffold in medicinal chemistry, recognized for its diverse pharmacological activities and significant anticancer potential. Objectives: This study aimed to design and assess a novel series of 2-amino benzothiazole derivatives as potential HDAC inhibitors using comprehensive in silico methodologies.

Methods: A virtual library of 2-amino benzothiazole derivatives was constructed and evaluated for drug- likeness and pharmacokinetic parameters using Swiss ADME. Compounds that satisfied the ADMET criteria were subsequently subjected to molecular docking studies using Auto Dock against HDAC6 (PDB ID: 1C3S) to predict binding affinities and interaction profiles.

Results: ADMET profiling demonstrated favorable pharmacokinetic characteristics across the designed series. Molecular docking analyses indicated that the derivatives occupied the HDAC6 active site in a binding orientation analogous to the standard inhibitor, Panobinostat, establishing key interactions with residues HIS: A132, PHE: A200, PHE: A198, and the prosthetic group ZN: A951.

Conclusion: The designed 2-amino benzothiazole derivatives exhibit promising in-silico profiles as selective HDAC6 inhibitors, warranting further optimization and experimental validation for their development as potential anticancer therapeutics.

Keywords: HDAC, Panobinostat, Cancer, 2-Aminobenzothiazole, SAHA, Molecular Docking, Anticancer Activity.

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Formulation Designing and Evaluation of Lidocaine Buccal Film for Prosthodontic Procedure

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ABSTRACT

Background: Local anaesthesia is crucial in prosthodontic procedures to ensure patient comfort. Conventional injectable formulations, though effective, are often linked with needle-associated anxiety and discomfort. Buccal films serve as a non-invasive option, enabling targeted drug delivery while enhancing patient compliance.

Objective: To formulate and evaluate a mucoadhesive lidocaine buccal film aimed at delivering effective local anaesthesia during prosthodontic treatments.

Methods: Lidocaine buccal films were prepared using the solvent casting technique with sodium alginate and HPMC E15 as primary film-forming polymers. Eudragit RLPO was incorporated for controlled release, along with a plasticizer to enhance flexibility. Characterization of the developed films included assessment of their thickness, flexibility (folding endurance), surface pH, drug loading, and in vitro drug release profile. Differential Scanning Calorimetry (DSC) was performed to assess drug–polymer compatibility.

Results: The developed films showed uniform thickness, good mechanical strength, neutral pH, and stable drug content. DSC analysis confirmed no significant drug–polymer interaction, while in vitro studies confirmed satisfactory release suitable for local anaesthetic action.

Conclusion: The optimized lidocaine buccal film demonstrates potential as a patient-friendly alternative to injections in prosthodontic procedures, ensuring effective anaesthesia with improved comfort and compliance.

Keywords: Lidocaine, Buccal film, Local Anaesthesia, Prosthodontics, Drug Safety

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Synergetic Hepatoprotective Effect of Hydroalcoholic Extract of Phyllanthus acidus Leaves and Acetazolamide in CCl_4 and PCM Induced Hepatotoxic Models in Rats

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ABSTRACT

Introduction: Phyllanthus acidus is a well-known plant of the Euphorbiaceae family. The plant has a potent hepatoprotective profile, and in traditional medicine, the leaf juice is used as a liver tonic. Acetazolamide is a carbonic anhydrous compound with potent lipogenesis and antioxidant properties. In this study, we will attempt to evaluate the synergistic effect of synthetic and natural compounds.

Material & Method: The extract was prepared using an ultrasonic-assisted method and pretreatment models were used to evaluate the hepatoprotective effect against the PCM and CCl_4 Models. Liver enzyme analysis and histopathological changes were observed.

Results: Phyllanthus acidus exhibits remarkable antioxidant activity using DPPH and FRAP with 188.85 and 186.49 (µg/ml) IC 50 values. The proposed combination encountered the damage produced by the hepatic toxins. Phyllanthus acidus + Acetazolamide (PA+AZZ) against the PCM intoxication level of SGPT decreases in comparison to disease control

492.13±15.6, 348.25±7.89, 231.91±8.23 and SGOT 781.65±85.36, 733.74±76.35, 650.52±45.9. PA+AZZ against the CCl4 intoxication level of SGPT decreases in comparison to disease control 455.28±26.35, 397.48±40.58, 309.61±24.41 and SGOT 562.79±94.13, 486.27±105.4, 350.15±130.4.

Discussion: Phyllanthus acidus, a plant with terpenoids and flavonoids, has a liver-protective history against toxins. With its strong antioxidant profile, Acetazolamide inhibits cytochrome enzymes and lipid peroxidation, reducing lipogenesis in PCM and CCl_4 intoxication.

Conclusion: Phyllanthus acidus and acetazolamide both possess effective synergistic capacity to reduce the imbalance generated by the hepatic toxins PCM and CCl_4.

Keywords: Phyllanthus acidus, Hepatoprotective, Acetazolamide, Synergistic Effect, PCM intoxication, CCl_4 intoxication.

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Pharmacogenomics' Revolutionizing Personalised Medicine

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ABSTRACT

Pharmacogenomics is a transformative field that combines pharmacology and genomics to revolutionize personalized medicine. By analyzing an individual's unique genetic makeup, it moves beyond the traditional "one-size-fits-all" approach to drug therapy. This innovative discipline provides a powerful framework for predicting how a patient will respond to specific medications, thereby improving drug efficacy, minimizing adverse drug reactions, and optimizing dosing strategies. The applications of pharmacogenomics are wide-ranging, impacting fields from oncology and psychiatry to cardiology and pain management. By guiding treatment selection and dosage, it empowers clinicians to make data-driven decisions that enhance patient outcomes and safety. Furthermore, pharmacogenomics plays a pivotal role in the development of new, more targeted drugs. As a cornerstone of personalized medicine, it promises a future of proactive and individualized healthcare, leading to more effective treatments, reduced costs, and a more efficient healthcare ecosystem.

Keywords: Pharmacogenomic, Personalized Medicine, Health Care, Optimizing dose, ecosystem

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Drug repurposing with In Silico Clinical Trials for Faster, Smarter Therapeutics

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ABSTRACT

Traditional drug development is often costly, time-consuming, and prone to high failure rates. In response, drug repurposing identifying new uses for existing drugs has emerged as a faster and more efficient alternative. When combined with in silico clinical trials, which use computer simulations of virtual patients, this method enables rapid candidate evaluation without the immediate need for physical testing. By leveraging AI, systems biology, and multi-omics data, researchers can model disease mechanisms, predict drug-target interactions, and simulate therapeutic outcomes. These tools significantly streamline the process of screening compounds, optimizing dosing, and minimizing late-stage failures. They also allow for testing across diverse virtual populations, improving personalization and reducing development costs. Successful applications, such as during the COVID-19 pandemic and in oncology, highlight the accuracy and potential of these computational methods. Together, drug repurposing and in silico trials offer a smarter, faster, and more scalable pipeline for discovering new therapies improving speed, safety, and precision in modern drug development. This integrated approach is rapidly becoming central to 21st-century pharmacological innovation.

Keywords: Drug Repurposing, Silico, Pandemic, Pharmacological

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Revolutionizing Drug Safety

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ABSTRACT

Drug safety is changing dramatically due to a combination of technological advancements, creative regulations, a developing understanding of pharmacogenomics, and empirical data. As individualized medicine becomes more popular, safety monitoring will progressively shift from population-based risk assessments to customized risk profiles in an effort to enhance outcomes and minimize adverse effects. Pharmacovigilance could undergo a radical change thanks to artificial intelligence and machine learning, which make it possible to identify safety signals early by analyzing large datasets like social media, electronic health records, and patient-reported outcomes. Real-time data sharing between pharmaceutical companies, healthcare providers, and international regulatory bodies will also encourage a more proactive and collaborative approach to drug safety. Adaptive trial designs and advancements in post-marketing surveillance are also being incorporated into regulatory frameworks. Notwithstanding these developments, issues like algorithm transparency, data privacy, and fair access to safety monitoring tools still exist. An ecosystem for drug safety that is more dynamic, accurate, and responsive is being created by the convergence of digital health tools, regulatory science, and patient-centric approaches.

Keywords: Pharmacogenomics, Pharmacovigilance, Technological Advancements, Post marketing surveillance, Regulatory Science

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Use of GIS Tracking in Drug Related Health Trends

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ABSTRACT

Drug-related health crises, including substance abuse, overdose fatalities, and the spread of infectious diseases such as HIV and hepatitis C—represent growing challenges to public health systems worldwide. Tackling these complex issues requires more than traditional epidemiological tools; it demands a spatial lens to understand where, why, and how these

patterns emerge and evolve. Geographic Information Systems (GIS) offer a powerful, data-driven framework to visualize, analyze, and respond to these health dynamics across geographic and temporal scales. This presentation explores the multifaceted role of GIS in addressing drug-related public health concerns. Drawing on case studies and geospatial analyses, we demonstrate how GIS has been applied to: Identify high-risk clusters of opioid overdoses, Map the distribution and accessibility of harm-reduction and treatment services, and, Examine socio-environmental contributors such as poverty, housing instability, and proximity to healthcare facilities. We also highlight the benefits of integrating GIS with real-time data from emergency medical services and public health surveillance systems. This fusion enables early detection of emerging trends, supports data-informed resource allocation, and empowers rapid, localized interventions By translating complex data into actionable insights, GIS equips health professionals, researchers, and policymakers with a critical tool for crafting effective, community-based responses to substance use crises. As drug-related challenges continue to escalate globally, spatial analysis emerges as an essential component of proactive public health strategy.

Keywords: Geographic Information System (GIS), Spatial Analysis in Public Health, Disease Surveillance Mapping, AI-Enhanced Geospatial Analytics, Healthcare Accessibility Mapping, Pharmaceutical Supply Chain Tracking

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Analysis of Pharmacovigilance System in India

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ABSTRACT

Pharmacovigilance (PV) plays a vital role in ensuring drug safety by monitoring and preventing adverse drug reactions (ADRs). Despite the establishment of the Pharmacovigilance Programme of India (PvPI) in 2010, India continues to face significant challenges in spontaneous ADR reporting, stakeholder awareness, and effective implementation, leading to underreporting and compromised patient safety. To analyze the current status of the pharmacovigilance system in India, identify key challenges, and propose actionable strategies to strengthen ADR reporting and post-marketing surveillance. The study involves a descriptive analysis of India's PV structure, reporting mechanisms, and departmental ADR data from 2025. It also explores barriers such as poor documentation, high patient load, lack of training, and systemic issues in pharmaceutical care that affect PV outcomes. The analysis revealed major gaps in India's PV framework: low awareness among healthcare professionals and patients, insufficient training in ADR reporting, poor reporting practices, and a fragmented data system. Tools like PvPI's online forms, helpline, and mobile app are underutilized. Contributing factors include unclear prescriptions, similar-looking drug packaging, and time constraints in clinical settings. Pharmacovigilance must be treated as a collective responsibility involving regulators, healthcare professionals, the pharmaceutical industry, and patients. Strengthening PV in India requires a unified reporting system, integration of PV education at all levels, and proactive engagement from all stakeholders to ensure safer drug use and improved public health outcomes

Keywords: Pharmacovigilance, Adverse drug reaction, PvPI, Drug safety, Reporting system

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Neuralink and the Future of Human-AI Integration

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ABSTRACT

Neuralink, co-founded by Elon Musk, is at the forefront of developing brain-computer interfaces (BCIs) that create a direct communication pathway between the human brain and digital systems. This presentation explores Neuralink's key technological components including ultra-thin neural threads, the N1 chip, and robotic implantation techniques and examines their transformative potential in the field of pharmaceutical sciences. By enabling real-time monitoring of neural activity, Neuralink could significantly enhance our understanding of central nervous system (CNS) drug mechanisms, optimize dosing strategies, and enable the design of personalized, adaptive drug regimens. The integration of BCIs with artificial intelligence further opens possibilities for predictive diagnostics and closed-loop drug delivery systems that respond to neural biomarkers in real time. In addition to exploring clinical and research applications, this presentation addresses critical ethical considerations, including data privacy, patient safety, and the broader societal implications of neurotechnology. As a convergence point between neuroscience, pharmacology, and digital innovation, Neuralink represents a pioneering step toward personalized medicine and next-generation therapeutic strategies.

Keywords: Neuralink, Brain computer interface, Human AI Integration, Neurotechnology, Future technology

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Integrating Genomics and Personalized Drug Safety Profiles

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ABSTRACT

Each person's body responds to medication differently, yet most prescriptions still follow a one-size-fits-all model. This mismatch can lead to side effects, ineffective treatment, or even serious harm. Genomics offers a new path forward by revealing how our genetic makeup influences how we process drugs—how fast we metabolize them, how strongly we respond, and what risks we may face. By integrating genomic data into personalized drug safety profiles, healthcare can shift from reactive to preventive. Clinicians gain the ability to choose medications and doses that align with a patient's unique biology, reducing trial-and-error and improving outcomes. This integration is no longer a distant ideal; it's becoming part of modern care. As genomic tools become more accessible, we are moving toward a healthcare system where every prescription is informed, intentional, and individualized—making treatment not just more effective, but safer for everyone.

Keywords: Genomics, Personalized medicine, Drug safety, Pharmacogenomics, Precision medicine, Adverse drug reactions

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Proteonomics- Based Drug Discovery

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ABSTRACT

Proteomics the large-scale study of proteins and their functions is redefining the landscape of modern drug development. Unlike traditional approaches centered on genomics, proteomic technologies offer dynamic, real-time insights into disease mechanisms by capturing changes in protein expression, modifications, and interaction networks. This presentation explores how cutting-edge proteomic tools such as mass spectrometry, protein microarrays, and advanced bioinformatics are revolutionizing key stages of the drug discovery pipeline. These strategies enable more precise identification of drug targets, facilitate biomarker discovery, and enhance understanding of mechanisms of action by aligning with actual physiological states. Case studies from oncology, neurodegenerative diseases, and infectious disease research will illustrate how proteomics drives translational breakthroughs. In addition, we address ongoing challenges such as data complexity, reproducibility, and standardization. Innovative solutions, including AI powered analytics and integrated multi-omics platforms, will be discussed as pathways to overcome these barriers. As drug development moves increasingly toward precision and personalized medicine, proteomics stands at the forefront accelerating the discovery of safer, more effective therapeutics and reshaping the future of targeted healthcare.

Keywords: Proteomics, Drug Discovery, Biomarkers, Protein Expression Profiles, Target

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Medicinal Plants: A Comprehensive Review on Medicinal Plants Potent for The Anticoagulant Effect

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ABSTRACT

The use of natural and herbal medicines is increasing globally due to fewer side effects compared to synthetic drugs. Anticoagulants are essential for treating thrombotic disorders, which are leading cause of mortality worldwide. Ayurveda, have a long history of using plants for medicinal purposes. Many plants possess anticoagulant properties due to their phytoconstituents like antioxidants, phenols, and polyphenols. The World Health Organization reports that 80% of people in developing countries rely on traditional medicines. Synthetic anticoagulants have adverse effects like haemorrhagic symptoms and excessive bleeding, prompting interest in natural alternatives. Medicinal plants like Aloe vera, Equisetum arvense, and Mimosa tenuiflora have shown potential anticoagulant effects in studies. Heparin, discovered in 1916, remains a crucial component of anticoagulant therapy. Recent studies highlight the anticoagulant impact of plant extracts with antioxidant properties. Anticoagulants are vital in managing VTE but require careful monitoring due to bleeding risks. New oral anticoagulants offer alternatives but come with challenges like cost-effectiveness and lack of specific antidotes. Natural compounds are being explored as potential anticoagulants due to their historical use in cardiovascular diseases. Coagulation process involves complex interactions between procoagulant and anticoagulant substances. Understanding the biological function of natural compounds can aid in developing new treatments for thrombotic diseases. Plants continue to be a vital source for drug discovery due to their diverse secondary metabolites. Research into plant-based anticoagulants aims to provide safer alternatives with fewer side effects than synthetic drugs. The development of thrombosis involves both inherited and acquired risk factors that complicate its pathophysiology.

Key words: Anti-coagulants, Medicinal Plants, Traditional Medicines, Intrinsic Pathway, Extrinsic Pathway

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Personalised Medicine: The Future of Pharmacotherapy

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ABSTRACT

Personalized medicine marks a paradigm shift in pharmacotherapy, moving away from the "one-size-fits-all" model toward tailored treatment strategies based on an individual's genetic, lifestyle, and environmental factors. Advances in genomics, proteomics, and data analytics enable precise therapeutic decisions, optimizing efficacy and minimizing adverse reactions. Pharmacogenetics—using genetic profiles to guide drug selection and dosing—has demonstrated notable success, particularly in oncology, cardiology, psychiatry, and infectious diseases. Clinical guidelines now support over 35 actionable gene–drug pairs, with regulatory bodies incorporating pharmacogenetic information into drug labelling. The methodology integrates patient profiling, biomarker identification, data interpretation through AI and bioinformatics, and customized drug delivery technologies such as 3D printing, tele pharmacy, and bioelectronic devices. This approach improves drug efficacy, reduces adverse drug reactions, optimizes dosing, enhances patient compliance, and enables early disease detection. Case studies, including HER2-positive breast cancer treatment with trastuzumab and genotype-based warfarin dosing, highlight its clinical value. Despite promising outcomes, challenges remain—high testing costs, lack of standardized guidelines, ethical considerations, and data security issues. Future directions include AI-driven predictive models, more accessible genetic testing, polygenic risk scoring, and broader preventive applications. Personalized medicine not only enhances patient outcomes but also fosters innovation in drug development and healthcare delivery, potentially reducing costs and improving satisfaction. Envisioned future applications include integrating complete genomic data into medical records at birth, empowering healthcare providers to deliver precisely

targeted, preventive, and effective care. Ultimately, personalized medicine is poised to redefine pharmacy practice and healthcare systems worldwide.

Keywords: Personalized medicine, pharmacotherapy, Pharmacy Practice

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Preclinical Evaluation of Hydro-alcoholic Flower Extract of Tagetes erecta in Hemorrhoids

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ABSTRACT

Tagetes erecta L., commonly known as African or Mexican Marigold, belongs to the family Asteraceae and is widely recognized for its medicinal, ornamental, and industrial applications. This annual herb is native to Mexico and Central America but is cultivated globally, including in India and Southeast Asia. The present study investigates the anti-inflammatory, antioxidant, and wound-healing properties of the hydro-alcoholic flower extract of T. erecta in experimentally induced hemorrhoids in rats. The extract was prepared using Ultrasound-Assisted Extraction (UAE), which offers advantages such as improved yield, reduced extraction time, and enhanced recovery of bioactive compounds. GC-MS analysis identified 27 major phytoconstituents, including flavonoids, carotenoids, tannins, and saponins—compounds known for their anti-inflammatory and tissue-repairing activities. Rats were administered oral doses of 100, 200, and 400 mg/kg of the extract. The group receiving 400 mg/kg showed the most significant improvement, with marked reductions in the inflammatory index and rectoanal coefficient, suggesting decreased rectal edema and inflammation. These effects indicate a dose-dependent pharmacological response. The therapeutic outcomes are attributed to the synergistic effects of the bioactive constituents that contribute to inflammation control and tissue regeneration. The findings support the traditional use of T. erecta in treating hemorrhoids and propose its potential as a plant-based therapeutic agent. Further research is required to elucidate the molecular mechanisms, identify active biomarkers, and investigate antioxidant parameters and inflammatory mediators involved in its anti-hemorrhoidal activity.

Keywords: Tagestes erecta, Hemorrhoids, GC-MS, Rectonal Coefficient

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Evaluation of in-vitro Anti-urolithiatic Activity of Glycyrrhiza glabra Linn. Root Extract

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ABSTRACT

Background: Kidney stones are a common condition resulting from multiple imbalanced physiological processes. Complex biochemical mechanisms can lead to urinary supersaturation, followed by crystal nucleation, growth, and aggregation in the urinary tract. These events ultimately result in urolithiasis. Glycyrrhiza glabra is a well-known medicinal plant with a broad pharmacological profile and has been traditionally used in the management of urolithiatic

conditions. Its antioxidant and anti-inflammatory activities provide the main rationale for this study.

Objective: The present study aimed to evaluate the in vitro anti-urolithiatic activity of Glycyrrhiza glabra roots.

Methods: Hydroalcoholic root extract of Glycyrrhiza glabra was tested at different concentrations to assess its anti-urolithiatic potential. In vitro nucleation and aggregation assays were performed using a spectrophotometer, followed by microscopic observation.

Results: The plant extract exhibited strong inhibitory activity against urolithiasis. Phytoconstituents present in the roots, particularly tannins, polyphenols, and flavonoids, appear to play a crucial role in suppressing crystal nucleation and aggregation. The antioxidant properties of the extract may further contribute to this effect.

Conclusion: The hydroalcoholic extract of Glycyrrhiza glabra roots demonstrated notable antioxidant and anti-urolithiatic potential. Further research is warranted to isolate and identify the active compounds and to confirm these findings through in vivo studies.

Keywords: Urolithiasis, Glycyrrhiza glabra, Aggregation, Nucleation, Anti-urolithiasis

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Antioxidant and Anticoagulant Screening of Allamanda schottii Leaves Extract in Rats

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ABSTRACT

Background: Anticoagulants are used frequently in cases of cardiac and thrombotic disorders, but sometimes the therapy can lead the life-threatening conditions. Plants consist of various bioactive molecules; hence the extracts of their different part show various pharmacological activities. Allamanda schottii is well known for its richness in terms of secondary metabolites protease in the plants helps to reduce the clot with no or less side

effects.

Method: In the present study, we used leaves of the Allamanda schottii processed for the extraction. The Ultrasonic Assisted Extraction (UAE) method was used. Preliminary phytochemical analysis was performed using reagent phytochemical testing, Total Phenolic Content estimation, and antioxidants (using DPPH and FRAP). For the evaluation of in-vitro anticoagulant activity, clot lysis, Prothrombin Time, and Activated Partial Prothrombin Time were assessed. In vivo anticoagulant activity was evaluated by Clotting time, and Tail Amputation. Major organs were extracted for histopathology to assess hemorrhagic events.

Result: The results show the potency of the plants towards the anticoagulant activity, after the treatment, prolonged clotting was observed in PT (90.33s and 84s), APTT (175.5s and 174.33s), and Clotting time (121s and 123s) at higher concentration. The statistical significance value of all groups compared with the control group and found p<0.001 significant difference.

Conclusion: Allamanda schottii comprises a variety of constituents, and a range of secondary metabolites induce distinct medicinal properties. The antioxidant and clot lysis activities showed significant efficacy, indicating the possibility of discovering new antioxidant and anticoagulant compounds.

Keywords: Tail Amputation, Clotting time, DPPH. Ultra Sonic Extraction, anticoagulant, Allamanda schottii

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A Study of Trend Growth Rate of Exports of Pharma Products

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ABSTRACT

This paper explores the trends and patterns in the export of pharmaceutical products of India. The Indian government actively supports the production of pharmaceutical, which are recognised and trustable in the world. This Pharma industry place an important role in employment generation. During the covid-19 pandemic India's pharmaceutical sector majorly contributed by producing and supplying medicine to various countries. The export of drugs and pharmaceutical product increased by 125% from Rs 90415 crore in the year 2013-14 to Rs 204110 crores in the year 2022-23, which is 5.71% of India's total export. India ranks third, globally in this pharmaceutical production, by volume and also exports in nearly 200 countries which include, USA, Belgium, South Africa, UK and Brazil, as top 5 destinations. In the world, India is the largest vaccine producer and contribute 60% of global vaccine output, and also is the leading provider of generic medicines which holds 20% share of the global market in terms of volume. India has delivered over 298 million Covid-19 vaccine doses to nearly 100 countries as of May 19, 2025. The government launched three Production Linked Incentives (PLI) schemes: Bulk Drugs (2020), Medical Devices (2020) and Pharmaceutical (2021) for promoting independency, boost home-based production and invite investment. The study is based on analytical study derived from secondary data and also applied semi-log function to access the trend growth of Pharma export. The analysis revealed that India's pharmaceutical export has been increasing over the time, with a Compounding Annual Growth Rate (CAGR) of 9.59%.

Keywords: Urolithiasis, Glycyrrhiza glabra, Aggregation, Nucleation, Anti-urolithiasis

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Nanocarriers for Safer Therapeutics: Mechanisms, Materials and Clinical Implications

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ABSTRACT

In the modern healthcare system, drug toxicity persists as a significant problem since it frequently results in severe adverse drug events and restricts the clinical use of effective treatments. The use of lipid-based nanocarriers in drug delivery systems has become a promising strategy to improve therapeutic efficacy and drug safety in recent years. Nanostructured lipid carrier (NLC) is second generation smarter drug carrier system having solid matrix at room temperature. This carrier system is made up of physiological, biodegradable and biocompatible lipid materials and surfactants and is accepted by regulatory authorities for application in different drug delivery systems. These systems increase the bioavailability of drugs, reducing dose-related adverse effects and enabling therapeutic efficacy at lower doses. Nanocarriers additionally offers several advantages over traditional nano drug delivery systems such as solid lipid nanoparticles (SLNs), liposomes, and polymeric nanoparticles. Because these nanocarriers increase bioavailability, decrease off-target effects, and allow for controlled or targeted drug release, they can improve the pharmacokinetic and pharmacodynamic profiles of drugs. Therefore, lipid-based nanocarriers have great potential for reducing drug-induced toxicity and enhancing patient outcomes. As nanomedicine evolves further, combining thorough nanotoxicological analysis, empirical evidence, and patient-centered design will be essential for ensuring efficacy and safety.

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Study of Saraca indica and Bauhinia variegata Extract for Acute Toxicity in Wistar Rats

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ABSTRACT

The Present study investigates the acute toxicity of hydroalcoholic extract of Saraca Ashoka, Bauhinia variegata. The hydro alcoholic extracts of SA and BV were prepared by Soxhlet extraction method. The temperature for Soxhlet extraction was 90°C for both the extracts. The obtained extract of BV is slight sticky in appearance and the extract of SA is powder. The phytochemical Screening were performed for both the extracts. These plants are traditionally used for the various therapeutic purposes like diabetes, gynecological disorders, obesity etc. Extracts were evaluated for its safety profile in accordance with OECD guidelines for acute toxicity study. Healthy adult Wistar rats were administered single doses of extracts with different concentrations of 150,350,2000mg/kg body and observations were made for signs of toxicity which includes changes in behavior, body weight and mortality. The results indicate no significant signs of toxicity up to a dose of 2000mg/kg body weight with no mortality or severe adverse effects observed for all herbal extracts of SAHE and BVHE. The study concludes the extracts may have a favorable safety profile when administered acutely.

Keywords: SAHE (Hydroalcoholic extract of Saraca asoca), BVHE (Hydroalcoholic extract of Bauhinia vareigata), Saraca asoca, Bauhinia vareigata PCOS, Polycystic Ovarian Syndrome,herbal medicine, OECD

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Review on Emerging Benefits of Zebrafish in Extent Future of Pharmacology in India

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ABSTRACT

The Zebrafish model presents a more promising and less labor-intensive alternative compared to other models, leading to its application in various biomedical research areas, including toxicity assessments, genetic investigations, carcinogenic studies, teratogenic studies, and behavioral studies such as anxiolytic and anti-nociceptive research. The efficacy of zebrafish models has been established through their development into highly effective representations of human diseases, with their application extending across multiple research domains aimed at elucidating the fundamental mechanisms underlying these conditions. Given the 70% genetic similarity between zebrafish and human genomes, zebrafish are increasingly utilized as model organisms to enhance our understanding of the genetic and molecular foundations of numerous diseases. Consequently, novel and compelling insights into these diseases are emerging, positioning zebrafish as an invaluable resource for future research endeavors. Due to their numerous advantages and reduced complications, there has been a rise in zebrafish experiments in India, necessitating the establishment of CCSEA or other regulatory frameworks for the management of zebrafish. In 2021, the CCSEA released guidelines for animal experimentation involving fish, with a particular focus on the zebrafish model. This review article concentrates on the various applications of zebrafish as research models in different pharmacological activities, alongside the CCSEA guidelines for the experimentation and handling of zebrafish. Zebrafish are characterized by their small size, ease of accessibility, and convenience in drug administration, requiring lower overall dosages. A significant attribute of the transparent zebrafish embryo is its capacity to illuminate aspects of fish development, neurological progression, and other mutations that may arise during research. The innovative experimental techniques discussed in this article will facilitate a deeper understanding of various methodologies and the appropriateness of the fish model. Additionally, it will provide insights into the various considerations necessary for selecting the most suitable model for specific studies.

Keywords: Zebrafish, Zebrafish Research Model, Regulatory Guidelines for Zebrafish, Pharmacological Research Model, Cancer Research, Genetic Research, Transparent Embryo

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PET Nanoparticle Exposure Impairs Renal Cell Homeostasis through Endocrine and Profibrotic Mechanisms

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ABSTRACT

Chronic kidney disease (CKD) is a world health problem found to be progressive and irreversible, which leads to a gradual loss of the renal functionality that often lasts longer than three months. With the hormone-disruptive compounds such as endocrine-dysregulating chemicals (EDCs) of plastic materials, such as polyethylene terephthalate (PET), more involvement of environmental factors has been linked to CKD development that disrupts the regulation of hormones and the renal homeostasis. A typical synthetic polymer is PET, which is known to be environmentally persistent and degrades to produce nanosized particles (PET-NPs), able to migrate to tissues such as the kidney. There is emerging evidence to suggest that exposure to micro and NPs will result in renal fibrosis, inflammation, and dysfunction through an endocrine interfering mechanism. This work describes PET-NPs synthesis and cryogenic treatment/Nile Red-tagging. Different PET-NPs concentrations were exposed to rat renal epithelial cells (NRK-52E). The assays consisted in cellular uptake of the drugs using flow cytometry, viability assays, and apoptosis assay. The expression of estrogen receptors (ER-α, ER-β) and fibrosis and epithelial-to-mesenchymal transition (EMT) markers was measured by molecular analyses. It was found that at the higher concentration, the uptake of NP internalization in PET decayed. Cell viability was decreased and the cell death was induced by PET-NP exposure. Strikingly, ER-α and especially ER-β were repressed, which was in agreement with upregulation of profibrotic and EMT markers. Overall, PET-NPs destabilize ER- signalling and trigger cytotoxicity and apoptosis of renal epithelial cells, triggering fibrogenic and EMT reactions. This indicates mechanistic association between exposure on environmental NPs and CKD pathogenesis which highlights the necessity of regulative focus in NPs contaminants, and the health hazards.

Keywords: Urolithiasis, Glycyrrhiza glabra, Aggregation, Nucleation, Anti-urolithiasis

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Artificial Intelligence Boon for Pharmacy

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ABSTRACT

The Artificial Intelligence (AI) is transforming modern pharmacy by increasing the speed, precision, and personalization of pharmaceutical care. Traditionally, processes such as prescription validation, drug interaction checks, and patient profiling relied heavily on manual work. With AI, these tasks are becoming faster, more precise, and more reliable. In drug discovery, AI models analyze vast chemical and biological datasets to identify promising compounds and predict their pharmacological properties, significantly reducing development time and costs. In both hospital and community pharmacies, AI tools help detect potential drug interactions, recommend alternative therapies, and flag high risk patients through data analysis. AI helps in making personalized medicine and tailored healing plans based on a patient's health history. Furthermore, its powered chatbots and digital assistants improve patient engagement by helping patients solve their doubts about medicine and sending timely dosage reminders to boost adherence. Despite its promise, AI adoption is met with challenges and is very prone to privacy hindrance, ethical considerations, and regulatory requirements. The pharmacy professionals, learning to integrate AI responsibly is essential. Rather than replacing pharmacists, AI strengthens their role helping deliver safer, smarter, and more patient-focused care.

Keywords: Artificial Intelligence (AI), Pharmacy Practice, Drug discovery, Personalized Medicine.

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Enhancement Of Flavonoid Production in Passiflora Foetida Linn. Using Jasmonic Acid Via Cell Suspension Culture Technique

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ABSTRACT

Passiflora foetida Linn. is a medicinally important plant containing a variety of bioactive compounds such as C-glycosyl flavonoids, apigenin, isovitexin, vitexin, and passifloricins A, B, and C. This research focuses on preserving and exploring the medicinal potential of P. foetida for the treatment of various acute diseases. The study employed callus induction and cell suspension culture techniques using jasmonic acid as an elicitor. Elicitor technology was applied to enhance the biosynthesis of various active phytoconstituents. Jasmonic acid was specifically utilized to stimulate the production of active compounds in cell suspension cultures, followed by detailed chemical characterization through advanced analytical techniques. Furthermore, the pharmacological activity of the in-vitro-derived phytoconstituents was evaluated. Results indicated that treatment with 4.0 µM jasmonic acid significantly enhanced flavonoid content. Intracellular accumulation of metabolites demonstrated superior elicitation compared to extracellular levels, particularly after 96 hours of treatment. The study concludes that the increased vitexin content induced by jasmonic acid application may contribute to the plant's antibacterial potential in a dose-dependent manner.

Keywords: Passiflora foetida Linn., jasmonic acid, vitexin, cell suspension culture

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"Green Science for a Lean Future: Polyherbal Approach to Obesity"

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ABSTRACT

Obesity has emerged as a pressing global health concern, affecting over 650 million adults worldwide and contributing to increased morbidity and mortality. Conventional pharmacotherapies, while effective in certain cases, often present limitations such as side effects, high costs, and unsustainable long-term outcomes. In recent years, polyherbal formulations—combinations of multiple medicinal plants-have gained attention as a holistic,

multi-target strategy for obesity management. This work explores the scientific basis, traditional knowledge, and therapeutic potential of polyherbal approaches in combating obesity. Drawing from ethnopharmacological literature and contemporary research, key anti-obesity mechanisms of herbal constituents are highlighted, including appetite suppression, enhancement of lipid metabolism, inhibition of adipogenesis, and modulation of gut microbiota. Notable plants frequently incorporated in polyherbal anti-obesity blends include Garcinia cambogia, Camellia sinensis, Embelia ribes, Zingiber officinale, and Terminalia chebula. The synergistic action of their bioactive compounds—such as hydroxycitric acid, catechins, embelin, and polyphenols-enhances efficacy while minimizing adverse effects. Evidence from in vitro, in vivo, and limited clinical studies indicates that polyherbal formulations can significantly reduce body weight, improve lipid profiles, and enhance antioxidant status. However, challenges remain in standardization, dose optimization, safety validation, and large-scale clinical trials. Integrating traditional wisdom with modern scientific validation offers a sustainable pathway toward effective obesity management. Polyherbal strategies not only target the biochemical and physiological aspects of obesity but also align with the growing global preference for natural, eco-friendly, and culturally rooted therapeutics.

Keywords: Polyherbal Formulation, Obesity, Herbal Synergy, Ethnopharmacology, Weight Management

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Eluxadoline Nanoparticles: Design, Characterization, and Advanced Therapeutic Approach for Irritable Bowel Syndrome

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ABSTRACT

Background: Background: Eluxadoline, a μ-opioid receptor agonist and δ-opioid receptor antagonist, is effective in managing irritable bowel syndrome (IBS) but suffers from poor aqueous solubility and low oral bioavailability due to limited dissolution and rapid clearance.

Objective: To develop and optimize chitosan-based polymeric nanoparticles of eluxadoline for improved solubility, stability, bioavailability, and targeted gastrointestinal delivery in IBS therapy. Methods: Nanoparticles were prepared using the ionic gelation method with chitosan and sodium tripolyphosphate (TPP). Preformulation studies included UV spectrophotometry (λmax 243 nm), DSC (melting point 188–189 °C), and FTIR. A Box–Behnken design optimized chitosan concentration, TPP concentration, and TPP volume to minimize particle size, PDI, and maximize zeta potential and entrapment efficiency. Seventeen formulations were evaluated for physicochemical properties, in vitro drug release, and ex vivo intestinal permeation.

Results: The optimized formulation (desirability 0.991) showed a particle size of 300.4 nm, zeta potential of +41.2 mV, entrapment efficiency of 76.89%, and uniform spherical morphology. In vitro release studies demonstrated sustained release in simulated gastrointestinal conditions, particularly at pH 6.8. Ex vivo studies using goat intestine showed 78.13% absorption over 10 hours, indicating enhanced intestinal uptake.

Conclusion: Chitosan-based polymeric nanoparticles effectively improved the solubility, stability, and bioavailability of eluxadoline, offering a promising oral delivery platform for IBS therapy with potential to enhance patient compliance and therapeutic outcomes.

Keywords: Eluxadoline, chitosan, nanoparticles, Box–Behnken design, cross-linking agent, intestinal delivery.

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FORMULATION AND EVALUTION OF POLYHERBAL LIPBALM

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ABSTRACT

Introduction: Growing awareness of the adverse effects of synthetic chemicals in cosmetics has accelerated the demand for herbal alternatives. This study focuses on developing a polyherbal lip balm with enhanced safety, therapeutic benefits, and consumer appeal.

Objectives: To formulate and evaluate a herbal lip balm with optimal organoleptic properties, stability, and therapeutic activities, and to compare its performance with a marketed herbal product.

Methods: A polyherbal formulation incorporating beetroot extract, peppermint oil, beeswax, coconut oil, beta-9-betaxanthin, and bakuchiol from Babchi oil was prepared. The product was evaluated for pH, spreadability, melting point, color stability, antimicrobial and anti-aging activities, and overall acceptability. Three formulations containing varying extract volumes were compared to a commercial lip balm.

Results: The optimized formulation, with a higher extract concentration, exhibited superior stability, favorable pH, desirable texture, and significant antimicrobial and anti-aging activities. Phytoconstituents such as vitamins B3, B6, B9, flavonoids, tannins, and ethanol extract enhanced its antioxidant and therapeutic profile.

Conclusion: The developed polyherbal lip balm demonstrates promising potential as a safer and more efficacious alternative to synthetic products, offering moisturization, antimicrobial protection, and anti-aging benefits with superior overall performance compared to marketed herbal formulations.

Keywords: Polyherbal lip balm, beetroot extract, bakuchiol, beta-9-betaxanthin, herbal cosmetics, anti-aging, antimicrobial activity.

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From Molecule to Market: Quantum-AI Fusion for Drug Discovery and Real-World Validation

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By connecting molecular modeling with treatments ready for the market, the combination of artificial intelligence (AI) and quantum computing could change the drug development process. This research looks at a "molecule-to-market" framework that combines AI-driven target selection, lead optimization, and preclinical validation with quantum algorithms for molecular simulations. We offer a method that cuts down on both time and costs in drug development by using AI's ability to make quick decisions based on data and the improved accuracy of quantum methods in predicting molecular interactions. Additionally, we use case studies that include clinical translation, assessments of regulatory compliance, and experimental tests to show real-world validation. This approach demonstrates how the mix of quantum technology and artificial intelligence (AI) can speed up the process of developing safe and effective drugs, enabling quicker movement from the molecular design phase to market approval and ultimately changing pharmaceutical innovation.

Keyword: Quantum computing, Artificial intelligence (AI), Quantum–AI fusion, Lead optimization, Target identification, Preclinical validation, Accelerated drug development, Computational drug design.

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Nanostructured Lipid Carriers: An Innovative Platform for Enhanced Transdermal Drug Delivery

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ABSTRACT

Biocompatible and physiological lipids, along with surfactants and co-surfactant, make up the new pharmaceutical compositions called nanostructured fatty acids (NLC) As a second- generation lipid nanocarrier, NLCs have established themselves as a superior replacement for first-generation solid lipid nanoparticles (SLNs). The structure, makeup, preparation techniques, and characterization of NLCs—essential requirements for the creation of a reliable medication delivery system—are covered in this review. Due to their numerous benefits, including skin hydration, occlusion, increased bioavailability, and targeted delivery, NLCs have a lot of promise in the pharmaceutical and cosmetic sectors. By highlighting its potential uses in topical drug delivery systems, the article seeks to pique readers' curiosity in the current state-of-the-art NLC technology. NLCs are a very promising medication delivery platform due to their simplicity of manufacture, biocompatibility, scalability, non-toxicity, increased capacity for drug loading, and greater stability.

Keywords: Lipid, topical, skin, and nanostructure lipid carrier

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Global Evolution of Drug Safety: Bridging Clinical Trials and Real-World Evidence

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ABSTRACT

Drug safety has historically relied on evidence gathered from controlled clinical trials, where patient populations are carefully selected, conditions are standardized, and outcomes are rigorously monitored. While these trials are essential for determining a drug's efficacy and immediate safety, they often have limitations—such as small sample sizes, short durations, and exclusion of patients with co-morbidities or polypharmacy—making it difficult to predict how medicines will perform in the general population. With the growing complexity of therapeutic products, including biologics, gene therapies, and personalized medicines, there is an urgent need to complement trial data with Real-World Evidence (RWE) derived from electronic health records, patient registries, insurance claims, mobile health devices, and other digital sources. This integration provides insights into long-term safety, rare adverse drug reactions (ADRs), and drug performance across diverse demographic and clinical settings. Regulatory agencies such as the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA) have increasingly recognized the value of RWE in supporting regulatory decisions, post-marketing surveillance, and updating product labels. Advanced data analytics, artificial intelligence (AI), and decentralized clinical trials are accelerating this transition, enabling continuous monitoring of drug safety in near real-time. In this evolving landscape, bridging the gap between clinical trial evidence and real-world data not only enhances pharmacovigilance but also builds patient trust, supports precision medicine, and fosters faster, safer decision-making in healthcare.

Keywords: Drug Safety, Clinical Trials, Real-World Evidence, Pharmacovigilance, Adverse Drug Reactions, Regulatory Science

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Battling Deadly Viruses – The Latest Tool Against Animal-Origin Infections: Rabies

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ABSTRACT

Rabies is a vaccine-preventable zoonotic viral disease caused by the Rabies virus (genus Lyssavirus), which targets the central nervous system and leads to fatal encephalitis. Transmission typically occurs through the bite or saliva of infected mammals such as dogs, bats, raccoons, and other wildlife. Following an incubation period ranging from weeks to months,

nonspecific symptoms like fever and fatigue progress to severe neurological manifestations, including hydrophobia, paralysis, and coma, ultimately resulting in death. Effective management relies on timely post-exposure prophylaxis (PEP), involving wound care, rabies vaccination, and rabies immunoglobulin (RIG), which is only effective if administered before symptom onset. Recent advances in rabies research include innovative approaches such as parainfluenza virus-

based vaccines, neuroprotective therapies, monoclonal antibodies (e.g., F11), and experimental antivirals like SYS6008. Additionally, oral rabies vaccines are under investigation for controlling the disease in wildlife reservoirs. While these strategies show promise in early studies, further clinical validation and regulatory approval are essential.

Keywords: Rabies, post-exposure prophylaxis, Neuroprotective therapy, Monoclonal antibodies, Oral rabies vaccine

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Chewable Ashwagandha Tablets: A Novel Strategy for Enhanced Therapeutic Efficacy

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ABSTRACT

The present study focuses on the formulation and evaluation of chewable tablets containing Withania somnifera (Ashwagandha), a well-known adaptogenic herb used in traditional Ayurvedic medicine for its rejuvenating properties. Utilizing the wet granulation method, the tablets were developed with the aim of improving palatability, bioavailability, and patient compliance, particularly among pediatric, geriatric, and dysphagic populations. The rationale for selecting W. somnifera lies in its wide availability across India and its scientifically supported therapeutic properties, including antioxidant, anti-inflammatory, immunomodulatory, and anti-stress effects. Comprehensive pre-compression evaluations such as angle of repose, Hausner's ratio, and Carr's index were conducted, followed by post-compression tests including hardness, friability, weight variation, and disintegration time. The study proposes a natural, user-friendly alternative to synthetic health supplements, promoting patient adherence and satisfaction through a chewable herbal formulation.

Keywords: Chewable Tablets, Pediatric, Immunomodulatory, Adaptogenic

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"Pharmacological Investigation of Wound-Healing Effects of Manilkara zapota and Rumex acetosa in Experimental Animals"

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ABSTRACT

Rumex acetosa and Manilkara zapota have long been utilized in traditional medicine for their therapeutic properties, including wound healing; however, experimental evidence supporting their efficacy remains limited. The present study evaluated the wound healing potential of ethanol extracts from these plants in experimental animals. Extraction yields were 12.5% for R. acetosa and 18.5% for M. zapota, and the extracts were formulated into dusting powders for topical application. Phytochemical analysis indicated the presence of bioactive constituents, notably flavonoids and emodin, which are known to exert antioxidant, anti-inflammatory, and collagen-stimulating effects that can facilitate tissue repair. Wound healing activity was assessed using excision wound models, measuring percentage wound contraction and epithelialization period. Statistical evaluation using one-way ANOVA followed by Tukey's multiple comparison test revealed that both extracts produced significant wound contraction ($P < 0.001$) on days 8 and 12 compared with controls. On day 8, wound areas were reduced to 6.35 ± 0.12 mm² for R. acetosa and 12.35 ± 0.28 mm² for M. zapota, with further reductions by day 14 to 2.36 ± 0.36 mm² and 2.35 ± 0.33 mm², respectively. The epithelialization period was notably shortened in treated groups, indicating accelerated healing. These findings demonstrate that ethanol extracts of R. acetosa and M. zapota, enriched with flavonoids and emodin, possess significant wound healing activity and hold promise for development as natural therapeutic agents in wound management.

Keywords: *Rumex acetosa*, *Manilkara zapota*, wound healing, epithelialization, herbal medicine

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Curcumin Solid Lipid Nanoparticles: Formulation, Characterization & Neurotherapeutic Potential

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ABSTRACT

Curcumin, a bioactive polyphenolic compound derived from dried turmeric (Curcuma longa) roots, has attracted considerable scientific interest for its capacity to modulate inflammatory and antioxidant pathways while inhibiting amyloid aggregation, a pathological hallmark of Alzheimer's disease (AD). Experimental evidence indicates that curcumin improves cognitive performance, reduces α-synuclein A53T accumulation, and suppresses amyloid-beta (Aβ) aggregation by inducing autophagy through downregulation of the PI3K/Akt/mTOR pathway. However, its therapeutic application is hindered by poor bioavailability, primarily due to rapid intestinal and hepatic conjugation into curcumin glucuronides. The present study investigated the neuroprotective potential of curcumin-loaded solid lipid nanoparticles (Curcumin-SLN) against scopolamine-induced spatial memory impairment. Curcumin-SLNs were formulated using hot homogenization followed by ultrasonication, yielding particles sized 188–300 nm with entrapment efficiencies ranging from 48.98 ± 0.68% to 87.65 ± 0.99%. Wistar rats received Curcumin-SLN (25 mg/kg, p.o.) or rivastigmine (2 mg/kg,

i.p.) for eight consecutive days, with scopolamine (20 mg/kg, i.p.) administered on the final day. Cognitive performance was evaluated through conditioned avoidance and rectangular-maze tests. Subsequently, brain homogenates were analyzed for glutathione (GSH), catalase, malondialdehyde (MDA), and acetylcholinesterase (AChE) activity, followed by

histopathological assessment. Curcumin-SLN significantly improved cognitive outcomes, as evidenced by reduced transfer latency and enhanced conditioned avoidance responses (p < 0.05). Biochemical findings revealed decreased MDA and AChE activity, accompanied by increased catalase and GSH levels, comparable to rivastigmine. Histological analysis confirmed attenuated neuronal degeneration. Overall, Curcumin-SLN demonstrated substantial neuroprotective efficacy by enhancing bioavailability, highlighting its promise as a preventive and therapeutic strategy for AD and related neurodegenerative disorders.

Keywords: Curcumin, Solid lipid nanoparticle, Alzheimer

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Drug Repurposing: Clinical Techniques and Regulatory Frameworks

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ABSTRACT

Drug repurposing, often called drug repositioning or reprofiling, is the process of finding new medical uses for medications that are already on the market. Sildenafil citrate, for example, went from being a sedative to an erectile dysfunction medication, while thalidomide went from being a sedative to an immunomodulatory drug. Supporters say it

might help meet unmet medical needs by speeding up development, lowering costs, and employing pharmaceuticals that have already been shown to be safe. There are worries, meanwhile, about how specific new indications are, how safe they are, and how they might be used for regulatory purposes. Ethical concerns include fair access, getting permission before using medications off-label, and being open about what you're doing. Recent progress includes AI applications, network pharmacology, and omics technology. Regulatory bodies help pharmaceuticals get approved by running clinical trials to see how well they work when used for other purposes. Some of the problems are protecting intellectual property, making sure drugs only work on certain targets, designing trials that are hard to understand, and not having enough money. Ethical issues include patient autonomy, possible conflicts of interest caused by financial incentives for businesses, and

how to use resources. Precision medicine, AI, and working together on a global scale are all things that will happen in the future. In conclusion, drug repurposing presents a promising avenue for therapeutic innovation; yet, it necessitates meticulous evaluation of its intricacies and ethical ramifications to optimize advantages and mitigate hazards.

Keywords: Artificial intelligence, repositioning, repurposing

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Nanotechnology-Based Therapeutics: Green synthesis of Silver Nanoparticles for Diabetic Wound healing

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ABSTRACT

Management of diabetic wounds remains one of the major challenges in treating diabetic patients. Delayed wound healing in such cases is primarily due to hyperglycemia, which results from the body's inability to metabolize glucose efficiently. This condition often leads to chronic, non-healing wounds.

In recent years, nanotechnology has significantly transformed approaches to the identification, treatment, and preManaging diabetic wounds remains a major challenge in treating diabetic patients. Delayed wound healing in such cases is primarily caused by hyperglycemia, which results from the body's inability to efficiently metabolize glucose. This

condition often leads to chronic, non-healing wounds. In recent years, nanotechnology has greatly changed approaches to identifying, treating, and preventing many diseases. Although several treatments are available for diabetic foot ulcers, their effectiveness is still limited.

Among emerging therapies, silver nanoparticles (AgNPs) have shown impressive wound healing properties. These nanoparticles, usually ranging from 1 to 100 nm in size, have antibacterial, antifungal, antiviral, anti-inflammatory, and anti-angiogenic activities. Silver nanoparticles can be produced through three main methods: physical, chemical, and biological. However, physical and chemical methods often face issues like low yield, inconsistent particle size, surface contamination, use of toxic reducing agents, solvent residues, and high energy use.

Biological synthesis, also called green synthesis, involves using plant extracts and silver nitrate to create nanoparticles. This method is simple, cost-effective, reliable, and eco-friendly. The main goal of green synthesis is to obtain high-yield, stable nanoparticles without harmful by-products.

This study aims to explore the wound-healing potential of green-synthesized silver nanoparticles in managing diabetic wounds and the treatment of numerous diseases. Although several treatments are available for diabetic foot ulcers, their effectiveness remains limited. Among emerging therapies, silver nanoparticles (AgNPs) have shown remarkable wound

healing properties.

Keywords: Silver nanoparticle, diabetic foot ulcer, wound healing, green synthesis

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"Molecular Docking Studies on Benzimidazole Derivatives as DNA Gyrase B Inhibitors"

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ABSTRACT

Benzimidazole derivatives are promising antimicrobial scaffolds targeting DNA gyrase subunit B (GyrB) of Staphylococcus aureus, a key ATP-dependent enzyme essential for bacterial DNA supercoiling. Using the crystal structure PDB ID: 5J9M,3G57 molecular docking was carried out to evaluate binding at the ATP-binding pocket. Ligands were energy-minimized, and interactions analyzed with PyMOL and Discovery Studio. Several derivatives exhibited strong binding affinities (–8.5 to –10.2 kcal/mol) compared to standard antimicrobial agents. Gly230, Thr47, and Asn70 formed key hydrogen bonds, while Asp102 and Arg286 contributed hydrophobic stabilization. These findings indicate that benzimidazole derivatives could serve as potent lead compounds for the development of novel anti-S. aureus agents targeting DNA gyrase.

Keywords: Benzimidazole, antimicrobial, molecular docking, DNA gyrase B, PDB 5J9M, 3G57 binding interaction.

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"Structure-Based Design and Characterization of Aldose Reductase Inhibitors: A Targeted Approach Toward Diabetic Therapy"

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ABSTRACT

Background: Chronic hyperglycemia is a hallmark of diabetes mellitus (DM), a metabolic disease that frequently results in consequences such neuropathy, kidney, and retinopathy. The first enzyme in the polyol pathway, aldose reductase (AR), is a crucial therapeutic target since it causes oxidative stress under hyperglycemic circumstances, which greatly contributes to these issues.

Objective: To design, identify, and characterize novel aldose reductase inhibitors (ARIs) for preventing or managing diabetes-related complications.

Methods: Using structure-based drug design, which includes molecular docking, grid creation, and ligand and protein synthesis, 82 compounds were virtually screened against AR (PDB ID: 1ADS). Twenty-two lead compounds (RS1–RS22) were chosen based on docking scores and binding interactions. These were created and described by means of mass

spectrometry, FT-IR, UV-Vis, and 1H NMR.

Results: The conventional medications pioglitazone and epalrestat scored -12.012 and -10.705, respectively, whereas the docking scores varied from -12.012 to -4.280. Strong binding affinities and important interactions with AR were demonstrated by the 22 RS compounds. Spectral data validated functional groups and structural characteristics.

Conclusions: A number of possible ARIs with antidiabetic effects were found. A potential method for drug discovery is provided by the combination of spectroscopic validation and in silico screening, which calls for additional in vitro and in vivo testing.

Keywords: Aldose reductase inhibitors, Diabetes Mellitus, Hyperglycemia, Molecular Docking

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"Digital Transformation in Healthcare: -Trends, Challenges & Their solutions"

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ABSTRACT

Background: The digital transformation of healthcare is redefining medical service delivery through the integration of

Artificial Intelligence (AI), telemedicine, wearable health devices, and secure Electronic Health Records (EHRs). These technologies aim to enhance diagnostic accuracy, treatment efficiency, and patient accessibility, fostering a shift toward preventive and personalized care.

Objective: This study examines current trends in digital healthcare, identifies major challenges hindering adoption, and

proposes sustainable strategies for integration into health systems.

Methods: A narrative review was conducted using recent literature, healthcare reports, and case studies from both global and national contexts. Sources were analyzed to identify emerging technological trends, critical barriers, and best-practice strategies.

Result: Key trends include AI-assisted diagnostics, telehealth expansion, integration of the Internet of Medical Things

(IoMT), mobile health applications, and data-driven precision medicine. Significant barriers include cybersecurity vulnerabilities, high infrastructure and maintenance costs, limited digital literacy among healthcare providers and patients, and interoperability issues between diverse systems. Proposed solutions involve implementing robust data protection frameworks, securing government and institutional funding, establishing digital skill development programs, adopting standardized interoperability protocols, and fostering multi-stakeholder collaboration.

Conclusion: Digital transformation holds immense potential to enhance accessibility, efficiency, and patient-centeredness in healthcare. However, overcoming security, cost, literacy, and interoperability challenges requires coordinated policy measures, technological innovation, and inclusive training initiatives. A balanced approach combining innovation with ethical and equitable practices will be essential for creating a sustainable, inclusive, and future-ready digital healthcare ecosystem

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From Trials to Reality: Harnessing Real- World Evidence to Enhance Drug Safety

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ABSTRACT

Clinical trials are the foundation for evaluating a drug's safety and efficacy before regulatory approval. However, clinical trials often involve small and selected populations, excluding many real- world groups such as the elderly, pregnant women and patients with multiple diseases. Due to the controlled nature of clinical trials, some rare, long term and population-specific adverse effects may go undetected.

When a drug enters the market, it is prescribed to a diverse population over longer periods, sometimes revealing safety concerns that were not apparent in trials. Traditional post-marketing surveillance systems can be slow to detect these issues. This is where Real World Evidence plays an important role.

Real World Evidence (RWE) is derived from the data collected during routine clinical care, insurance claims, electronic health records, patient registries, prescription databases and wearable health devices. Real World Evidence allows earlier detection of adverse drug reactions, expands safety assessments to broader populations and informs evidence- based regulatory actions.

Regulatory agencies such as the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA) are increasing recognizing the value of RWE. Its integration into pharmacovigilance can guide label updates and support safer prescribing decisions. Harnessing RWE alongside trial data bridges the gap between controlled research settings and the complexities of everyday healthcare, which improves patient safety and public health outcomes.

Keywords: Clinical Trials, Drug Safety, Real-World Evidence, Post Marketing Surveillance, Adverse Drug Reactions Pharmacovigilance

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Formulation Optimization and Evaluation of Fast Dissolving Oral Film of Caffeine

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ABSTRACT

Background: Caffeine, generally used in the treatment of fatigue, drowsiness, and lack of mental alertness is required to have rapid onset of action on the CNS as stimulant. It has a naturally bitter taste, which can severely impact patient compliance so needs to be masked and palatability is to be improved.

Objective: The caffeine fast-dissolving oral film, prepared via the solvent casting method, provides rapid onset of action and prompt therapeutic benefits.

Methods: The fast-dissolving oral film was optimized using a Box-Behnken design with three factors at three levels, where Polyox N80, Polyox N1105, and HPMC E5 served as independent variables, and the swelling index, adhesion time, mucoadhesive strength, along with cumulative percentage drug release, were considered as response variables.

Results: The optimized fast dissolving oral film showed uniform thickness and drug content. It had a swelling index of 125.21%, adhesion time 30 min, and mucoadhesive strength of 0.049N. The film showed immediate release of 95.86% over 30 min.

Conclusion: The caffeine fast-dissolving oral film, produced via the solvent casting technique, ensures a rapid onset and immediate action. The research is aimed to focus on formulating caffeine oral film possessing desired CQAs; i.e., good physical property, thickness and film weight, tensile strength, drug content uniformity. Additionally, the proposed oral film formulation is expected to have fast drug release profile, better ex vivo mucoadhesion time, and higher ex vivo drug permeation compared to conventional formulation.

Keywords: Caffeine, oral drug delivery system, fast dissolving oral film, design of experiment (DoE), Box-Behnken optimization

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Formulation Design and Optimization of Efinaconazole-Loaded Lipid Nano-Carrier for Treatment of Onychomycosis

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ABSTRACT

Background: Onychomycosis poses a therapeutic challenge due to the dense keratin barrier of the nail, limiting drug penetration.

Objective: This study aimed to design, optimize, and evaluate efinaconazole-loaded liposomal formulations with improved transungual penetration, enhanced drug retention, and sustained release for effective onychomycosis management.

Methods: Liposomes were prepared via the ethanol injection method. A Box–Behnken design was applied for optimization, with hydrogenated soy phosphatidylcholine, cholesterol concentration, and stirring speed as independent

variables. The dependent responses included mean particle size, polydispersity index, entrapment efficiency, zeta potential, and drug release. The optimized formulation underwent in vitro release studies, TEM, DSC, drug release kinetics analysis, and ex vivo nail permeation study. A liposomal nail lacquer was subsequently developed and evaluated using the optimized batch.

Results: The optimized liposomes exhibited a mean particle size of 189.7 nm, PDI of 0.187, zeta potential of –28.20 mV, and entrapment efficiency of 47.80%. Drug release was sustained for 12 hours with a cumulative release of 75.41%, following Korsmeyer–Peppas kinetics ($R^2 = 0.9886$). TEM imaging revealed spherical, nanosized, unilamellar vesicles, while DSC confirmed successful drug encapsulation. Ex vivo permeation across the human nail plate showed nearly double the drug permeation compared to pure drug solution. The developed nail lacquer retained its physical stability and met all required quality attributes.

Conclusion: The optimized liposomal formulation showed strong agreement with model predictions and demonstrated superior transungual permeation, sustained release, and reduced dosing frequency, offering a promising approach for improved onychomycosis therapy.

Keywords: Transungual, Liposomes, Box–Behnken design

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CAR-T Cell Therapy: Revolutionizing Cancer Treatment and Its Implications for Future Therapeutic Strategies

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ABSTRACT

Background: Cancer stands as a primary global death because which claiming almost 10 million lives in 2020 and will likely reach 28 million new cases yearly by 2040. The treatment complexity of cancer arises from genetic factors interacting with environmental elements and disrupted cellular controls, which make conventional therapies like chemotherapy and radiation less effective. The current situation demands the development of treatment methods that focus on individual patient needs and specific targets.

Objective: The review investigates contemporary developments in Chimeric Antigen Receptor (CAR) T-cell therapy alongside CRISPR/Cas9 gene-editing technology to explore their combined potential for cancer treatment improvement.

Recent Advances: CAR-T cell therapy creates modified T cells that recognize tumor-associated antigens to direct immune attacks against cancer cells. The therapeutic effectiveness against blood cancers through CAR-T could improve by CRISPR/Cas9 integration to enhance specificity and minimize immune system avoidance and lower production costs thus enabling off-the-shelf CAR-T possibilities for solid tumor treatment.

Conclusion: CRISPR/Cas9 enhancement of CAR-T therapy marks a breakthrough in cancer immunotherapy which brings new possibilities to patients facing difficult-to-treat cancers. Research must continue to enhance safety measures and address current restrictions while broadening the range of possible uses.

Keywords: Transungual, Liposomes, Box–Behnken design

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Protective Effects of *Nyctanthes arbor-tristis* Sepals on Dexamethasone-Induced Insulin Resistance and β-Cell Dysfunction in Rats

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ABSTRACT

Background: Chronic dexamethasone therapy impairs glucose metabolism and insulin signaling, leading to insulin resistance and β-cell dysfunction—hallmarks of type 2 diabetes mellitus (T2DM).

Objective: To evaluate the protective role of ethanolic extract of *Nyctanthes arbor-tristis* (NAT) sepals on dexamethasone-induced insulin resistance and β-cell damage in Wistar rats.

Methods: Rats were treated with dexamethasone (1 mg/kg, i.p.) for 10 days to induce insulin resistance. NAT extract (200 mg/kg and 400 mg/kg, p.o.) and pioglitazone (30 mg/kg, p.o.) were administered for comparison. Biochemical parameters such as fasting blood glucose (FBG), insulin, HOMA-IR, lipid profile, and oxidative stress markers (MDA, SOD, CAT) were assessed. Pancreatic histology was evaluated to observe β-cell integrity.

Results: NAT treatment significantly improved glycemic control and lipid profile, reduced HOMA-IR, and enhanced antioxidant enzyme levels (↑SOD, ↑CAT, ↓MDA). Histopathological findings revealed restored pancreatic islet structure and preserved β-cell morphology, particularly at 400 mg/kg.

Conclusion: NAT sepals exhibit potent antioxidant and insulin-sensitizing effects, mitigating dexamethasone-induced metabolic disturbances. This study supports their potential as a natural therapeutic agent for glucocorticoid-induced insulin resistance and β-cell protection.

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Digital twins in cardiac care: Development of virtual hearts in cardiovascular research and personalized care.

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ABSTRACT

Background: Digital twins are the virtual (3D) representation that stimulate, predict and monitor patient's health based on real world data. Digital twins have better influence in individual health and promising potential in cardiac care.

Objective: This review states the burden of cardiovascular diseases and the emerging capacity of digital health technologies and the need to include lifestyle data into digital twin models.

Methods: A detail review was carried out using databases like google scholar and PubMed, by considering articles published between 2024 and 2025. The digital twin concept was illustrated by proposing a digital twin archetype framework (basic, intermediate and advanced levels) and the TwinCardio concept. The need for self-reported data, real time datas from wearables and laboratory results were also explained.

Result and conclusion: Digital twins enhance personalized care and early detection by improving patient engagement. However, data privacy, misuse, data breaches due to diverse data and lack of ethical frameworks are the concerns. Studies overlooking patient's autonomy and sensitive data handling should be proceeded. By addressing these gaps safe and effective digital healthcare can be attained.

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Title: The role of wearable biosensors in human health care.

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ABSTRACT

Background: A biosensor is an advanced analytical device which designed to detect any slight changes in biochemical processes and convert them into electrical signals. In future aspects, wearable biosensors play a key role in diagnostic techniques with the help of AI in the human healthcare system.

Objective: This work explores the potential of wearable biosensors, particularly for continuous monitoring in physiological and biochemical markers, aiming to support early diagnosis and disease management.

Method and Technology: On recent growth in electrochemical sensing technologies highlights the various types of biosensors. These include sweat –based sensors, (Electrochemical sensor, SERS surface enhanced Raman scattering and sweat-ISF sensor.), Saliva-based biosensors, (Wireless electronic pacifier, mouthguard sensor, ring sensor and theranostic dental patch), Tear-based biosensors, (Contact lens biosensors, flexible eye patch biosensors and eye glass biosensor) and interstitial fluid biosensors,(Microneedle transdermal biosensor).

RESULTS: It helps to minimize the risk of cross-contamination and offers very low exposure to blood-borne pathogens and provide real-time health monitoring.

CONCLUSION: Traditional disease management and diagnosis are often delayed, costly and invasive procedures. So, introducing biosensors can transform diagnosis by rapid, cost-effective, identification, and monitoring of diseases in early stages, by improving healthcare outcomes.

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A STUDY ON DRUG UTILIZATION EVALUATION OF CORTICOSTEROIDS

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ABSTRACT

Background: This study explores current corticosteroid use, focusing on prescribing patterns, safety concerns, and the need for rational use to reduce adverse effects and improve outcomes.

Objective: The study assessed the most commonly used corticosteroids, their dosage and frequency, related adverse events, drug interactions, age and gender correlations, and the role of clinical pharmacists in their safe use.

Methods: A six-month observational study in a tertiary hospital reviewed case files from general medicine, orthopedics, and dermatology to assess corticosteroid use.

Results: This study documented six cases of adverse medication responses caused by the use of corticosteroids, two of which were tingling sensations caused by dexamethasone and four of which involved hyperglycemia. According to the Naranjo causality assessment scale, four (40%) of the ten ADRs were possible, and six (60%) were probable. Dexamethasone was the initial medicine of choice for treating Hansen's disease and pemphigus vulgaris, followed by hydrocortisone. Budesonide and hydrocortisone were the main medications used to treat COPD and pneumonia.

Conclusion: Since corticosteroid usage was linked to a greater frequency of adverse drug reactions (ADRs), a treatment card was developed to improve patient safety and monitoring. This demonstrates the significance of the study in detecting risks and encouraging safer use.

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Evaluation of anti-inflammatory, analgesic and antiarthritic potential of ethanolic extract of leaves of *Alocassia macrorrhzia.*

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ABSTRACT

Background: *Alocasia macrorrhiza* has been traditionally employed in ethnomedicine for the management of pain and inflammatory disorders. However, limited empirical data exists to substantiate its pharmacological efficacy.

Objective: To scientifically investigate the analgesic, anti-inflammatory, and anti-arthritic properties of hydroalcoholic extract of *Alocasia macrorrhiza* leaves using validated in vivo models.

Methods: Experimental evaluation involved administration of the extract (100, 200, 400 mg/kg/po.) in formalin-induced nociception, carrageenan-induced paw edema, and CFA-induced arthritis in wistar rats. Outcomes included nociceptive behaviour, paw volume, hematological indices, inflammatory biomarkers (CRP, RF), radiographic and histopathological assessments.

Results: AM 400 mg/kgsignificantly attenuated formalin-induced nociceptive behavior in early phase (74.33 ± 10.63)and in late phase (22.83 ± 7.82)when compared with disease control group. In carrageenan-induced inflammation the edema was significantly ($p < 0.0001$)suppressed by AM 100, AM 200 and AM 400 mg/kg. while in CFA-induced arthritis model all three doses found to effective in reducing paw edema, CRP and RF levels. Moreover the histological analysis revealed decreased synovial hyperplasia and cartilage degradation and Radiographs also indicated preservation of joint architecture.

Conclusion: The hydroalcoholic extract of *Alocasia macrorrhiza* demonstrated potent, dose-dependent analgesic, anti-inflammatory, and anti-arthritic effects. These findings validate its traditional claim and highlight its potential as a phytopharmaceutical candidate for inflammatory disorders.

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Formulation and In-Vitro Evaluation of Fexofenadine HCl Nano Lipid Based Formulation

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ABSTRACT

Introduction: Nanostructured lipid carriers (NLC's) are second-generation lipid nanoparticles that are used as alternative colloidal drug carriers. Fexofenadine HCl, is a long-acting antihistamine that is used to treat annual hay fever, angioedema and chronic autoimmune hives.

Methods: Fexofenadine NLC was prepared using the ultra-sonication method followed by hot homogenization. Total six formulations were developed. All the formulations were evaluated for particle size analysis, encapsulation efficiency and drug release studies. The physical stability was conducted on optimized formulation for 3 months.

Results: The particle size of all the formulations was found in the range of 124± 0.12 to 231.4± 0.12 nm. The PDI was ranged between 0.204 ±0.002 to 0.273± 0.001. The zeta potential values for all the NLC formulations were found to be within the range of -22.21± 2.23 to -28.17± 1.31. Based on the physicochemical properties, F6 formulation was selected as the optimized formulation.

Conclusion: Fexofenadine NLC was developed using ultrasonication method and hot homogenization. The optimized formulation (F6) showed highest encapsulation efficiency, drug release and was stable for 3 months.

Keywords: Fexofenadine, nanostructured lipid carriers, encapsulation efficiency, in vitro release

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An Observational Study on Detecting, Monitoring and Reporting The Potential Adverse Drug Reaction and Their Cost Among Hospital Patient At Tertiary Care Teaching Hospital

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ABSTRACT

Background: Adverse drug reactions (ADRs) are a key concern in clinical practice, often leading to complications that affect patient safety and increase treatment costs. Monitoring and reporting of ADRs are essential for improving healthcare quality and promoting rational drug use.

Objectives:

- To evaluate the types, frequency, and severity of ADRs
- To determine causality and management strategies
- To assess the financial burden associated with ADRs

Methods: A six-month prospective observational study was conducted at SNMC and HSK Hospital & Research Centre, Bagalkot. Reported ADRs were analyzed based on type, severity, causality (WHO scale), management, and cost impact.

Results: A total of 139 ADRs were recorded from 100 patients. 14 patients incurred additional treatment costs, while others did not require alternative therapy. ADRs were more frequent in males (58%) than females (42%). Type A reactions were most common (89.92%), with antihypertensive being the leading drug class (20.14%). Most reactions were classified as *probable* (74.10%).

Conclusion: Regular monitoring and reporting of ADRs are essential for improving patient safety and reducing healthcare costs. Identifying high-risk drugs enables safer prescribing. Strengthening pharmacovigilance practices at the hospital level supports better clinical outcomes, rational drug use, and increased awareness among healthcare professionals.

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THE FUTURE OF CLINICAL RESEARCH DRIVEN BY Al IN LUNG CANCER

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ABSTRACT

Background: Lung cancer is a leading cause of cancer mortality, with clinical trials often facing challenges due to tumor heterogeneity and complex data. Artificial Intelligence (Al) offers innovative solutions to enhance trial design, execution, and analysis.

Objectives: To evaluate the impact of Al in different phases of lung cancer clinical trials and identify where it contributes most significantly.

Methods: A focused review of current literature and research data was conducted to examine Al applications across clinical trial phases. Key areas analyzed included patient selection, biomarker identification, data monitoring, and predictive analytics.

Results: Al provides the greatest benefits in Phase II and Phase Ill trials. In Phase II, Al improves patient stratification and identifies biomarkers for targeted

therapies. In Phase Ill, it enhances real-time monitoring, predicts clinical outcomes, and streamlines data analysis. Al's impact in Phase I and IV is moderate, supporting dose prediction and post-marketing surveillance.

Conclusion: Al is reshaping lung cancer clinical research, with its most valuable contributions in Phases II and Ill. It improves trial precision, accelerates decision-making, and supports the development of personalized treatment approaches.

Key Words: Lung cancer, Artificial intelligence, Clinical trials

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Formulation and Evaluation of Anti-Fungal, Anti-Bacterial Cream of Clove Oil

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ABSTRACT

Background: Clove oil, rich in eugenol, possesses strong antimicrobial properties. The increasing resistance to synthetic agents and demand for herbal alternatives has prompted research into natural formulations for topical infections.

Objective: To formulate and evaluate an oil-in-water (O/W) cream containing clove oil for its antibacterial and antifungal efficacy.

Methods: Clove oil was obtained from a local market and characterized using gas chromatography. The cream was prepared using standard emulsification methods, combining clove oil with acetyl alcohol, stearyl alcohol, mineral oil, stearic acid, and lanolin (oil phase), and water, propylene glycol, triethanolamine, methyl paraben, and propyl paraben (aqueous phase). The prepared formulations were evaluated for appearance, consistency, phase separation, pH, viscosity, spreadability, drug content, tube extrudability, and in-vitro diffusion. The optimized batch (F3) was subjected to antimicrobial testing against *Escherichia coli*, *Staphylococcus aureus*, and *Candida albicans*.

Results: All formulations exhibited acceptable physicochemical properties. Batch F3 showed the highest spreadability (18.7 gm.cm/sec), drug release (87.92%), and drug content (>95%). Antimicrobial activity of F3 revealed significant zones of inhibition: 23.5 mm (*E. coli*), 23 mm (*S. aureus*), and 18 mm (*C. albicans*).

Conclusions: The formulated clove oil cream demonstrated promising antibacterial and antifungal activity, suggesting its potential as a natural topical antimicrobial agent.

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DEVELOPMENT AND INVESTIGATION OF NABUMETONE LOADED ETHOSOMAL GEL FOR ANTI-INFLAMMATORY ACTIVITY

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ABSTRACT:

Aim and Background : The present work was to formulate and evaluate Ethosomal gel of Nabumetone for Anti-inflammatory activity.

Methods : The Nabumetone loaded ethosomal gel (F1-F9) were prepared by Hot method by varying the concentrations of ethanol and soya lecithin. These suspensions evaluated for vesicle size, drug content, release studies, entrapment efficiency, SEM.

Results : From In vitro evaluation data of ethosomal suspensions found that F7 has least vesicle size and maximum entrapment efficiency. F5 has closer result to F7 hence both formulations were developed into gel and evaluated the gel characteristics. pH, Spreadability, Extrudability and Viscosity of F5 and F7 are within the range and these shown positive results in animal activity. The vesicles of both formulations were stable upon long term storage.

Conclusion: Successful approach was carried out in developing a prolonged release topical delivery system containing ethosome vesicles. The ethanol concentration greatly effect the entrapment of drug into vesicles and its sizes. Topically ethosomes can be delivered in form of gel to get prolonged effect.

Key words: Nabumetone, Anti-inflammatory, Ethosomes, Ethosomal gel, Soya lecithin.

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DESIGN AND EVALUATION OF ANTIPSYCHOTIC MEDICATED LOZENGES FOR PAEDIATRICS

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ABSTRACT

Background: Lurasidone Hydrochloride is primarily used in the management of psychiatric disorders. Still, its novel application as an oral lozenge for treating throat infections in paediatric patients presents a promising alternative to conventional dosage forms like syrups and tablets. Lozenges offer localised action and improved patient compliance.

Objective: The present study aims to formulate and evaluate oral retentive lozenges of Lurasidone Hydrochloride using various polymers to achieve targeted and effective treatment of throat infections.

Method: Fifteen lozenge formulations (FO—F14) were prepared using the heating and congealing method. Polymers such as hydroxypropyl methyl cellulose (K1OOM & E5), guar gum, and hydroxypropyl β-cyclodextrin were used in varying concentrations. Physicochemical parameters, including hardness, moisture content, and weight variation, were evaluated. IR spectroscopy assessed drug-excipient interactions. In vitro dissolution studies and kinetic modelling using Higuchi, first-order, and Peppa’s plots were conducted.

Results: Formulation F14 (1%HPMC K1OOM and cyclodextrin) showed optimal performance, with 99.76% drug release in 30minutes. All formulations were mechanically stable, free of grittiness, and showed no drug-excipient interactions. Release kinetics followed Peppa’s model with regression values between1.0—1.9.

Conclusion: Lurasidone lozenges offer a viable, bioavailable, and patient-friendly solution for paediatric throat infections with potential applications in geriatric compliance as well.

Keywords: Lurasidone Hydrochloride; Lozenges; Paediatrics.

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STEM CELL THERAPY IN ONCOLOGY: ADVANCEMENTS, CHALLENGES AND CLINICAL IMPACT

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ABSTRACT

BACKGROUND: Stem cell therapy offers a promising frontier in oncology by targeting cancer at its source—cancer stem cells (CSCs). Mesenchymal stem cells (MSCs) and their exosomes play dual roles in tumor modulation and therapy enhancement. Despite advances in genetic engineering and nanotechnology, challenges like safety and heterogeneity persist. Understanding stem cell biology is key to developing personalized, effective cancer treatments

OBJECTIVES:

1. To explore the role of CSCs in tumorigenesis.
2. To highlight recent advancements in stem cell and exosome-based cancer therapies.
3. To evaluate major clinical and regulatory challenges.
4. To assess clinical impact in targeted therapy.
5. To discuss future directions in personalized and precision oncology.

METHODS:

- **Study:** comprehensive literature review
- **Databases searched:** PubMed, Scopus, and Web of Science
- **Search keywords:** cancer stem cells, mesenchymal stem cells, exosomes, CAR-T and stem cell immunotherapy.

CONCLUSION: Stem cell therapy offers targeted cancer treatment, but safety concerns and tumor-promoting risks require further research and clinical validation.

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Plant-Mediated Engineering of Pt-Au Nanoparticles: Insights from *Molluva spicata* Stem Extract

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ABSTRACT

The main aim of this investigation was to develop an environmentally friendly method for synthesizing bi-metallic nanoparticles composed of gold and platinum, utilizing the ethanolic stem extract of *Molluva spicata* (MOSP-Pt-Au-BiNPs), and to evaluate their possible therapeutic benefits. Employing a green synthesis approach, multi-metallic nanoparticles were produced and thoroughly characterized through various analytical techniques, including UV-visible and FTIR spectroscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), particle size distribution, and zeta potential measurements. The nanoparticles were further subjected to assessment through skin irritation tests and in vivo wound healing studies.Characterization results revealed that the synthesized MOSP-Pt-Au-NPs predominantly displayed a cuboidal morphology, with an average particle size of 47.38 ± 9.22 nm. The measured zeta potential was -65.3 mV, reflecting good colloidal stability. In wound healing assays, animals treated with MOSP-Pt-Au-NPs showed markedly improved wound closure compared to the control group (Group I) over a 21-day observation period (days 7, 14, and 21). Notably, the 5% PLAU treatment group achieved the highest wound contraction rates, exhibiting performance on par with the standard treatment group throughout the experiment.

The superior biological activity of these nanoparticles is linked to their nanoscale properties, including small particle size and low PDI, which enhance their surface reactivity, foster beneficial interactions with biological tissues, and minimize cytotoxicity while ensuring high biocompatibility. As such, these biosynthesized nanomaterials present substantial potential for a range of biomedical and pharmaceutical applications.

Keywords: Nanoparticles**,** *Molluva spicata*, particle size, green synthesis, bimetallic.

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"Pharmacological Evaluation and Therapeutic Potential of *Calotropis sp.*: A Foundational Study in Ethnomedicinal Authentication and Antimicrobial Assays"

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ABSTRACT

Background: *Calotropis species* are traditionally used to treat infections, inflammation, and tumors, but their pharmacological basis remains underexplored due to species misidentification and lack of standardization.

Objective: To authenticate a morphologically distinct *Calotropis* specimen and evaluate its phytochemical content and antimicrobial activity.

Materials and Methods: The plant was collected and authenticated through morphological and anatomical analysis, followed by rbcL gene-based DNA barcoding. Leaf extracts were prepared using cold maceration and Soxhlet extraction in methanol, chloroform, and petroleum ether. Phytochemical screening and antimicrobial assays against clinical pathogens (bacterial and fungal strains) were conducted. Latex was tested for milk clotting activity.

Results: DNA barcoding showed 98.04% similarity with *C. procera*. Extracts, especially methanolic, were rich in flavonoids and phenolics and showed strong antimicrobial activity, notably against *S. aureus*. Latex showed proteolytic activity.

Conclusion: This study validates the traditional use of *Calotropis* through taxonomic and pharmacological evidence, supporting its potential in antimicrobial drug discovery and further bioactive compound exploration.

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Title: Phyto-pharmacological Evaluation and Green Nanofabrication of *Calotropis* sp.: Advancing Extract-Based Biointerventions via ZnO@SiO_2 Nanocomposite Synthesis.

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ABSTRACT

Background: Medicinal plants like *Calotropis* offer promising avenues for addressing oxidative stress, inflammation, and renal disorders through both traditional and modern interventions. Integrating phytopharmacology with green nanotechnology may enhance their therapeutic efficacy and application range.

Objective: To evaluate the in vitro antioxidant, anti-inflammatory, and anti-urolithiatic potential of *Calotropis* leaf extracts and to develop a green-based formulation with improved antimicrobial prospects.

Methods: Soxhlet extracts were used for evaluating DPPH and hydrogen peroxide assays for antioxidant activity, and a protein denaturation assay for anti-inflammatory potential. Anti-urolithiatic efficacy was assessed via turbidimetric inhibition of calcium oxalate crystallization. In parallel, a green synthetic approach was applied to develop a ZnO@SiO_2-based formulation utilizing plant-derived biomolecules. Antimicrobial activity was tested against bacterial and fungal strains.

Results and Conclusion: Extracts showed significant activity across pharmacological assays, indicating potential for mitigating oxidative and inflammatory stress, along with preventive action against stone formation. The green formulation exhibited enhanced microbial inhibition, suggesting added benefit through bioengineering. These findings reinforce the medicinal relevance of *Calotropis* and its suitability for advancing plant-based therapeutic systems.

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One-Step Apexification Using MTA in a Non-Vital Immature Tooth

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ABSTRACT

Background: Apexification is a vital endodontic procedure aimed at inducing apical closure in non-vital, immature permanent teeth.

Objective: To achieve apical barrier formation using Mineral Trioxide Aggregate (MTA) in a tooth with open apex and periapical pathology. **Methods**: A patient presented with a history of trauma and incomplete root formation. Clinical and radiographic findings revealed a non-vital tooth with an open apex and periapical radiolucency. Following diagnosis and access opening, disinfection was carried out with copious irrigation and intracanal medicament. MTA was placed as an apical barrier.

Results: The case showed favorable outcomes with formation of a calcific barrier, successful obturation, and radiographic evidence of periapical healing within a short period.

Conclusion: MTA is an effective material for single-visit apexification, offering superior sealing, biocompatibility, and predictable outcomes, making it a gold standard in modern endodontic practice.

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"REVOLUTIONISING SMILES WITH AI: TODAY'S TREND AND TOMORROW'S MODERNISATION"

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ABSTRACT

Artificial Intelligence (Al) is transforming the field of orthodontics, bringing unprecedented accuracy, efficiency, and personalization to patient care. AI is at the forefront of modern orthodontics, reshaping how practitioners diagnose, plan, and execute treatments.

Leveraging cutting-edge machine learning algorithms and big data analysis. Al has introduced a new era of precision and efficiency in orthodontic care. AI powered tools are redefining traditional practices by enhancing diagnosis, treatment planning, and appliance design. From automated cephalometric analysis and predictive modelling to remote monitoring and real-time adaptive treatments, Al empowers orthodontists to deliver optimised outcomes.

This poster explores the current applications of Al in orthodontics, highlighting its benefits such as reduced treatment time, improved precision, and enhanced patient satisfaction. It also addresses challenges like data privacy, accessibility, and ethical considerations, while looking ahead to future advancements, including Al integration with big data and genomics. By embracing Al, orthodontics is evolving into a smarter, more patient-centric discipline, ensuring that every smile is both beautiful and data-driven.

TODAYS TREND

1. AI in diagnosis
2. Personalised treatment plans
3. Virtual smile design
4. Orthodontic aligners
5. 3-D Printing
6. Orthognathic surgery
7. Model analysis
8. Wire bending

TOMORROW'S MODERNISATION

1. Fully autonomous dental procedures
2. Predictive oral health
3. Smart oral care devices
4. Global accessibility
5. Integration with genomics

Conclusion: AI is set to redefine how we approach dental health—making it more efficient, personalized, and accessible. While today's trends hint at a promising start, tomorrow's innovations promise to take oral care to unprecedented heights.

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"Guiding Precision in File Retrieval"

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ABSTRACT

Separated intracanal instruments pose a significant challenge during endodontic treatment, often compromising disinfection and obturation. Guided endodontics, an emerging minimally invasive technique, utilizes cone-beam computed tomography (CBCT) and computer-aided design/computer-aided manufacturing (CAD/CAM) to enable precise localization and retrieval of fractured instruments. By creating a 3D-printed stent that directs a bur along a pre-planned path, clinicians can conservatively access the fragment with minimal dentin removal and reduced risk of canal deviation or perforation. This technique is especially valuable in cases involving anterior teeth, calcified canals, or where conventional methods such as ultrasonics have failed. Case reports and recent literature support the efficacy, safety, and accuracy of guided endodontics in managing separated files. Although limited by equipment requirements and access challenges in posterior teeth, guided endodontics represents a significant advancement in complex root canal retreatments, offering improved outcomes and preservation of tooth structure.

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INTRAORAL SCANNERS: THE MAGIC WAND OF MODERN ORTHODONTICS

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ABSTRACT

Intraoral scanners (IOS) have revolutionized the field of orthodontics. This innovation offers significant advantages in precision, patient comfort, and efficiency. The use of IOS facilitates accurate diagnosis, enhances treatment planning, and enables seamless integration with digital technologies such as CAD/CAM systems, clear aligner therapy, and 3D printing. Orthodontic specific applications include the fabrication of customized appliances, indirect bonding trays, and digital models for monitoring treatment progress. Moreover, IOS enhances patient communication by providing visual simulations of treatment outcomes, improving case acceptance.

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"AI to the Rescue: Making Endodontics a Breeze"

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ABSTRACT

Artificial Intelligence (AI) is transforming endodontics by enhancing, not replacing, clinician expertise. It automates cognitive tasks like learning and decision-making, aiding in the detection of root fractures, periapical lesions, and working length determination.

AI also improves treatment planning through predictive analytics and enhances diagnostic accuracy by reducing noise in radiographic imaging. Convolutional neural networks (CNNs) have shown diagnostic accuracy comparable to trained endodontists (Setzer et al., 2020; Schwendicke et al., 2021). AI systems exhibit high sensitivity and specificity in assessing root canal anatomy and detecting fractures, supporting precise clinical decisions. While AI boosts workflow efficiency and patient outcomes, its integration must remain within ethical and professional limits. The true strength of AI lies in complementing human skills, leading to safer, more accurate, and personalized dental care.

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"Reinforcing the Weak: A Comparative In Vitro Study of Nanohybrid and Fiber-Reinforced Composites in Bicuspid Restoration"

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ABSTRACT

Objectives: Restoring severely damaged teeth poses a clinical challenge due to compromised structural integrity and the risk of fracture under occlusal loads. With the availability of advanced restorative materials, selecting one that offers optimal durability and fracture resistance is crucial. This study aimed to evaluate and compare the fracture resistance of nanohybrid composite and fiber-reinforced composite in extensively damaged premolars. Forty-five extracted human permanent premolars were disinfected using 0.5% sodium hypochlorite, cleaned, and stored in normal saline. The teeth were mounted in cold-cure acrylic and randomly divided into three groups (n=15):

- **Group 1 (Control):** Intact, unprepared teeth
- **Group 2:** Standardized MOD cavities restored with nanohybrid composite
- **Group 3:** Standardized MOD cavities restored with fiber-reinforced composite

All samples underwent thermocycling (500 cycles between 5°C and 55°C). Fracture resistance was tested using a universal testing machine, and the load at cusp fracture was recorded in Newtons.

Results: Group 1 (Control group) showed the highest mean fracture resistance of 3068.00 ± 129.02 N, followed by Group 3 of 2100.0053 ± 236.187 N and Group 2was the lowest at 1566.00 ± 103.01 N.Statistical analysis (ANOVA, Tukey's post hoc test) confirmed significant differences among all groups ($p < 0.0001$).

Conclusion: Fiber-reinforced composites provide superior fracture resistance compared to nanohybrid composites in structurally compromised teeth.

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BUDD - CHIARI SYNDROME: A CASE STUDY

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ABSTRACT

BACKGROUND: Budd-Chiari syndrome is a rare disorder caused by thrombotic or nonthrombotic obstruction of hepatic venous outflow, typically presenting with hepatomegaly, ascites, and abdominal pain. Its incidence is estimated at 1 in 100,000 to 1 in 2.5 million annually and commonly affects individuals aged 2040.

OBJECTIVE: To ensure early diagnosis, rational therapy, evidence-based care, patient counselling and proper follow-up.

CASE SUMMARY: A 38-year-old male presented with upper abdominal pain, nausea, vomiting, and loss of appetite. Icterus was noted on examination. Laboratory tests showed decreased prothrombin time (PT) and activated partial thromboplastin time (aPTT). Abdominal ultrasonography revealed hepatic vein thrombosis. The patient was treated with heparin, warfarin, and supportive care. PT and a PTT improved to 11 and 25 seconds, respectively.

METHOD: Prospective observational study.

RESULT: Diagnosed with Portal vein thrombosis and Budd-Chiari syndrome.

CONCLUSION: Early diagnosis, appropriate anticoagulant drug use, and regular follow-up can lead to favorable outcomes and prevent relapse.