Proceedings Book

CETPS 24
Conference on Emerging Trends in Pharmaceutical Sciences

The Book of Proceedings

Conference on Emerging Trends in Pharmaceutical Sciences (CETPS 24)
Faculty of Pharmacy, Capital University of Science & Technology
May 11, 2024 | Islamabad Pakistan

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24)

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Message of The General Chair

It is my honor and pleasure to welcome you all to the Conference on Emerging Trends in Pharmaceutical Sciences (CETPS 24) on May 11, 2024, at the Capital University of Science & Technology. It is my great privilege to serve as a General Chair of CETP 24. The Conference is organized by the Faculty of Pharmacy, Capital University of Science & Technology. The CETPS 24 has provided a multi-disciplinary venue for renowned National & International Scientists and scholars to share their novel ideas and research work about emerging advances in Pharmaceutical Sciences to address the rich space of pharmaceutical problems. The submitted papers were evaluated based on their significance, novelty, and technical quality through a critical review process. I am highly thankful to the Patron, Mr. Mian Amer Mahmood, and Co-Patron, Dr. Muhammad Mansoor Ahmed for extending continuous help and support. I would also like to thank the Organizing Chair of CETPS 24, Dr. Nadia Shamshad Malik, for her leadership and commitment to the conference. The CETPS 24 would not have been possible without the enthusiasm and hard work of different committees of the Faculty of Pharmacy. Last, but certainly not least, my thanks go to all the authors and invited speakers who submitted papers and all the attendees of the Conference.

Dr. Muzaffar Abbas
General Chair CETPS 24
Dean, Faculty of Pharmacy
Capital University of Science & Technology

Message of The Organizing Chair

Dear Conference Attendees!

It is my pleasure to welcome you all to this year's conference. As the organizing chair, I am thrilled to see so many researchers, professionals, and enthusiasts gather here to exchange ideas and insights on various topics.

Over the course of the conference, you will have the opportunity to attend various presentations and discussions that cover a wide range of themes. Our esteemed speakers and presenters come from different parts of the country and they bring with them a wealth of knowledge and expertise.

We have put a lot of effort into organizing this conference, and I am confident that it will be a memorable and productive event for everyone involved. I hope that you will take advantage of the opportunity to engage in lively discussions, learn from each other, and build long-lasting connections.

Once again, I welcome you all to this conference and wish you a successful and enjoyable time.

Dr. Nadia Shamshad Malik
Organizing Chair CETPS 24
Faculty of Pharmacy
Capital University of Science & Technology

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Unlocking Liposomal Formulation Development Potential: From Lab Bench to Market

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Article Info

Keywords:
Liposomal drug delivery, Lipid excipients, Manufacturing processes, Nanosizing techniques, Drug loading methods, Critical quality attributes (CQAs).

Abstract

Background: Liposomal drug delivery methods have attracted considerable attention in both the pharmaceutical and biotechnology sectors due to their unique characteristics that enhance the efficacy of therapeutic agents. This presentation seeks to offer insights into the fundamental chemistry and established pharmaceutical technologies utilized in commercially available liposomal products.

Method: The presentation covers details such as lipid excipients, manufacturing processes, nanosizing techniques, drug loading methods, and the critical quality attributes (CQAs) associated with liposomal products. Comprehensive research on liposomal drug delivery methods and commercially available products was conducted to gather relevant information.

Result: The presentation provides comprehensive insights into the chemistry and technologies involved in liposomal drug delivery. It highlights key aspects such as liposome composition, manufacturing processes, and critical quality attributes associated with liposomal formulations. Additionally, various drug loading methods and nanosizing techniques utilized in liposomal drug delivery are discussed.

Conclusion: The knowledge presented in this presentation can prove invaluable for research and development endeavors concerning liposomal drug candidates at various stages of the pipeline. By understanding the fundamental chemistry and established pharmaceutical technologies behind liposomal drug delivery, researchers and industry professionals can optimize the development and commercialization of liposomal formulations, ultimately leading to improved therapeutic outcomes for patients.

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Clinical Pharmacy Services: Past, Present & Future

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Article Info

Keywords: Clinical pharmacy, Patient-centered care, Pharmaceutical care, Healthcare outcomes, Pharmacy profession.

Abstract

Background: The evolution of clinical pharmacy began in the USA in the early 1960s at the University of Michigan, progressing to formal recognition within the pharmacy profession by the late 1960s. This discipline focuses on pharmacists delivering patient-centered care to optimize medication therapy, promote health, and prevent disease.

Objective: This narrative traces the development of clinical pharmacy from its inception to its current status, highlighting its transformation from a product-focused to a patient-centered approach and its increasing significance within healthcare settings.

Method: The transition to a patient-focused model faced challenges due to differences in pharmacy systems and healthcare structures across countries. Implementation barriers, such as educational deficiencies, limited clinical skills, resource constraints, and policy constraints, further hindered progress.

Results: Numerous studies have demonstrated the significant impact of pharmacotherapy on morbidity and mortality. Pharmaceutical care and clinical pharmacy services have shown efficacy in managing common pathologies like diabetes, hypertension, asthma, hyperlipidemia, chronic pain, rheumatic diseases, psychiatric disorders, and in patients with multiple medications.

Conclusion: Despite initial obstacles, clinical pharmacy has emerged as a cornerstone of the healthcare system, contributing to improved clinical outcomes and patient care. Its role continues to expand, demonstrating its indispensable value in contemporary healthcare.

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3D Printing in Pharmaceutical and Medical Applications "Recent Achievements and Challenges" A Formulation Scientist Prospective

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Article Info

Keywords:
3D printing, fused deposition modeling, hernia mesh, ciprofloxacin, tensile strength, polypropylene, polyvinyl alcohol, personalized dosing, modified release.

Abstract

Background: This research explores the application of fused deposition modeling (FDM), a three-dimensional printing (3DP) technique, for fabricating personalized ciprofloxacin-impregnated hernial meshes and oral tablets using polypropylene (PP) and polyvinyl alcohol (PVA) polymers. Through drug loading into pre-extruded filaments via soaking in drug solution and hot melt extrusion (HME) for customized drug-loaded filaments, the research aims to investigate the efficacy of FDM 3DP as an efficient and cost-effective means for producing tailored dosage forms and modified-release formulations.

Objective: The primary objective of this research is to demonstrate the feasibility and effectiveness of FDM 3DP in producing personalized dosage forms and modified-release formulations.

Method: Filaments loaded with drugs through soaking exhibited drug contents of 3 ± 1% w/w for PP and 5 ± 1% w/w for PVA, while those manufactured using HME contained 15-20% drug. Hernial meshes with diverse designs, pore sizes, shapes, and thread thicknesses were conceptualized and 3D-printed using pre-extruded PP and PVA filaments, both with and without drug loading. Evaluation encompassed the assessment of tensile properties, drug loading, and in vitro drug release profiles, followed by in vivo testing in a rabbit model to gauge

biocompatibility and adhesiogenicity.
Results: The findings of this research underscore the potential of FDM 3DP as a viable and economical alternative for manufacturing tailored hernial repair meshes. Moreover, the research successfully yielded drug-loaded 3D meshes, offering promise for combatting post-surgical infections.
Conclusion: This research illuminates the potential of FDM 3DP as a versatile tool in the realm of personalized medicine, showcasing its capacity to produce customized dosage forms and modified-release formulations effectively and economically.

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Tyrosinase Enzyme a Promising Target for the Design and Synthesis of Anti-Melanogenic Agents

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Article Info

Keywords: Tyrosinase, inhibitors, melanin, phenolic antioxidants, enzyme assays, docking studies, cytotoxicity, melanoma.

Abstract

Background: Tyrosinase, a binuclear copper-containing metalloenzyme, facilitates the conversion of L-tyrosine to L-3,4-dihydroxyphenylalanine (L-DOPA) and subsequent oxidation of L-DOPA to dopaquinone, leading to melanin synthesis. Abnormal melanin production contributes to conditions such as Melasma, post-inflammatory hyperpigmentation (PIH), Parkinson's disease, and other neurodegenerative disorders. Developing tyrosinase inhibitors without adverse effects is imperative.

Objective: To design and synthesize tyrosinase inhibitors using natural phenolic antioxidants and assess their efficacy through computational and wet lab approaches.

Methods: Derivatives of natural phenolic antioxidants were synthesized and evaluated for tyrosinase inhibitory activity using enzyme-based assays. Kinetic mechanisms of potent derivatives were determined, and docking studies were conducted to compare binding affinities with IC50 values. Cytotoxicity and cell-based tyrosinase inhibition studies were performed, along with evaluation in murine skin melanoma (B16F10) cells.

Results: A derivative exhibiting significantly higher tyrosinase inhibitory activity than the standard inhibitor Kojic acid was identified, showing a thousand-fold increase in potency. The synthesized derivatives demonstrated superior inhibitory activity in both enzyme assays and cell-based studies.

Conclusion: Natural phenolic antioxidant derivatives exhibit promising potential as tyrosinase inhibitors, with one derivative surpassing the standard inhibitor's activity by a considerable margin. These findings lay the groundwork for the development of effective and safe treatments for conditions related to abnormal melanin production.

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Microneedle Patch of Levosulpiride for Bioavailability Enhancement Approach

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Article Info

Keywords: Levosulpiride, thiolated chitosan, microneedle patch, transdermal delivery, bioavailability, drug loading.

Abstract

Background: Levosulpiride, characterized by slow and weak absorption from the gastrointestinal tract, possesses a low oral bioavailability (< 25%) and a short half-life of approximately 6 hours. To address this, levosulpiride-loaded thiolated chitosan microneedle patches (LS-TC-MNPs) were developed to enhance its bioavailability.

Objective: This study aimed to deliver levosulpiride transdermally via a thiolated chitosan microneedle patch (TC-MNP) to improve its bioavailability.

Methods: Thiolated chitosan was synthesized and characterized using nuclear magnetic resonance (1HNMR) spectroscopy, attenuated total reflectance-Fourier transform infrared (ATR-FTIR) spectroscopy, differential scanning calorimetry (DSC), and X-ray diffraction (XRD). Levosulpiride-loaded thiolated chitosan microneedle patches (LS-TC-MNPs) were fabricated from various concentrations of thiolated chitosan solution. The LS-TC-MNP was characterized through FTIR spectroscopic analysis, scanning electron microscopy (SEM), penetration ability, tensile strength, moisture content, patch thickness, and elongation tests.

Results: LS-TC-MNP fabricated with a 3% thiolated chitosan solution exhibited optimal tensile strength, moisture content, patch thickness, elongation, drug-loading efficiency, and drug content. LS-TC-MNP-3 showed promise in enhancing the bioavailability of levosulpiride.

Conclusion: Thiolated chitosan microneedle patches, particularly LS-TC-MNP-3, present a promising strategy for improving the bioavailability of levosulpiride, offering potential benefits for transdermal drug delivery.

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Personalized Medicine & Pharmacogenetics in the Pakistani population; Key Findings of the last 5 Years

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Article Info

Keywords: Pharmacogenetics, Cytochrome P450, Genetic polymorphisms, Pakistani population, Drug metabolism, Clinical outcomes.

Abstract

Background: Pharmacogenetics focuses on studying how genetic variations influence drug actions. The cytochrome P450 (CYP450) family, a significant subset of drug-metabolizing enzymes, plays a crucial role in drug metabolism. Genetic polymorphisms in CYP450 enzymes result in variable metabolic capacities among individuals, affecting the efficacy and safety of drugs metabolized by these enzymes. Despite the importance of understanding CYP450 gene variants, the population distribution and allelic frequencies of these variants in the Pakistani population remain largely uncharacterized.

Objective: This study aimed to explore genetic polymorphisms in 10 major CYP genes within the Pakistani population and compare their frequencies with other populations. The findings are expected to provide insights into the proportion of the Pakistani population at risk of adverse drug reactions and environmental toxin exposure.

Method: Genetic polymorphisms in CYP genes were investigated in the Pakistani population through comprehensive genetic analysis. The frequencies of CYP gene polymorphisms were compared with those of other populations to assess variability across different ethnic groups.

Results: Our study findings shed light on the prevalence of CYP gene polymorphisms in the Pakistani population, allowing for a better understanding of pharmacogenetic variability. These insights are crucial for identifying individuals at increased risk of adverse drug reactions and toxic environmental exposures.

Conclusion: The pharmacogenetic knowledge generated by our

	investigation has the potential to guide personalized drug treatments, leading to improved clinical outcomes and cost-effective healthcare interventions. Additionally, this presentation will share key findings from recent studies conducted in the Pakistani population, further enriching our understanding of pharmacogenetic variability in this region.

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An Innovative Approach of Exosome-Based Targeted Drug Delivery of Proteolysis-Targeting Chimeras (PROTACs) for Cancer and Viral Infections

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Article Info

Keywords:
Personalized cancer immunotherapy, Nanotechnology, Nano-vaccines, HPV-related cancers, Proteolysis Targeting Chimaeras (PROTACs).

Abstract

Background: Personalized cancer immunotherapies, reinforced by the creative application of nanotechnology (nano-vaccines), are paving the way for novel methodologies to the targeted treatment of cancers associated with the human papillomavirus (HPV), a persistent global health concern despite current preventive measures.

Objective: This exploration delves into the potential of personalized nano-vaccines tailored to individual tumor mutations in HPV-related cancers and the role of nanotechnology in delivering tumor-specific antigens to enhance immune responses for precise therapeutic interventions.

Method: Recent developments in polymeric nanoparticles and high-density lipoprotein-mimicking nano-discs, as observed in preclinical models, are synthesized to highlight the efficacy of personalized cancer vaccines and the challenges in optimizing nano-carrier systems for human trials.

Results: The integration of nanotechnology with Proteolysis Targeting Chimaeras (PROTACs) offers a transformative approach to targeted protein degradation, potentially improving therapeutic outcomes while minimizing side effects.

Conclusion: The convergence of nanotechnology and PROTACs expands the scope of personalized cancer treatments, promising complex and effective therapeutic solutions. Despite complexities in HPV-related cancers, ongoing research underscores the dynamism and pursuit of excellence in contemporary oncology.

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Sensing with TRP Cationic Ion Channels; Molecular Logic of Hot, Cold and Pain Perception

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Article Info

Keywords:
TRPV3 ion channels, Camphor sensitivity, Cysteine residues, Voltage-clamp experiments, Analgesic compounds.

Abstract

Background: Transient receptor potential vanilloid (TRPV) ion channels are crucial in peripheral sensory signaling, being robustly expressed in sensory neurons and responsive to various stimuli like thermal heating, membrane depolarization, and chemical agonists such as camphor and monoterpenoids. TRPV3, in particular, influences sensory thermotransduction, nociception, inflammatory responses, hair growth, and susceptibility to dermatitis in rodents. Conserved cysteine residues in TRPV1-4 pore-forming regions are pivotal in channel activation via S-nitrosylation.

Objective: Understanding the binding sites for TRPV3 agonist camphor can aid in designing more effective analgesic compounds. This study aims to investigate the role of conserved cysteine residues in the pore region of TRPV3 channels in mediating responses to camphor and other agonists.

Method: Overlap-extension PCR was used to mutate conserved cysteine residues in the pore region of TRPV3 channels. Mutant constructs were confirmed by DNA sequencing and used to produce cRNAs. Oocytes expressing mutant TRPV3 channels were subjected to voltage-clamp experiments and challenged with agonists 2-APB, camphor, and dihydrocarveol.

Result: Mutants mTRPV3-C619S and mTRPV3-C612S exhibited similar responses to 2-APB compared to wild-type TRPV3. However, the response to camphor was abolished in mTRPV3-C619S, while mTRPV3-C612S showed slightly reduced sensitivity to camphor but retained sensitivity to dihydrocarveol.

Conclusion: Pore-region cysteine residues play a critical role in

	camphor sensitivity of TRPV3 ion channels. Identifying ligands with improved efficacy and selectivity for other TRP ion channels (TRPM8, TRPA1) holds promise for therapeutic applications across various diseases.

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Therapeutic Drug Monitoring: Optimizing Therapy for Improved Outcomes

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Article Info

Keywords:
Therapeutic drug monitoring, Drug concentrations, Therapeutic range, Pharmacokinetics, Personalized medicine, Adverse drug reactions.

Abstract

Background: Therapeutic drug monitoring (TDM) is an essential component of patient care, allowing healthcare professionals to optimize drug therapy and enhance patient outcomes. By measuring drug concentrations in a patient's blood or plasma, TDM ensures that drug levels remain within a therapeutic range, minimizing the risk of toxicity or ineffective treatment. This approach is particularly critical for medications with narrow therapeutic indices, such as anticonvulsants, immunosuppressants, and antibiotics.

Objective: The primary objective of TDM is to individualize drug dosing and adjust treatment regimens based on measured drug concentrations, thereby reducing adverse drug reactions, improving drug efficacy, and promoting personalized medicine.

Method: TDM involves regular monitoring of drug levels, often through blood or plasma sampling, followed by analysis to determine whether concentrations fall within the desired therapeutic range. Pharmacokinetic principles are applied to interpret these measurements and guide dosing adjustments.

Results: Regular TDM enables early detection of drug interactions, nonadherence, and pharmacokinetic variations, facilitating timely interventions and improved patient care. By ensuring optimal drug therapy, TDM contributes to better patient outcomes and reduces healthcare costs associated with adverse events or ineffective treatment.

Conclusion: As medication regimens become increasingly complex, the importance of TDM in modern healthcare will continue to grow. Embracing TDM as a routine practice can help healthcare professionals tailor treatment regimens to individual patient needs, maximizing therapeutic benefits while minimizing risks.

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Impact of Intravenous to Oral Switch in a Tertiary Care Hospital Centered: Observational Study

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Article Info

Keywords:
Intravenous Per Oral Switch, Antimicrobial Stewardship, Cost Savings, Length of Stay.

Abstract

Background: Intravenous to Oral Switch (IV-to-PO switch) is an important component of antimicrobial stewardship (AMS). IV-to-PO switch has reported benefits including decreased length of stay, reduced healthcare costs, reduced risk of infection, and reduced nurse workload. However, studies exploring IV-to-PO switches within the hospital settings of Pakistan remain relatively new.

Objectives: The primary objective is to study the impact of the IV-to-PO switch program in terms of length of stay and cost savings. Missed potential, along with quantifying indications, specialty, and type of care were included as secondary objectives.

Methods: It is a prospective observational study that explored the eligibility of patients for IV-to-PO switch through discharge summaries presented at the Take-Home (TH) pharmacy of a tertiary care hospital in Islamabad, Pakistan.

Results: Most of the switches performed were from the obstetrics/gynecology specialty with most switches belonging to switch therapy of ceftriaxone to cefixime. The 150 IV-to-PO switches performed reported an 8.7% cost savings in total pharmacy bills. The surgical type of care was also reported to have a higher frequency of IV-to-PO switch eligible candidates (n = 105). An independent samples t-test performed for length of stay showed non-significant results (p=0.599).

Conclusions: This study explores the impact of IV-to-PO switch

on cost-effectiveness, missed potential, and the length of stay (LOS) of IV-to-PO switch. Through collaborative efforts in the future

research, the benefits of IV-to-PO switch can be maximized for more diverse populations and indications.

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Myocardial Remodeling Mediated By the NF-κB Pathway

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Article Info

Keywords:
Heart failure, Myocardial remodeling, Total glucosides of peony, Angiotensin, Nuclear factor kappa B cells

Abstract

Background: Myocardial remodeling is one of the main mechanisms that leads to chronic heart failure (CHF). Thus, the drugs that suppressed the process of myocardial remodeling showed better clinical outcomes to deal with CHF. Total glucosides of paeony (TGP) which is used in many traditional Chinese medicines (TCM) exhibited promising ethno-pharmacological effects such as immunosuppressant, anti-inflammatory, analgesia, anti-stress, liver disease, allergies, anticoagulant, and cardiovascular activities.

Objectives: This study aims to investigate the effects of TGP on myocardial remodeling by regulating the nuclear factor kappa B cells (NF-κB) pathway.

Methodology: SD rats were selected and divided into five groups (n=8), control, sham-operated, Captopril, low dose TGP and high dose TGP respectively. The pressure-overload method was adopted by abdominal aorta ligation to induce CHF. Furthermore, collagen fibers were detected by picrosirius red staining and expression of NF-kB, TGF-β1 by immunohistochemistry and observed under a polarized microscope and assessed by image-pro plus 6.0. Matrix metalloproteinase's (MMP)-2, -9 mRNA levels by reverse transcription PCR (RT-PCR), the concentration of angiotensin II was determined by radioimmunoassay and ELISA was employed to determine the cytokine IL-1β.

Results: It was observed that TGP could relieve myocardial remodeling in rats induced by abdominal aorta ligation and decrease the level of angiotensin II and I/III collagen ratio, and pathogenic cytokines and inhibit the expression and activities of MMPs.

Conclusion: Consequently, the observations suggested that myocardial remodeling was mediated by the NF-κB pathway.

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Population Pharmacokinetics of Tacrolimus in Pakistani Patients by using TDM data

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Article Info

Keywords:
Tacrolimus, PopPK modelling, TDM, SCM, Chi-square test.

Abstract

Background: The field of population pharmacokinetic modeling and dosing simulations has emerged as an invaluable tool for dose optimization across the world. As tacrolimus is mainly eliminated through the liver there is a possibility of variation in pharmacokinetics based on the ethnic background of the patients.

Objectives: To compare the pharmacokinetics of tacrolimus in Pakistani patients through a population pharmacokinetic modeling approach to optimize the dose for the respective population.

Methods: This was a multi-center, open-label, retrospective and non-interventional study that was conducted on pooled data collected from Pakistani patients. The plasma concentration-time data of tacrolimus from Pakistani patients were generated by collecting and analyzing the plasma samples after the administration of tacrolimus at therapeutic doses.

Results: The data from Chinese patients were received from the corresponding author(s) of previously published articles on popPK of tacrolimus. The data from both sources were combined to generate a pooled dataset which was used for the development of popPK model of tacrolimus and the effect of different covariates was observed by using the SCM (stepwise covariate modeling) approach. The significant covariates were included in the final model which was evaluated by using GOF (goodness of fit) plots and bootstraps analysis. The final model was used to compare the pharmacokinetics of tacrolimus in Pakistani patients through popPK modeling. The inter-individual variability was estimated in percentage while the effect of different covariates was analyzed by using the Chi-

square test with α = 0.05 for the forward inclusion of covariates and α = 0.01 for the backward elimination of covariates.
Conclusion: By using the TDM data of tacrolimus in Pakistani patients, the age of the patients was a significant covariate for tacrolimus clearance and therefore the dose of tacrolimus should be optimized based on the age of Pakistani patients.

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Fabrication and Evaluation of Differential Release Bilayer Tablets of Clarithromycin and Levofloxacin by 3D Printing

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Article Info

Keywords:
Hot melt Extrusion, solid dispersions, fused deposition modeling, 3D printing, customized dosing.

Abstract

Background: Formulation of customized drug delivery systems is considered an effective approach to fulfill the individualized needs of the patients.

Objective: To prepare and characterize customized 3D-printed bilayer tablets.

Methods: In this study, differential release bilayer tablets containing clarithromycin (CAM) as sustained release (SR) and levofloxacin (LVX) as immediate release (IR) were fabricated by bridging the techniques of hot melt extrusion (HME) and Fused Deposition Modeling (FDM). Both processes were optimized to minimize drug degradation and to achieve the safe deposition of drugs in their respective layers. This design may offer better clinical efficacy, better patient compliance and may overcome side effects caused by the generalized dosing.

Results: In-vitro drug release studies confirmed that almost 100 % of LVX was released within one hour, while CAM showed sustained drug release for up to 24 hours. The thermal stability of drugs and polymers was evident from the Differential Scanning Calorimetry (DSC) result. Powder X-ray diffraction (PXRD) and DSC results showed a decrease in the crystalline behavior of drugs after FDM. The Fourier Transform Infrared Spectroscopy (FT-IR) data showed no significant interactions between drugs and polymers after incorporation in the final formulation.

Conclusion: This work illustrated the potential applications of

HME and FDM in the formulation of customized drug delivery systems to fulfill the individualized needs of the patients on age of Pakistani patients.

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Designing and Synthesis of 2-Mercaptobenzimidazole Derivatives to Identify Potential Anti-Hyperglycemic Agents Through Computational Approach

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Article Info

Keywords:
Alpha-glucosidase, dipeptidyl peptidase 4, diabetes, molecular dynamic simulations, MM-GBSA

Abstract

Background: One of the most widespread diseases recognized all over the world is diabetes, accounting for 1.5 million deaths each year.

Objectives: To identify anti-hyperglycemic agents acting through various mechanisms in the diabetes pathway.

Methods: This study is focused on designing and synthesis of new derivatives of 2-mercaptobenzimidazole and their molecular dynamic studies to ascertain the binding interactions against α-glucosidase, PPaR-γ, DPP-IV and AMPK. One-pot synthesis of derivatives is also reported.

Results: Most of the designed compounds (A-10 = -10.5 Kcal/mol) showed significantly greater binding affinity with PPaR-γ as compared to the standard pioglitazone (-9.1 Kcal/mol). B-23 exhibited a binding affinity of -9.6 Kcal/mol with PPaR-γ and 5.21 Kcal/mol with AMPK and was subjected to MD simulations which showed a good stability profile.

Conclusion: The study of binding interactions revealed the potential to further optimize the interactions by designing hybrids at different sites.

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Remdesivir as Potential Treatment for Severe Coronavirus Disease (COVID-19)

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Article Info

Keywords:
COVID-19, Remdesivir, Mortality.

Abstract

Objective: To check the time to recovery (Remdesivir effect on the hospital stay of COVID-19 diseased patients) and the Remdesivir-related mortality rate of COVID-19 patients in the placebo group.

Methodology: We conducted a retrospective, observational single centered study of intravenous Remdesivir in adults who were hospitalized with COVID-19 disease. Patients whose saturation was less than 94% and early diagnosed cases, were assigned to receive Remdesivir ,200 mg loading dose on day 1st, followed by 100 mg daily for up to 4th or 9th additional days.

Results: Two groups were similar in age but there was a difference in gender distribution. The Remdesivir group was more hypoxic i.e. ≤94% saturation. COVID Pneumonia was found in most of the cases. Median length of hospital stay was 8.0 days in the RDV group compared to 4.0 days in the RDV group (p=0.329). There was a difference in mortality (RDV 16.12 % vs. 27.53% in non-RDV) between the two groups (p=0.18).

Conclusions: Our data show that Remdesivir has no effect in shortening the time to recovery in adults who were hospitalized with COVID-19 disease. However, it improves the Health status of COVID-19 patients with reduced mortality.

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Formulation and Characterization of Neem (Azadirachta Indica) Oil-Loaded Phospholipid Vesicles and Evaluation of Wound Healing Capability

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Article Info

Keywords:
Formulation, Characterization Neem oil, Loaded phospholipid, Vesicle, Wound healing capability.

Abstract

Background: Study Design: Neem oil is a natural less toxic alternative to synthetic formulations containing antimicrobial and healing properties.

Study Design: Preparation: Neem leaves were collected and processed to extract the active compounds by a sonication method to produce neem extract-based phospholipid containing nanoparticles. Characterization: The size, shape, and stability of the neem nanoparticles were determined using dynamic light scattering and transmission electron microscopy techniques.

Toxicity Assays: The toxicity of the neem nanoparticles was evaluated using a cell-based assay on human skin fibroblasts. The cells were treated with increasing concentrations of the neem nanoparticles and we observed cell viability and morphological changes.

Wound Healing Study: The effectiveness for wound healing was evaluated in a murine model. The mice were induced with a wound on their backs, and the neem nanoparticles were applied topically to one group of mice while the control group received saline. The wound healing process was monitored and compared between the two groups.

Results: The sonication method was successful in producing neem nanoparticles with an average size of 50 nm and a spherical shape and stable in aqueous solutions. The size and shape were found to be uniform and stable over time. The resulting nanoparticles showed a mean size distribution around 400 nm polydispersity < 0.2 and were stable for 120 days. The results of the toxicity assays showed that the neem nanoparticles were not toxic to human skin fibroblasts at the tested

	concentrations. No significant changes in cell viability or morphological changes were observed. The results of the wound healing study showed that the neem nanoparticles were effective in promoting wound healing and showed faster healing compared to the control group, with a significant reduction in wound size and improved tissue regeneration. Conclusion: Neem extract-based nanoparticles are a promising alternative for drug delivery, and wound healing applications, non-toxic and effective for promoting wound healing.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Synthesis, Characterization, and In-Vitro Evaluation of pH-Responsive PEI-MAA Polymeric Matrices Decorated with Mesalazine For Colonic Delivery

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Article Info

Keywords: Characterization, In-Vitro Evaluation, MAA Polymeric Matrices, Mesalazine, Colonic Delivery.

Abstract

Background: Colorectal drug delivery systems (CR-DDS) have served as efficient carriers for increasing the availability of various drugs in the colon region and are desirable to treat local diseases such as ulcerative colitis (UC), irritable bowel syndrome (IBS), and CRC.

Objective: To synthesize polyethyleneimine-co-methacrylic acid pH-responsive hydrogels through free radical polymerization technique using ammonium persulfate as reaction initiator and mehtylenbisacrylamide as a crosslinking agent.

Methods: The structure of PEI-MAA hydrogels was characterized by FT-IR, change in crystallinity was determined through X-ray diffractometry (XRD) while surface and micromorphology were determined through scanning electron microscopy (SEM). The hydrogels were subjected to a variety of tests including estimation of gelation time, sol-gel analysis, swelling experiment, drug loading and in-vitro drug release study. FTIR confirmed successful crosslinking of PEI with MAA as well as mesalazine entrapment.

Results: The gel fraction was directly affected by an increase in the concentration of PEI (87.49%–90.35%), MAA (91.29%–92.40%) and MBA (93.77%–96.09%). The hydrogels were more responsive to alkaline pH and higher swelling indices were observed for formulations of PEI (10.28–9.23), MAA (12.79–14.42) and MBA (7.88–5.01) at pH 7.4 in comparison with acidic pH where the obtained values for polymer, monomer and crosslinker were (2.02–2.48), (3.14–2.71), (2.21–1.73) respectively. Drug entrapment was decreased with an increase in the concentration of PEI (72.9%–67.8%) and MBA (64%–57.4%) while

MAA displayed an inverse behavior (73.2%◎ 77.3%). while displaying an inverse effect. The drug release followed the swelling pattern and there was a decrease in drug release at pH 7.4 with an increase in the concentration of PEI (86.03%–79.02%) and MBA (85.22%–76.42%) while MAA showed an increase in drug release (87.10%–92.61%).

Conclusion: The drug release pattern followed the Korsmeyer-Peppas model that displayed diffusion correlated with polymer chain relaxation and hydrated matrix. Based on the obtained results, PEI-MAA pH-responsive hydrogels could be a potential carrier for the colonic delivery of various hydrophilic drugs.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Preparation, Optimization and In-vitro Characterization of Simvastatin Loaded Microspheres by Using Box-Behnken Design

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Article Info

Keywords:
Simvastatin, Microspheres, Box-Behnken.

Abstract

Background: Simvastatin is an HMG-CoA reductase inhibitor used for the treatment of hyperlipidemia. Simvastatin has a half-life of 4.85 hours and it requires frequent dosing depending on the severity of the disease.

Objectives: The present study was performed to Prepare, Optimize, and Characterize the Simvastatin Loaded Microspheres (SLM) using a design expert (Box-Behnken) as a statistical tool.

Methods: Simvastatin-loaded microspheres were prepared using oil in water (O/W) solvent evaporation (ESE) technique. A design expert (Box-Behnken) was employed to explore the effects of polymer concentration, speed of stirring, and concentration of PVA on required responses including Percentage yield (F1) and particle size (F2). E.E (F3) and Percentage cumulative drug release (F4) from microspheres were the required responses to study the effects of individual factors and their possible responses on each other. A total of 17 formulations were prepared.

Results: SEM and optical microscope revealed the spherical morphology of prepared microspheres. The percentage yield was found in the range of 70%-89.5% and formulation SLM 4 showed the maximum particle size of 91.23 μm. The FT-IR studies revealed that there was no interaction between drug (simvastatin) and polymer (Eudragit E 100). E.E. varied from 68.7%-94.5%. The cumulative drug release of drug from microspheres comes with the range of 75.24%-92.34% after 24 hours and gives sustained release behavior. The drug release

from microspheres followed the approximately first-order kinetics (R2 = 0.939) and Korsmeyer-Peppas model with a non-Fickian diffusion mechanism.
Conclusion: Simvastatin loaded microspheres have received a long-term, pH-dependent release. This can improve Simvastatin's therapeutic efficacy for better hyperlipidemia management and improved patient compliance.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Evaluation of Permeation Enhancement Effect of Different Natural Oils on Transdermal Permeation of Curcumin from Nanoemulgel Formulations

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Article Info

Keywords:
Evaluation, permeation enhancement effect, transdermal permeation, curcumin, nanoemulgel

Abstract

Background: Curcumin, being a versatile natural drug, possesses multiple pharmacological activities, which are significantly limited by its reduced water solubility and rapid biotransformation.

Objectives: This project proposes to develop and evaluate curcumin-loaded nanoemulgel formulations with added different natural permeation enhancers to evaluate their ability to facilitate skin drug penetration of curcumin.

Methods: Three nanoemulsion formulations (NEG-1, NEG-2, and NEG-3) were developed via a high-speed homogenization technique with three different essential oils (olive, clove, eucalyptus oil) as oil phase, while tween-80 and PEG-400 were used as surfactant and co-surfactant. It proceeded by converting nanoemulsions into nanoemulgel using carbopol 940 as a polymer and triethanolamine as a gelling agent. All formulations were characterized for polydispersity index, droplet size, zeta potential, pH, viscosity, spreadability, drug content, in vitro drug release using Tuffryn® membrane as a barrier and ex-vivo skin permeation using rat abdominal skin as a barrier between the receiving and donor compartments of the Franz diffusion cell.

Results: The study indicated that the size of nanoemulsions was in the range of 211 ± 5 and 270 ± 6, with the smallest size observed for NEG-3, with PDI values in the range of 0.247 ± 0.02 to 0.323 ± 0.02. The overall surface charge of all formulations was negative, which is envisaged to help penetrate the drug into the

skin due to mutual repulsion between the formulation entity and negatively charged skin intercellular lipids. The pH (6.47 ± 0.1), viscosity (8673 ± 105 cp), and spreadability (23 ± 0.7 g.cm/sec) were all optimal regarding topical applications. All formulations released 80% of the cumulative drug within 12 hours of the experiment, while ex-vivo permeation analysis revealed that NEG-3 was able to permeate significantly higher drug (student's t-test, $p<0.05$) across rat skin compared to NEG-1 and -2.
Conclusion: The study concluded that eucalyptus oil was able to permeate significantly higher drugs across the skin, compared to olive and clove oils, and the NEG-3 is envisaged to promote skin drug permeation of curcumin for local treatment of different skin pathologies.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Design, Synthesis and Pharmacological Investigation of Novel 2-Mercaptobenzimidazole Derivatives as Anti Ulcer Agents

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Article Info

Keywords:
Ulcer, Drug discovery, Molecular docking, Lipinski's Rule, Carbonic Anhydrase

Abstract

Background: Ulcer may develop at any area of the elementary canal including the esophagus, stomach, duodenum or other. Any imbalance leads to destruction of mucosal lining of gastrointestinal tract resulting in peptic ulcer. The unique structural features of benzimidazole and a wide range of biological activities of its derivatives made it a privileged structure in drug discovery.

Objective: Primary objective of this study to design, Synthesis and pharmacological investigation of Novel 2-Mercaptobenzimidazole Derivatives as Anti-Ulcer Agents

Methods: 20 different chalcones were prepared by reacting substituted aldehydes with ketones, these chalcones were condensed with benzimidazole-pyrazole hybrids to give final products (M3a–M3t). Docking and In-silico studies were done by utilizing AutoDockVina and online tools (SWISS ADME). The chemical structures of 2-mercaptobenzimidazole derivatives were confirmed by FTIR, 1HNMR and 13CNMR spectroscopic data.

Results: Molecular docking studies were carried out to predict the binding affinities and interactions of the synthesized compounds with target proteins CA-II (PDB ID: 1A42), and H+ /K+ -ATPase (PDB ID: 5YLU). These derivatives were screened for In-vitro antioxidant potential (DPPH), CA-II, ex-vivo H+ /K+ ATPase assay and in-vivo ethanol-induced gastric ulcer in rats among these M3e, M3i and M3m showed promising results (IC50 = 17.76 μM, 20.73 μM and 30.69 μM), M3e and M3m showed significant results (IC50 = 41.49 μM and 27 μM), M3i and M3m showed enhanced activity 38.82± 3 and 42.45± 2.52.

The compounds M3e, M3i, and M3m exhibited maximum anti-ulcer activity and reduced the ulcer region by, 68 ± 3%, 74 ± 5%, 81 ± 5% respectively.
Conclusion: Results support that compounds M3e, M3i, and M3m have potent anti-ulcer and antioxidant activities.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Inflammation Targeted Nano-Drug Delivery System for Ulcerative Colitis Therapy

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Article Info

Keywords:
Zo-polyurethane, methacrylate copolymer, budesonide, nanoparticles, colitis

Abstract

Background: Ulcerative colitis (UC) is a chronic persistent idiopathic inflammatory condition of the large intestine that affects millions of people worldwide. Conventional therapeutic dosage forms are available to treat UC but most of them have limited efficacy because of problems related to reduced drug solubility, less drug availability at inflamed sites, and systemic toxicity. Nanotechnology-based drug delivery systems have the potential to accumulate and gather in the colon tissues experiencing inflammation due to a phenomenon called "epithelial enhanced permeability and retention effect" ultimately leading to improved therapeutic efficacy and localized and targeted therapy, which increases the local bioavailability and reduces systemic toxicity.

Objective: The primary objective of this study is to inflammation targeted nano-drug delivery system for ulcerative colitis therapy

Methods: We prepared budesonide-loaded dual-sensitive nanoparticles using enzyme-sensitive azo-polyurethane and pH-sensitive methacrylate copolymer for the treatment of colitis. The therapeutic potential of the enzyme/pH dual-sensitive nanoparticles was evaluated using a rat colitis model and compared to single pH-triggered nanoparticles.

Results: Clinical activity scores, colon/body weight ratios, myeloperoxidase activity, and proinflammatory cytokine levels were markedly decreased by dual-sensitive nanoparticles compared to single pH-triggered nanoparticles and budesonide solution. Moreover, dual-sensitive nanoparticles accumulated selectively in inflamed segments of the colon. In addition, dual-sensitive nanoparticle plasma concentrations were lower than

single pH-triggered nanoparticles, and no noticeable in vitro or in vivo toxicity was observed.
Conclusion: Our results demonstrate that enzyme/pH dual-sensitive nanoparticles are an effective and safe colon-targeted delivery system for colitis therapy.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Therapeutic potential of Benzimidazole derivatives in Diabetes-induced Peripheral Neuropathy in Mice

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Article Info

Keywords:
Diabetic neuropathy, Benzimidazole derivatives, Enzyme-linked immunosorbent assay

Abstract

Background: Diabetic peripheral neuropathy (DPN) is a common chronic complication of diabetes mellitus. It leads to distressing and expensive clinical sequelae such as neuroinflammation, increased pain sensitivity, amputation, and neuropathic pain (painful-DPN). Previous studies have shown that benzimidazole derivatives have assemble significant attention for their multifaceted pharmacological properties including analgesic and anti-inflammatory potential.

Objectives: The objectives of the current study were to inquire the potential of newly synthesized benzimidazole derivatives against diabetes-induced peripheral neuropathy.

Methods: The current study was designed to synthesize and characterize benzimidazole derivatives and to reconnoiter their pharmacological profile via ameliorating multiple indices of neuropathy in the streptozotocin-induced mouse model of type 1 diabetes mellitus. Mechanical allodynia and hot plate tests were used to evaluate diabetes-induced pain hypersensitivity. Moreover, enzyme-linked immunosorbent assay (ELISA) was performed to explore the underlying mechanism of benzimidazole derivatives. The binding affinities of recently synthesized benzimidazole derivatives to protein targets were ascertained by molecular docking studies.

Results: The results showed that streptozotocin-induced pain hypersensitivity was significantly suppressed by administering benzimidazole derivatives in diabetic mice. Moreover, benzimidazole derivatives promisingly decreased streptozotocin-induced biochemical changes. The benzimidazole

	derivatives show strong binding affinities towards various protein targets. Conclusion: The benzimidazole derivative could be a potential therapeutic agents against streptozotocin-induced diabetic neuropathy.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Anti-nociceptive effects of magnolol via inhibition of TRPV1/P2Y and TLR4/NF-κB signaling in a postoperative pain model

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Article Info

Keywords:
Post-operative pain, PC12 cells, Magnolol, TRPV1, P2Y; NF-κB

Abstract

Objective: The current study explored the antinociceptive activity of magnolol in post-incisional inflammatory nociceptive pain.

Methods: Preliminary, the anti-inflammatory, antioxidant, and cytoprotective potential of magnolol were confirmed against hydrogen peroxide (H2O2)-induced PC12 cells. Next, an in-vivo model of planter incision surgery was established in BALB/c mice. Tramadol 50 mg/kg intraperitoneal (i.p.) and magnolol (0.1, 1, 10 mg/kg i.p. + 10 mg/kg intra planter) were administered after plantar incision surgery and behavior parameters were measured.

Results: The results indicate that magnolol significantly suppressed post-incision-induced mechanical allodynia, thermal hyperalgesia and paw edema. Magnolol promisingly inhibited post-incision induces nitric oxide (NO), malondialdehyde (MDA), eosinophil peroxidase (EPO) and neutrophil infiltration. Magnolol strongly attenuated post-incision inducing the release of tumor necrosis factor-α (TNF-α), interleukin-1β (IL-1β) and inhibited deoxyribonucleic acid (DNA) fragmentation. Magnolol markedly down-regulated post-incisional increase expression of transient receptor potential vanilloid 1 (TRPV1), purinergic (P2Y) nociceptors as well as toll-like receptor 4 (TLR4), nuclear factor kappa light chain enhancer of activated B cell (NF-κB), cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase

(iNOS) while upregulating the expression of inhibitor of nuclear kappa B alpha (IκB-α).
Conclusion: The present study strongly suggests that magnolol significantly suppressed post-incisional inflammatory nociceptive pain by targeting TRPV1/P2Y and TLR4/ NF-κB signaling.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Liquid-Liquid Microextraction Based Deep Eutectic Solvent New Method Development of RP-HPLC for Determination of Celecoxib in Tablets Formulation and Waste Water Sample.

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Article Info

Keywords:
Micro extraction, DES, HPLC, Celecoxib, tablet formulation, wastewater

Abstract

Background: The research work is very sensitive and effective of the RP-HPLC method for the determination of trace analysis celecoxib based on deep eutectic solvent in tablet formulation and wastewater samples. Celecoxib is used to treat osteoarthritis-related pain, discomfort, edema, and stiffness.

Objectives: RP-HPLC method development for the determination of quantitative study using green chemistry approach.

Methods: As per ICH guidelines the developed method was optimized and validated all analytical parameters and various process conditions. Many deep eutectic solvent systems were optimized and evaluated including choline chloride (ChCl) + citric acid, choline chloride (ChCl) + urea, and choline chloride (ChCl) + phenol tested at different molar ratios before it was measured here.

Results: Optimization studies showed that the best performance results were obtained on choline chloride (ChCl) + phenol 1:2 ratio and while at pH 8 phosphate buffers were found maximum results. The optimum volume of organic solvent (Chloroform) was the best solubility and DES, 2mL, and 2 mL respectively. In the validated methods all analytical parameters such as Percent recovery 98.0% and precision were found as RSD values less than < 2% the inter-day and intermediate-day results were found 1.12% and 1.06% respectively. The method found a linear range between 0.01 and 0.04 mg/mL while the best identification and quantification LOQ and LOD values were obtained at 0.0.1 and 0.39 mg /L respectively.

Conclusion: The present research work was successfully applied

to real samples for the traces of celecoxib in tablet formulation and wastewater samples using a green chemistry approach.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Biosynthetic Silver Nanoparticles against Gastric Cancer Cells and Enhance the Therapeutic Effect of 5-Fluorouracil

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Article Info

Keywords:
Gastric cancer, biosynthetic, chemotherapeutic drug; therapy, proliferation, migration; invasion, mechanism

Abstract

Background: Gastric cancer (GC) is the fourth leading cause of cancer death worldwide. Silver nanoparticles (Ag-NPs) have been increasingly used in the diagnosis and treatment of cancer due to their physicochemical properties.

Objectives: This study investigated the role of a kind of biosynthetic silver nanoparticle (b-Ag) in the development of GC, the enhancement of 5-fluorouracil (5F), and its mechanism.

Methods: X-ray, transmission electron microscopy (TEM), and UV absorbance were used to detect the characterizations of AgNPs. CCK8, Colony formation and a Transwell assay were performed to confirm the malignant behaviors of GC. DCFH-DA and DHE were used to detect intracellular reactive oxygen species (ROS). Quantitative reverse transcription polymerase chain reaction (qRT-PCR) was used to detect the mRNA expression of apoptosis-related genes. (3) Results: Compared with the chemosynthetic silver nanoparticles (c-Ag), b-Ag had a stronger cytokilling effect, and it had a better inhibition on the malignant phenotype of GC when combined with 5F. The b-Ag increased the expression of Bax and P53 while decreasing the expression of Bcl2. It also promoted the generation of intracellular ROS.

Conclusions: By promoting cell apoptosis and increasing intracellular ROS, b-Ag inhibited the development of GC and enhanced the inhibition of 5F on GC.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Impacts of Plasmonic Photothermal Therapy on Litchi chinensis Sonn. Nanostructures

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Article Info

Keywords:
Green nanoparticles, silver-selenium, cytotoxic, plasmonic

Abstract

Background: The phytochemical components of litchi possess therapeutic benefits in addition to being used as stabilizers and reducing agents in the production of nanomaterials.

Objectives: In this study, we report the biosynthesis of Silver, Selenium, and Silver- Selenium nanoparticles by using Litchi chinensis (Sonn) seed extracts and cytotoxicity response of respective nanoparticles in combination with Plasmonic Photo Thermal Therapy.

Methods: Biogenic nanoparticles formation was characterized by UV-visible spectrophotometry, scanning electron microscopy with energy dispersive X-ray spectroscopy, and thermogravimetric analysis. The cytotoxic effect of biogenic nanoparticles with and without photothermal effects was studied by CCK8 antineoplastic assay. The apoptotic inducing ability of the biogenic nanoparticles and/or PTT was investigated by Propidium Iodide staining, Bax/Bcl-2 gene expression analysis using RT- PCR and western blotting.

Results: The mean particle size of biosynthesized nanoparticles was found 18–78 nm with polydispersity. The thermogravimetric analysis demonstrated that lychee seed extracts existed on the surface of biogenic nanoparticles.These results clearly indicate the successful formation of biogenic NPs for cellular uptake. Biogenic nanoparticles and PTT (1.0 W cm−1) showed significant cell death, expression of Bax and suppression of Bcl-2.

Conclusions: Significantly, biosynthesized nanoparticles showed a broad-spectrum anticancer activity with PTT therapy and therefore represent promoting ROS generation by modulating mitochondrial apoptosis induction in PANC-1 cancer cells.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Prescribing Practices at a Tertiary Healthcare Setting of Islamabad, Pakistan: A Descriptive Cross-Sectional Study

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Article Info

Keywords:
Prescribing practices, tertiary healthcare facility, WHO/INRUD, Core Indicator

Abstract

Background: Inappropriate drug utilization poses significant challenges, contributing to treatment inefficacy, antibiotic resistance, and adverse effects, particularly in developing countries like Pakistan. Previous examinations of prescription trends in Pakistan's healthcare system have uncovered widespread inappropriate practices, including polypharmacy, excessive use of analgesics, antibiotics, and injections, as well as overlooking drug interactions and prescription clarity.

Objectives: To investigate drug utilization patterns, guided by World Health Organization (WHO)/INRUD core drug use indicators and additional parameters, in a secondary healthcare hospital in Islamabad, Pakistan.

Method: Data collection occurred through random visits to the outpatient department (OPD) of the healthcare facility between December 2019 and March 2020. Prospective data collection from prescriptions and patient interviews yielded a total of 2290 prescriptions for analysis. Data analysis was conducted using SPSS software v23.0.

Results: The study found an average of 3.37 drugs prescribed per encounter, with polypharmacy positively associated with patient age. Only a small fraction (4.8%) of drugs were prescribed using generic names. Antibiotics were frequently prescribed (41.5%), while the proportion of injectable drugs (12.3%) remained within acceptable limits. However, essential prescription components such as diagnosis, dosage form, administration method, and therapy duration were frequently

absent. Approximately 87% of prescribed drugs were listed in the National Essential Medicines List, and 80% were available in the hospital pharmacy. Correct dosage information was present in only 30% of cases, and proper drug labeling was observed in just 20% of prescriptions.

Conclusion: The study reveals prevalent non-compliant prescribing practices, including polypharmacy, brand name preference, excessive antibiotic use, compromised prescription legibility and completeness, and inadequate patient counseling and drug labeling, within the secondary healthcare hospital of Islamabad, Pakistan.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Antimicrobial and Phytochemical Studies of Seriphidium Chitralense (Podlech) Y. R Ling. An Endemic Plant Species from Northern Pakistan

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Article Info

Keywords: Seriphidiumchitralense; Antimicrobial;Crude Extract; Phytochemical; DMSO

Abstract

Background: The northern regions of Pakistan are home to a diverse range of medicinal and herbal plants that still need to be well studied from a pharmacological and therapeutic perspective.

Objective: This study aims to assess the antimicrobial properties and conduct a phytochemical investigation of Seriphidium chitralense, a plant species native to Chitral, Pakistan. To achieve the study's objectives, the aerial parts of S. chitralense were evaluated for their antimicrobial activity using five different crude extracts: methanol, acetone, ethyl acetate, n-hexane, and aqueous extract.

Methods: The assessment was conducted against three Gram-positive bacteria (Enterococcus faecalis (ATCC 14506), Bacillus subtilis (ATCC 19659), Staphylococcus aureus (ATCC 6538), six Gram-negative bacteria (Escherichia coli (ATCC 25922), Enterobacter cloacae (ATCC), Pseudomonas aeruginosa (ATCC 27853), Vibrio cholera (ATCC), Shigella flexeneri (ATCC), Salmonella typhi (ATCC 14028)), and two fungal pathogens (Candida albicans (ATCC 2091) and Candida glabrata (ATCC 62934).

Results: The findings of our investigation demonstrated that the methanol and acetone extracts displayed the highest activity level against all bacterial and fungal strains. This was followed by the ethyl acetate and n-hexane extracts, which exhibited good to moderate activity. Conversely, the aqueous extract exhibited poor results against all the pathogenic organisms. Conventional antibiotics were employed as a positive control for bacteria and fungi. In addition, consecutive methanol and

	ethanol extracts of Seriphidium chitralense demonstrated a significant quantity of alkaloids, flavonoids, terpenoids, phenols, cardiac glycosides, cumarine, sterols, and tannins. Conclusion: However, the aqueous extract did not contain a significant fraction of the specific phytochemicals. Moreover, a comprehensive investigation is required to examine the diverse pharmacological characteristics of this plant and the extraction of bioactive chemicals that could catalyze advancements in drug development.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Awareness of Cosmetics' Adverse Effects among Pharm-D Students: A Nationwide Cross-sectional Study

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Article Info

Keywords:
Cosmetic adverse effects, Awareness, Public Health, Education, Consumer Safety

Abstract

Background: The rapid growth of the cosmetics industry has been raising concerns about cosmetic product safety. Pharm D students represent the future healthcare professionals who play a critical role in safeguarding public health. However, nationwide studies on their awareness levels regarding cosmetic Adverse Effects are lacking

.Objectives: To evaluate and enhance the awareness of Pharm D students regarding cosmetic adverse effects.

Methods: A nationwide cross-sectional study was conducted among Pharm D students enrolled across different academic years in all provinces of Pakistan. A 21-item self-administered questionnaire was distributed via Google Forms, where correct answers were shown after submission. 913 responses were collected across three months. A stratified sampling technique was employed to ensure equal representation of each province. Data was analyzed through SPSS and R studio.

Results: The mean awareness levels regarding cosmetic adverse effects among Pharm D students was 13.71 ± 4.92 (95% CI: 13.39-14.03) out of 20. The mean knowledge score of males was significantly lower than females (12.55vs14.11; Z=-4.521, p< 0.001). Statistically Significant differences were present between the awareness levels of students across different provinces (H = 44.865, df = 5, p< 0.001) and academic years (H = 36.019, df = 4, p< 0.001). Further, we found that the students of Punjab had significantly higher awareness levels as compared to Sindh and KPK with mean values of (14.45vs12.98 and 11.51; post-hoc Bonferroni; p<.0001).

Conclusions: The Pharm D students had moderate awareness regarding cosmetic adverse effects. However, further

	enhancements in the education of Pharm-D students are essential to uphold public health standards.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Kaempferol as a Dietary Anti-Inflammatory Agent: Current Therapeutic Standing

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Article Info

Keywords:
Kaempferol, inflammation, anti-inflammatory, phytochemicals, flavonoids, natural sources, molecular mechanisms.

Abstract

Background: Inflammation is a physiological response to various forms of damage, characterized by pain, redness, heat, and swelling. Current therapeutic strategies for inflammatory diseases often involve natural drugs containing phytochemical constituents, such as flavonoids found in fruits, vegetables, and herbal medicines.

Objective: This review aims to summarize the literature on the anti-inflammatory effect of kaempferol, a polyphenol abundant in natural sources, including its biological activities and molecular mechanisms of action.

Methods: A comprehensive search of literature databases was conducted to identify relevant studies focusing on the anti-inflammatory properties of kaempferol. Articles discussing its natural sources, chemistry, biosynthesis, oral absorption, metabolism, bioavailability, and therapeutic effects were included.

Results: Kaempferol exhibits significant anti-inflammatory efficacy both in vivo and in vitro. Its presence in various fruits, vegetables, herbal medicines, and plant-derived beverages underscores its potential as a natural remedy for inflammatory conditions. The molecular mechanisms underlying its anti-inflammatory effects are diverse and encompass multiple pathways.

Conclusion: Kaempferol emerges as a promising natural compound for the management of inflammatory diseases. This

review provides an updated overview of its anti-inflammatory properties, highlighting its potential therapeutic benefits and molecular mechanisms of action.

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Prevalence and Knowledge of Self Medication Practices among Medical Students of Women Medical and Dental College Abbottabad

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Article Info

Keywords:
Knowledge, self-medication, prevalence, medical students

Abstract

Background: Self-medication is "the use of medicine by the patient himself without being properly diagnosed by the authorized physician or intermittent or continual medication for chronic and recurrent diseases and clinical situations with a chronic picture"

Objectives: This study aims to determine the perception, knowledge and pattern of use of self-medication among undergraduate medical students of Women Medical College Abbottabad.

Methods: A descriptive cross-sectional study was carried out in Women Medical & Dental College students in all professional years of MBBS. A pre designed questionnaire was implemented among two hundred students by simple random sampling. Data were analyzed by SPSS-23 version through descriptive statistics, spearman correlation and binomial logistic regressions.

Results: The study's findings indicate that analgesics are the most frequently used self-medication, with antibiotics coming in second. Self-medication awareness was most commonly conveyed through family members and friends (65%), media

	(20%), books (10%) and miscellaneous (5 %). It was practiced mostly by 1st and 4thyear MBBS students, with a higher frequency of (65%) while only 35 % students were from 2nd, 3rd and final year MBBS. Adverse effects were: marked headache (40%), GIT disturbances (35%), sleep disturbances (15%) and miscellaneous (10%). Analgesics were available from online drug stores, while muscle relaxants were available through local pharmacies, anxiolytics and antibiotics were mostly received through friends and family, miscellaneous medicines are only available from online pharmacies Conclusion: Students should be educated on the effects of self-medication practices, particularly the rational use of analgesics and antibiotics.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Health-Related Quality of Life Among Senior Citizens among Elderly Population

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Article Info

Keywords:
Health, quality of life, elderly, population

Abstract

Background: Self-medication is "the use of medicine by the patient among women. Recurrent UTIs could significantly impact a woman's quality of life. Understanding the factors contributing to recurrent UTIs and exploring effective prevention strategies were crucial for managing this condition.

Objective: The primary objective of the study was to assess health-related quality of life and associated factors (gender, age, education, income, marital status, and expenses) that affect the quality of life among senior citizens in Islamabad, Pakistan.

Method: A community-based cross-sectional study was designed to assess the health-related quality of life among senior citizens in the territory of Islamabad, Pakistan. A convenient sampling technique was used to collect the data from 385 participants. A pre-validated tool SF-36 was used to collect the data. Data was clean-coded and analyzed by SPSS.

Results: The overall health-related quality of life score (55.79) was poor. Females had less quality-of-life score (50.84) as compared to males (59.74). Uneducated had a poor score (46.54) than educated (64.70). The age group (60-70 years) had a good quality of life score (60.07) as compared to the elder age groups (47.16). Married participants had a better quality of life score (57.67) than unmarried, divorced, and widowed participants (53.58, 46.85, and 47.39 respectively). Participants with low monthly income showed a low quality of life score (46.99) which was increased to (63.95) with an increment in monthly income. Financially independent participants had a better health-related quality of life score (59.44) as compared to those who were dependent on family (53.05) or government annuity (41.16).

Conclusion: These findings suggested the requirement for

	effective health promotion strategies to improve overall health status among the elderly. The health systems needed to be aligned to meet the needs of older people. Retirement age should be extended to 65 years of age.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Prevalence of Anemia and its Associated Risk Factor during the First Trimester: A Descriptive Cross-sectional Study from Deryans Community, A Descriptive Cross-Sectional Study

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Article Info

Keywords:
Maternal anemia, Nutrition, BMI, Poverty

Abstract

Background: Maternal anemia has become a global challenge for healthcare professionals. Of 0.1 million pregnant women, 147 maternal deaths occur in Pakistan. Anemia is one of the leading causes of maternal mortality and morbidity.

Objectives: The current cross-sectional study was conducted to assess the prevalence of anemia in the first trimester, through a convenience sampling technique at a maternity home located in Deryans community, from October 2020 to December 2020.

Methods: Minimum sample size, 382 participants were enrolled in the study, excluding pregnant women in the 2nd and 3rd trimesters. Descriptive and inferential statistics were applied to the data, and the chi-square and Kruskal Wallis test were applied to check the association.

Results: The results of the study depict 79.2% anemia among pregnant women, with 43.7% mildly anemic, 33.7% moderately anemic, and only 1.6% severely anemic. Gravidity ($p = .001$), parity ($p = .002$), poverty ($p = .001$), and poor nutritional habits were contributing factors associated with anemia. The most significant difference was observed among underweight women ($p = .001$) and women falling below the poverty line ($p = .001$). Respondents who fell below the poverty line had low body mass index and were suffering from severe anemia, reflecting deprivation of nutrition.

Conclusion: Nutritional interventions should include the provision of free nutritional supplementation and education to prevent the prevalence of anemia in the Deryan community.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Comparison between Available Pack Size of Eye and Ear Drops with Their Prescribing Pattern

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Article Info

Keywords: Pharmaceutical dosage forms, antibiotics, pack sizes, eye and ear infections, medication wastage

Abstract

Background: Pharmaceutical dosage forms are essential for treating various medical conditions, including eye and ear infections. However, inappropriate pack sizes of antibiotics used for such infections can lead to wastage, medication errors, and adverse outcomes.

Objectives: This cross-sectional study aimed to evaluate the appropriateness of pack sizes for antibiotics in eye and ear infections in Sahiwal, Punjab, Pakistan.

Methods: The study analyzed six commonly prescribed antibiotics for ear and eye infections including Ciprofloxacin, Moxifloxacin, Ofloxacin, Chloramphenicol, Tobramycin, and Sulfacetamide. Data were collected from November 2022 to February 2023, examining the frequency, duration of therapy, and strength of drugs mentioned on the leaflets of various brands from local pharmacies.

Results: A total of 28 most commonly used brands were analyzed. Out of 28 brands, 26 brands were significantly mismatched between prescribed dosages and available pack size strength. This resulted in potential medication wastage, financial burdens for patients, and challenges in accurate dosing and administration. Patients often had to purchase multiple packs to fulfill their needs, leading to unnecessary expenses and resource inefficiency.

Conclusions: This study highlights the importance of aligning pharmaceutical packaging with prescribed dosages to enhance patient outcomes and healthcare efficiency. Addressing the issue of inappropriate pack sizes can contribute to better management of eye and ear infections and mitigate the development of antimicrobial resistance. Implementing evidence-based

	recommendations in pharmaceutical packaging practices can lead to improved patient care and treatment outcomes.

Conference on Emerging Trends in Pharmaceutical Sciences 2024 (CETPS 24) May 11, 2024

Prescription Patterns of Anti-hypertensive Drugs in OPD of Fauji Foundation Hospital, Rawalpindi

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Article Info

Keywords:
Hypertension, Cost effectiveness, Antihypertensive Drugs, Prescribing Patterns, JNC Guidelines

Abstract

Background: Hypertension is a prevalent condition with complex interactions between socioeconomic culture, comorbidities, and medication prescribing patterns. Evaluating these factors is essential for optimizing treatment strategies.

Objective: This study aimed to analyze the socio-economic influence and cultural considerations among hypertensive patients, thus evaluating antihypertensive drug prescribing patterns at Fauji Foundation Hospital (FFH), considering potential influences of socioeconomic culture.

Methods: The methodology was based on a retrospective observational study designed to analyze prescribing patterns and medical management of hypertensive patients at Fauji Foundation Hospital, Rawalpindi which includes 100 OPD prescriptions of hypertensive patients with some comorbidities.

Results: The 50-60 year age group had the highest prevalence of hypertension with no comorbidities (35.29%). Losartan (ARB) was the most commonly prescribed class (37.1%), followed by combination therapy (13.4-15.5%). Xavor was the preferred brand of Losartan.

Conclusion: The study suggests potential issues with current prescribing practices at FFH. First, a focus on the Losartan brand "Xavor" might not be the most cost-effective approach as JNC guidelines emphasize generic medications. Additionally, the data doesn't reveal how often combination therapy was initiated without trying single-drug options first, potentially indicating overuse of this approach. These findings warrant further investigation to ensure optimal and cost-effective hypertensive treatment aligns with JNC guidelines.

The CETPS 24 brought together researchers, pharmacists, scientists,academicians, and industrialists to discuss the latest technologies, novel innovations, and recent advancements in the areas of Drug Discovery, Nanotechnology, Pharmacogenomics, Natural Products, Personalized Medicines, Pharmaceutical Biotechnology/Microbiology, Patient Safety/Clinical Studies, Novel Drug Delivery Systems, Pharmacokinetics Studies, and Pharmacology & Toxicology to make this conference a milestone for scientific excellence. By attending the conference, the participants had an opportunity to conduct face-to-face meetings with researchers to get real-time feedback on research ideas, discuss current challenges in their research and development, brainstorm a range of cutting-edge discussions related to the broad scientific discipline, and develop collaboration with researchers and the pharmaceutical industry. The participants got full access to all event presentations and conference materials. The organizing team of CETPS 24 looked forward to seeing the attendees at the Capital University of Science & Technology on May 11, 2024.

Conference on Emerging Trends in Pharmaceutical Sciences (CETPS 24)
Faculty of Pharmacy, Capital University of Science & Technology
May 11, 2024 | Islamabad Pakistan

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