Proceedings Book

CETPS 25
Conference on Emerging Trends in Pharmaceutical Sciences

The Book of Proceedings

Conference on Emerging Trends in Pharmaceutical Sciences 2025 (CETPS 25)

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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 25) on May 10, 2025, at the Capital University of Science & Technology. It is my great privilege to serve as a General Chair of CETPS 25. The Conference is organized by the Faculty of Pharmacy, Capital University of Science & Technology. The CETPS 25 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 25, Dr. Nadia Shamshad Malik, for her leadership and commitment to the conference. The CETPS 25 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 25
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 25
Faculty of Pharmacy
Capital University of Science & Technology

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Antimicrobial Stewardship- Need and Importance

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Article Info

Keywords:
Pharmacologica, Murraya Koenigii, Cisplatin, Nephrotoxicity.

Abstract

Background: Antimicrobial resistance (AMR) is a significant public health concern in Pakistan. Here's a snapshot of the situation:

Prevalence: Studies have shown high resistance rates to commonly used antibiotics, with some bacteria exhibiting resistance to last-resort treatments

Hence, antimicrobial stewardship is crucial in healthcare, promoting responsible use of antimicrobials to combat resistance, improve patient outcomes, and reduce healthcare-associated infections.

Effective stewardship programs optimize antimicrobial selection, dosing, and duration, minimizing adverse effects and resistance development.

By prioritizing antimicrobial stewardship, healthcare institutions can enhance patient safety, reduce morbidity and mortality, and mitigate the growing threat of antimicrobial resistance, ultimately preserving the effectiveness of these vital medications for future generations.

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Formulation and Evaluation of Methylsulfonylmethane Loaded Nano-Emulsion Specific for Arthritis

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Article Info

Keywords:
Formulation, Methylsulfonylmethane, Nano-Emulsion, Arthritis.

Abstract

Background: The hallmark of Alzheimer's disease (AD), a progressive neurodegenerative condition, is the buildup of amyloid-beta (Aβ) plaque, which is mainly caused by β-secretase 1 (BACE-1) activity. Background: Arthritis is a chronic inflammatory disorder that requires effective and targeted drug delivery systems to enhance therapeutic outcomes.

Objectives: This study aimed to develop and evaluate a polyvinyl alcohol (PVA)-stabilized nano-emulsion loaded with methyl sulfonyl methane (MSM) for improved solubility, stability, and transdermal absorption.

Methods: The nano-emulsion was formulated using an oil-in-water (O/W) technique and characterized for particle size, polydispersity index (PDI), zeta potential, viscosity, and drug encapsulation efficiency. The optimized formulation (F5) exhibited a nanoscale droplet size (98.4 ± 1.5 nm), low PDI (0.300), high encapsulation efficiency (93.7%), and stability over 90 days under controlled storage conditions.

Results: *In vitro* drug release studies demonstrated a sustained release profile, with F5 achieving 97.8% cumulative drug release over 24 hours. *Ex vivo* skin permeation and deposition studies confirmed enhanced transdermal delivery, with F5 showing the highest permeation (90.1%) and significant skin deposition. The skin irritation study indicated excellent biocompatibility, with minimal irritation comparable to normal saline. Furthermore, in vivo anti-arthritic evaluations using a Complete Freund's Adjuvant (CFA)-induced arthritis model demonstrated significant reductions in paw swelling

and joint inflammation, comparable to diclofenac treatment ($p < 0.05$). Conclusion: These findings suggest that PVA-stabilized MSM nano-emulsion offers an effective, biocompatible, and sustained-release transdermal drug delivery system for arthritis management. Further studies, including clinical trials, are recommended to validate its therapeutic potential for human applications.

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Nanomedicine-based Strategies for Targeting Tumor Microenvironment: Opportunities & Challenges

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Article Info

Keywords:
Nanotechnology,
Drug Delivery,
Tumor targeting.

Abstract

Background: Human struggle against deadly disease conditions is continued for ages. Nanotechnology has recently gained increased attention for its capability to effectively diagnose and treat various tumors.

Objectives: Investigating the antitumor potential of nanotechnology-based drug delivery systems.

Methods: A number of nanocarriers have been developed including Solid Lipid Nanoparticles (SLN), liposomes, polymeric nanoparticles, hybrid particles, magnetic nanocarriers, and gold nanoparticles. These nanoparticles were characterized in term of their particle size, PDI, Zeta potential and microscopy. *In vitro* release, kinetics of drug release and ex vivo behavior of the developed formulations were determined. Moreover, the antitumor potential of the developed formulations was checked in cell culture studies *in vitro*, followed the cell viability and cell uptake studies. Pharmacokinetic and anti-tumor efficacy studies of the developed formulations were investigated and compared with pure antitumor drugs *in vivo* using various animal models.

Results: Anti-tumor drug loaded nanomaterial formulations have shown excellent nanomaterial properties. They targeted delivery of various therapeutic agents. Moreover, the cancer targeting mechanisms and surface functionalization on nanocarriers showed excellent tumor targeting with reduced toxicities.

Conclusion: This extraordinary specific and selective nature of the nanomedicine is significant, and therefore, the modern

progressions in this arena is essential to be considered for a prosperous today and an affluent future.

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Fatty Acylated Histidine Arginine Peptides for siRNA Delivery to Silence STAT-3 in the Triple Negative Breast Cancer

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Article Info

Keywords:
siRNA delivery,
Cell Penetrating Peptides,
Breast Cancer,
Gene Silencing,
Gene Therapy.

Abstract

Background: A recent increase in the approval of nucleic acid therapeutics has received strong interest in the field. However, their clinical application needs a suitable delivery system. Cell-penetrating peptides (CPPs) are one of the promising candidates

Objectives: We hypothesized to synthesize a series of fatty acylated CPPs, NH2-K-(HR)4-CGKRK-CONH2 (CP-1), NH2-K(C18)-(HR)4-CGKRK-CONH2(Oleyl-P), NH2-K(C27)-(HR)4-CGKRK-CONH2(Chol-P),NH2-C-(HR)4-CGKRK-CONH2(CP2) and NH2-C(PEG)-(HR)4-CGKRK-CONH2(PEG-P), (where C18 is oleic acid, C27 is cholesterol and PEG is poly ethylene glycol) which contain cationic and hydrophobic residues to encapsulate siRNA and deliver it in the cells.

Methods: Solid Phase Peptide Synthesis, Cytotoxicity Assay, Serum Stability, Intracellular uptake of siRNA and gene silencing using Western blotting Assay were performed.

Result: Fatty acylated CPPs were synthesized using fmoc solid-phase peptide synthesis, followed by purification and characterization. The cytotoxicity profile of peptide-siRNA complexes was evaluated using cell viability assay, which demonstrated 100% cell viability up to 20 ÂµM in the selected breast cancer cell lines (MCF-7 and MDA-MB-231) and normal breast cells (MCF-10A). The gel retardation assay indicates that most peptides bind completely with siRNA at N/P ratio 5 and above. The serum stability data suggest that the peptides protect siRNA at N/P ratio 20 and above when incubated with 25% FBS for 24 h. Flow cytometry and confocal microscopy data reveal the significant uptake of Alexa-488 labeled siRNA into

the cytoplasm of breast cancer cells (MDA-MB-231 and MCF-7) with Oleyl-P and Chol-P. Western blotting data show that Oleyl-P caused 80% silencing of STAT-3 in MDA-MB-231, which was similar to commercially available lipofectamine, whereas Chol-P showed significantly more silencing of STAT-3 in comparison to lipofectamine($p < 0.05$).
Conclusion: The study reveals that oleyl and cholesterol conjugated CPPs serve as effective delivery vehicles for siRNA in breast cancer cell lines with significant silencing of STAT-3.

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Methods in Molecular Dynamics: Using Steered Molecular Dynamics to Understand Sustained Receptor-Ligand Interactions

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Article Info

Keywords:
Steered Molecular Dynamics, Non-equilibrium Dynamics, Protein-ligand Interactions.

Abstract

Background: Molecular Dynamics (MD) is a crucial method in Computational Biology for determining sustained interactions between receptor and its ligand, especially when assessing inhibitory activity of ligands or decoding pathways of receptor-ligand binding. Steered MD is one of the methods to determine the forces required to sustain this activity.

Objectives: The objective was to demonstrate the effectiveness of non-equilibrium MD for sustained protein-ligand interactions and binding pathways taken by ligands during inhibitory activity.

Methods: A receptor-peptide complex was prepared by implicitly placing the ligand at a distance from the receptor complex. After running 30ns of classical md the complex achieved stability of the complex was determined by the Root mean squared deviation (RMSD). The peptide was pulled towards the receptor using a constant pulling force of 1000kJ/mol. nm2, at a pulling rate of 0.01nm/ps, for 1ns into the surrounding aqueous environment. The same peptide was then pulled away from the receptor under similar conditions

Results: The RMSD of the pulling simulation and the analysis of interactions revealed the receptor residues crucial for sustained receptor-ligand binding.

Conclusion: SMD is a useful method that can lend critical insights into protein-ligand interactions and pathways taken by the ligand for reaching the binding sites.

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Activator protein 1 (AP-1) Complex in Antigen Presenting Cells Contributes to Salt-Sensitive Blood Pressure in Humans

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Article Info

Keywords:
Salt-sensitivity blood pressure, Antigen presenting cells, AP-1 complex.

Abstract

Background: Salt-sensitivity of blood pressure (SSBP) is an independent risk factor for cardiovascular morbidity and mortality. The activator protein 1 (AP-1) (FOS/JUN) have been implicated in activating the pro-inflammatory pathway, but its role in SSBP is unknown.

Objectives: We hypothesized that high salt activates the AP-1 signaling pathway and inflammation in antigen-presenting cells (APCs) and contributes to SSBP.

Methods: We conducted RNAseq analyses on human monocytes exposed to high salt in vitro. We enrolled patients with hypertension and phenotype them for salt sensitivity of blood pressure (SSBP) using an established inpatient protocol of salt-loading/depletion. We also adoptively transferred peripheral blood mononuclear cells (PBMCs) from salt-sensitive (SS) and salt-resistant (SR) hypertensive individuals into immunodeficient NSG mice treated with the high salt diet for three weeks; blood pressure was measured using tail-cup and radiotelemetry, followed by flow cytometry on immune cells of mice kidney and spleen.

Results: Our bulk RNA-sequencing data in human monocytes demonstrated that high salt increases the expression of the AP-1 gene family, compared to normal salt-treated monocytes. We

	observed expression of the e FOS genes changes in concert with blood pressure in salt-sensitive (SS) but not in salt-resistant (SR) patients. Compared to normal salt, high salt-induced a significant increase in the expression of FOS-JUN genes in monocytes of the spleen. Conclusion: These findings disclose the role of the AP-1 gene family in salt-sensitive hypertension and may provide a potential therapeutic target for the treatment and diagnosis of SSBP.

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Synthesis, Characterization (*In vitro* & *In-Vivo*) and Evaluation of Cefoperazone/Sulbactam loaded Chitosan/Polyvinyl Alcohol Nano-Fibers for Effective Management of Chronic Infected Skin Wounds

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Article Info

Keywords:
Antibacterial, chitosan, Electrospinning, Nano fibers, Wound healing.

Abstract

Background: Combating bacterial resistance intervening in the management of chronic infected burn wounds.

Objective: Synthesis and dual *in-vitro* and *in-vivo* characterization of Cefoperazone (CPZ) and Sulbactam (SBT)-loaded chitosan (CS)/poly (vinyl alcohol) (PVA) NFs (CS/PNFs) via electro-spinning method for efficacious recovery of chronic infected burn wounds. Method: CPZ and SBT-loaded chitosan/poly vinyl alcohol nano-fibers (CS/PNFs) were successfully synthesized by electro-spinning method followed by its *in-vitro* characterizations via SEM, FTIR, XRD and UV-Visible spectroscopy. The composite fibers were also characterized for in-vitro antibacterial activity against clinically isolated strains of Staphylococcus aureus. The synthesized Nano-fibers were evaluated for in-vivo burn wound healing capabilities (rabbit wound models) via percentage wound closure and histopathological assessment.

Results: Morphological analysis confirmed the arrangement of randomly oriented, smooth, elongated, cylindrical fibers exhibiting beaded appearance with no clumps however, drug loading caused reduction of fibers diameter and enhancement of beaded appearance. Structural analysis ensured successful drug loading along with crystalline nature of nanocomposite system. Drug release analysis presented burst release pattern (> 50% release in 2 h) with release mechanism following First order kinetics. Nanofibers indicated excellent antibacterial activity

against S. aureus particularly F5 (ZOI = 15mm). Rapid wound closure with respect to negative (untreated) and positive control (QuenchÂ®) was observed from the developed films indicated via formation of dense granulation tissue, complete epidermal regeneration, neovascularization, reformed collagen, folliculitis and presence of sebaceous glands via histopathological analysis.
Conclusion: In current study CPZ and SBT-loaded CS/PVA NFs were developed as promising antibacterial wound dressing material for accelerated healing of chronic infected burn wounds.

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Arjunolic Acid Modulate Pancreatic Dysfunction by Ameliorating Pattern Recognition Receptor and Canonical Wnt Pathway Activation in Type 2 Diabetic Rats

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Article Info

Keywords:
Arjunolic acid, Type 2 diabetes mellitus, TLR-4, Wnt, insulin signaling.

Abstract

Background: Arjunolic acid (AA) is a potent phytochemical with multiple therapeutic effects. In this study, AA is evaluated on type 2 diabetic (T2DM) rats to understand the mechanism of β-cell linkage with Toll-like receptor 4 (TLR-4) and canonical Wnt signaling. However, its role in modulating TLR-4 and canonical Wnt/β-catenin crosstalk on insulin signaling remains unclear during T2DM.

Objectives: The current study is aimed to examine the potential role of AA on insulin signaling and TLR-4-Wnt crosstalk in the pancreas of type 2 diabetic rats.

Method: Multiple methods were used to determine molecular cognizance of AA in T2DM rats when treated with different dosage levels. Histopathological and histomorphometry analysis was conducted using Masson trichrome and H&E stains. While, protein and mRNA expressions of TLR-4/Wnt and insulin signaling were assessed using automated Western blotting (jess), immunohistochemistry, and RT-PCR.

Results: Histopathological findings revealed that AA had reversed back the T2DM-induced apoptosis and necrosis caused to rats' pancreas. Molecular findings exhibited prominent effects of AA in

downregulating the elevated level of TLR-4, MyD88, NF-κB, p-JNK, and Wnt/β-catenin by blocking TLR-4/MyD88 and canonical Wnt signaling in diabetic pancreas, while IRS-1, PI3K, and pAkt were all upregulated by altering the NF-κB and β-catenin crosstalk during T2DM.

	Conclusion: Overall results, indicate that AA has potential to develop as an effective therapeutic in the treatment of T2DM associated meta-inflammation. However, future preclinical research at multiple dose level in a long-term chronic T2DM disease model is warranted to understand its clinical relevance in cardiometabolic disease.

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Pharmacological Evaluation of *Murraya Koenigii* in Cisplatin Induced Nephrotoxicity

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Article Info

Keywords: Pharmacologica, Murraya Koenigii, Cisplatin, Nephrotoxicity.

Abstract

Background: Customary medicines are used worldwide. Every drug has basic pharmacokinetic parameters, and renal clearance is an integral part of modern-day Pharmacology. During these elimination pathways, these drugs have some nephrotoxic effects. In modern pharmacological, researches exploration of new drugs/chemicals are blessings those have nephroprotective potential.

Objectives: In current standings, we planned to explore nephroprotective potential of *Murraya koenigii* a commonly used plant in houses.

Methods: Ethanolic extract of *Murraya koenigii* (MK) was set up by three days maceration took after by the ensuing dissipation utilizing rotary evaporator under reduced pressure. Rats were separated into four groups (six animals each). The normal group received normal saline and group 2, 3 and 4 was injected cisplatin (5mg/kg i.p) on day 1. Group 1 and 2 received normal saline throughout the period while group 3 and 4 received different doses of extract of MKi.e.200mg/kg and 400mg/kg. Blood samples were collected by retro-orbital method on alternative days such as day 0, 7, 14 and 21 throughout the study and plasma was separated for the analysis of renal biomarkers. At the end of the study one animal from each group was sacrificed and kidneys were preserved for histopathological examination. The data was analyzed analytically by using one way ANOVA.

Results: Nephrotoxicity is initiated by solitary dosage of cisplatin (5mg/kg i.p) that was biochemically showed by escalation in body weight, kidney weight, plasma creatinine

absolute sodium and potassium values while the cisplatin cause a decrease in plasma sodium and potassium. Administration of different doses of MK extracts (200mg/kg and 400mg/kg) creates huge assurance against nephrotoxicity caused by cisplatin. Weight loss was observed due to gastrointestinal toxicity and by reduced ingestion of food. Improvement in body weight was measured and improvement was seen in groups treated with MK as compared to intoxicated one and increase in body weight of rats in a dose dependent fashion and statistically significant as compared to control one. However, the majority of these progressions were mitigated by treatment with ethanolic extract of MK dose and time dependent. The improving impact was further obvious through diminished histopathological modifications of kidney tissues in the groups treated with MK. In addition, extreme tubular and glomerular degeneration alongside putrefaction was seen in cisplatin treated group when contrasted to control group. These histopathological changes were ameliorated in MK treated rats as compared to control group.

Conclusion: Study concludes that crude extract of *Murraya koenigii* possess the preventive effect against cisplatin induced nephrotoxicity in rats. In any case, additionally ponders are urged to investigate the unthinking premise of *Murraya koenigii* for its defensive impact against kidney.

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Wound Healing Activity of Metformin Hydrogel on Diabetic Foot

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Article Info

Keywords:
Diabetic wounds, hydrogels, sodium alginate, sodium carboxymethyl cellulose

Abstract

Background: Wound healing is a complex, critical event that is often impaired in diabetic situations due to hyperglycemia, increased inflammation, and reduced cell proliferation.

Objective: This study aimed to investigate the in vitro and ex vivo wound healing potential of MET-HCl hydrogels based on sodium alginate (NaAlg) and sodium carboxymethyl cellulose (CMC) through pharmacological characterization and clinical analysis.

Methods: "The pH stability, drug retention capacity, viscosity, spread ability and skin irritation of the prepared hydrogels were determined at room temperature and refrigerated condition.

Diabetic foot wound healing activity was assessed through following parameters, Wound area measurement, C reactive protein test and histopathological analysis of experimental rats".

Results: showed that MET-HCl hydrogels significantly enhanced the level of wound contraction and epithelial regeneration as compared to the control treatments. The serum level of CRP, an inflammatory marker, was also reduced in the treated groups, further supporting the anti-inflammatory effect of MET-HCl. Histopathological studies supported the findings by showing that the formulations of NaAlg-MET-HCl stimulated better granulation tissue formation, angiogenesis, and cellular proliferation.

Conclusion: The results suggested that MET-HCl hydrogels will be a potential treatment for diabetic wounds. Diabetic, wounds, hydrogels, sodium alginate, sodium carboxymethyl cellulose.

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Oral Delivery of Dihydroartemisinin-Piperaquine Fixed-Dose Combination Via Lipid Based Nanoparticle: A Promising Strategy against Malaria

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Article Info

Keywords: Dihydroartemisinin, Piperaquine, Nanostructured Lipid Carriers, Fixed-dose Combination, Malaria.

Abstract

Background: The fixed-dose combination of Dihydroartemisinin (DHA) and Piperaquine (PQ) is widely used in artemisinin-based combination therapy (ACT) for malaria, offering potent antimalarial activity with simplified dosing. However, the oral bioavailability of Dihydroartemisinin and piperaquine remains suboptimal due to its poor aqueous solubility and extensive first-pass metabolism, which may compromise therapeutic outcomes.

Objectives: This study aims to develop and evaluate nano structed lipid carriers (NLCs) to enhance the oral delivery of the DHA-PQ fixed-dose combination.

Methods: NLCs were formulated using high shear homogenization and ultrasonication techniques with a blend of solid and liquid lipids and optimized surfactants.

Results: Comprehensive physicochemical characterization revealed a nanosized formulation with favorable polydispersity index, zeta potential, and encapsulation efficiency. In vitro release studies showed sustained drug release, and in vivo pharmacokinetic evaluation in animal models revealed significantly enhanced oral bioavailability of piperaquine from NLCs compared to conventional formulations.

Conclusion: This approach holds promises for improving the efficacy, patient compliance, and overall success of DHA-PQ combination therapy in malaria treatment and potentially improving clinical outcomes in malaria management.

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Bioavailability Enhancement of Clozapine Through Microneedles

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Article Info

Keywords: Pharmacist-Led Interventions, Patient Care, Emergency.

Abstract

The present study was designed to deliver Clozapine (CL) through transdermal route. Clozapine is slowly and weakly absorbed through gastrointestinal tract, short half-life and oral bioavailability is less. In order to facilitate the transdermal delivery and to enhance the bioavailability of Clozapine, different permeability enhancement techniques has been used stepwise in this study. The thiolated chitosan was successfully synthesized and characterized by primary amine and thiol content quantification of thiolated chitosan, Proton Nuclear Magnetic Resonance (^{1}HNMR), Attenuated Total Reflectance-Fourier Transform Infrared spectroscopy (ATR-FTIR), Differential Scanning Calorimetry (DSC) and X-ray Diffraction (XRD). Clozapine loaded thiolated chitosan simple patch (CL-TC-P) was fabricated with different concentration of synthesized thiolated chitosan. After the physical tests (drug content, thickness, homogeneity, appearance, % moisture content and folding endurance) it was obvious that the CL-TC-P-3 with thiolated chitosan 3 % shows the best results. Hence the CL-TC-P-3 was used for formulation of simple thiolated chitosan patches with permeation enhancers. Sea buckthorn oil and milk thistles, as permeation enhancers, patches were fabricated with 0.5 ml of each. The final patches with permeation enhancers will be used for further comparison studies. After that Clozapine loaded thiolated chitosan microneedle patch (CL-TC-MNP) was fabricated. CL-TC-MNP was prepared by different concentrations of thiolated chitosan. The master template for microneedle patch was made by laser ablation technique. Hereafter, polydimethylsiloxane (PDMS) negative mold was made from master template, that was finally

used for CL-TC-MNP fabrication. Clozapine loaded thiolated chitosan microneedle patch (CL-TC-MNP) was characterized by FTIR spectroscopic analysis, Scanning Electron Microscopy study, *in-vitro* skin penetration study, tensile strength, moisture content, thickness of patch, elongation test. Other tests like; drug loading efficiency. CL-TC-MNP prepared by 3% thiolated chitosan depicted the best tensile strength, moisture content, thickness of patch, elongation, drug loading efficiency. CL-TC-MNP consisted of 225 needles in 15 rows having 15 needles each, covering an area of 8 x 8 mm. The length of each micro needle was found to be 575 μm, pyramidal shaped having sharp pointed end and base diameter of 200 μm. The *in-vitro* release was performed for Clozapine loaded thiolated chitosan simple patch (CL-TC-P), Clozapine loaded thiolated chitosan simple patch (CL-TC-P) with permeation enhancers (sea buckthorn oil, milk thistle oil) and Clozapine loaded thiolated chitosan microneedle patch (CL-TC-MNP 1-5). And the results showed a sustained release till 72 hours, and the maximum release was 92% for CL-TC-MNP-3. The *ex-vivo* study was performed for Clozapine loaded thiolated chitosan simple patch (CL-TC-P), Clozapine loaded thiolated chitosan simple patch (CL-TC-P) with permeation enhancers (sea buckthorn oil, milk thistle oil) and Clozapine loaded thiolated chitosan microneedle patch (CL-TC-MNP 1-5). And the results showed that the CL was successfully transported by CL-TC-MNP-3 nearly 90% through the mouse skin, (24 hours). After the results of *in-vitro* and *ex-vivo* studies CL-TC-MNPs were selected for *in-vivo* study. Based on above evidences, CL-TC-MNP seems to be promising strategy for bioavailability enhancement of Clozapine with the aid of thiolated chitosan microneedle patch.

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Synthesis, Characterization, and Molecular Docking Studies of Newly Synthesized Hippuric Acid Mutual Prodrugs as Potential Antiurolithics, Analgesics and Antioxidants

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Article Info

Keywords:
Hippuric acid, hippuryl chloride, oxalyl chloride, antiurolithic, antioxidant, oxidative stress, super saturation.

Abstract

Background: Hippuric acid (HA) is a naturally occurring metabolite excreted through human urine. Its concentration in urine is increased by dietary intake of phenols present in foods and vegetables. HA is experimentally substantiated to be a regulator of calcium oxalate (CaOx) super saturation in human urine and possesses a solvent effect on calcium oxalate salts.

Objectives: Objective of this study was to chemically link hippuric acid to various NSAIDS through anhydride linkage and synthesize potential mutual prodrugs for management of urolithiasis and associated renal colic.

Methods: Hippuric acid was linked to 5 NSAIDS through anhydride linkage by first synthesizing hippuryl chloride, followed by its reaction with sodium salts of NSAIDS. Synthesized compounds were characterized using FTIR spectrometry, 1H NMR and 13C NMR spectrometry and evaluated for in vitro antioxidant, in vivo acute toxicity, in vivo antiurolithic, in vivo analgesic and in vitro hydrolysis studies. Molecular docking analysis was carried out to determine target protein binding.

Results: All products showed stability at gastric pH while most of these showed significant pharmacological activities and were considered potential candidates for drug development studies.
Conclusion: The study efficiently synthesized potential mutual prodrugs for urolithiasis, demonstrating encouraging in vitro and in vivo activities and suggested their suitability for future drug development studies.

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Triptolide-Induced Hepatotoxicity is Associated with Mitochondria-Dependent Apoptosis

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Article Info

Keywords:
Triptolide, ROS, Drp1, Hepatotoxicity.

Abstract

Background: How triptolide is associated with mitochondrial dysfunction and apoptosis in connection with its hepatotoxicity remains unclear.

Objectives: The objective of our study was to find out the link between mitochondrial dynamics and cell death in triptolide induced hepatotoxicity.

Methods: We treated L02 cells with various concentrations of triptolide.

Results: The results demonstrated that triptolide treatment caused an increase in apoptotic cell death, mitochondrial depolarization, ROS overproduction, a decrease in ATP production, and mitochondrial fragmentation which in turn is associated with the activation of Drp1 fission protein. Triptolide treatment led to the translocation of Drp1 from the cytosol into outer mitochondrial membrane where it started mitochondrial fission. This fission event is coupled with the mitochondrial release of cytochrome c into the cytosol and subsequently caspase-3 activation. TEM analysis of rat liver tissues revealed the distortion of mitochondrial morphology in triptolide-treated group. Western blot analysis explained that disruption in mitochondrial morphology was attached with the recruitment of Drp1 to mitochondria, cytochrome c release, and caspase-3 activation. However, Mdivi-1 cotreatment inhibited the activation of Drp1 and caspase-3 and blocked the release of cytochrome c into the cytosol.

Conclusion: In short, inhibiting Drp1 protein activation may provide a new potential target for curing Drp1-associated apoptosis in triptolide-induced hepatotoxicity.

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Transforming Breast Cancer Therapy: Eudragit-Coated Chitosan Nanoparticles for Superior Oral Paclitaxel Delivery

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Article Info

Keywords:
Paclitaxel, Chitosan nanoparticles, Eudragit S-100, Breast cancer, Oral drug delivery.

Abstract

Background: Breast cancer remains a leading cause of cancer-related mortality among women worldwide. Conventional chemotherapeutics like paclitaxel are limited by poor oral bioavailability and non-specific drug delivery, leading to systemic toxicity.

Objectives: This study aimed to develop and evaluate a pH-responsive oral drug delivery system using paclitaxel-loaded chitosan nanoparticles coated with Eudragit S-100 to enhance oral bioavailability and minimize systemic side effects in breast cancer treatment.

Methods: Paclitaxel-loaded chitosan nanoparticles were prepared using ionotropic gelation. Various formulations were developed with and without Eudragit S-100 (ES-100) coating. Characterization included particle size, zeta potential, entrapment efficiency (EE), and in vitro dissolution at pH 1.2 and 7.4. Stability studies assessed changes in physicochemical parameters over time.

Results: The optimized uncoated formulation (F3) showed a particle size of 281.8 nm and a zeta potential of +38.9 mV, while the ES-100 coated formulation (F7) displayed a size of 425.01 nm and a zeta potential of 24.7 mV. F7 achieved 74% EE and 56.14% drug release at pH 7.4, with minimal release at pH 1.2. Drug release followed zero-order kinetics (RÂ² %0.93), indicating a diffusion-controlled mechanism. Formulations F1 F4 showed Fickian diffusion (n=0.4), whereas F5 F6 suggested erosion-controlled release (n=1.2 “1.3). Stability parameters remained unchanged, with non-significant variations (p>0.05).

Conclusion: The ES-100-coated chitosan nanoparticles demonstrated potential for targeted, pH-responsive oral

	delivery of paclitaxel in breast cancer treatment, enhancing therapeutic efficacy and stability.

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Exosomes as an Emerging Nanocarrier for The Transdermal Drug Delivery

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Article Info

Keywords:
Exosomes, Transdermal drug delivery, Biocompatible, Human plasma-derived exosomes, Freeze-thaw.

Abstract

Background: Exosomes are an emerging avenue of research in the field of drug delivery due to their remarkable targetability, biocompatibility, ability to cross biological membranes, and non-immunogenicity. Exosomes can also serve as a potential transdermal drug carrier due to their small size, biocompatibility, high deformability and excellent permeability.

Objectives: The aim of the current study was to explore the potential of human plasma-derived exosomes as versatile carriers for transdermal drug delivery by employing various active and passive loading methods. Methods: Exosomes were isolated from human plasma using differential centrifugation and ultrafiltration method. Drug loading was achieved by employing sonication and freeze thaw methods, facilitating effective drug encapsulation within exosomes for delivery. Each approach was examined for its effectiveness, loading efficiency and ability to preserve membrane stability. Methotrexate (MTX) a hydrophilic model was loaded at a concentration of 2.2 μM to exosomes underwent characterization using various techniques such as particle size analysis, transmission electron microscopy and drug loading capacity.

Results: Human plasma derived exosomes showed a mean size of 162.15±28.21 nm and zeta potential of -30.6±0.71 mV. These exosomes were successfully loaded with MTX demonstrated a better drug encapsulation of 64.538±1.54% by freeze thaw method in comparison 55.515±1.907% by sonication. In-vitro drug release displayed 60% loaded drug released within 72 hours by freeze thaw method that was significantly different

from that by sonication method i.e., 99% within 72 hours (p value 0.0045). Moreover, cell viability of exosomes loaded by freeze thaw method was significantly higher than that by sonication method (p value 0.0091) suggested that there was membrane disruption by sonication method. MTX loaded exosomal gel demonstrated three-folds increased in skin permeability as compared to MTX loaded gel

Conclusion: In conclusion, this study offers valuable insights into the potential of human plasma-derived exosomes loaded by freeze thaw method suggest as a promising carrier for improved transdermal drug delivery and maintain exosomal membrane integrity.

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Computational screening, Chemical Synthesis, *In-vitro* and *In-vivo* studies of Novel Chalcone Derivatives as Antioxidant and Anti-inflammatory Activities

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Article Info

Keywords:
Chalcone derivatives, molecular docking, anti-inflammatory activity, antioxidant activity, carrageenan-induced hyperalgesia.

Abstract

Background: Inflammation plays a crucial role in various diseases, and targeting the prostaglandin axis offers a promising therapeutic approach for inflammatory and immunological disorders

Objectives: This research aimed to compute the screening of the chalcone library and synthesis characterised by top-scoring compounds and assess the pharmacological potential, explicitly focusing on the antioxidant and anti-inflammatory activities

Methods: These top six chalcone derivatives were synthesised using acetophenone and benzaldehyde, and structures were characterised through nuclear magnetic resonance (NMR) spectral analysis and Fourier transform infrared (FTIR) spectroscopy.

Results: Computational finding by using AutoDock Vina protocol against target enzyme (prostaglandin G/H synthase 2) (PDB: 3LN1), where the compounds 3B, 2B, and 1A exhibited strong binding affinities of -9.8 Kcal/mol, -9.2 Kcal/mol, and -9.2 Kcal/mol, respectively. Among these compounds, compound 3B exhibited the highest antioxidant activity, demonstrating an efficacy percentage of 78.34% and an IC50 value of 7.86Î¼g/ml. The chalcone derivatives were also assessed for their effectiveness in carrageenan-induced hyperalgesia, a model used to study pain response. Compound 1A significantly

	increased latency periods at 30, 60, 90, and 120 minutes compared to compounds 2B and 3B, suggesting its potential analgesic properties. Furthermore, compound 3B significantly reduced allodynia response at 120 minutes, indicating its potential to alleviate mechanical sensitivity. In conclusion, the findings of 2B and 3B compounds have the pharmacological potential of chalcone derivatives as lead molecules for the design of new prostaglandin G/H synthase 2 inhibitors. Conclusion: Our results support further clinical investigation of chalcones as a component of therapeutic strategies for managing anti-inflammatory activity.

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Antibody designing against IIIabc junction (JIIIabc) of HCV IRES through affinity maturation; RNA-Antibody docking and interaction analysis

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Article info

Keywords:
Hepatitis C virus, internal ribosome entry site (IRES), antigen binding fragment, aggregation propensity

Abstract

Background: Hepatitis C virus is a single-stranded RNA based virus which can cause chronic HCV and hepatocellular carcinoma. HCV genotype 3a has relatively higher rate of fibrosis progression, prevalence of steatosis and incidence of HCC. Despite HCVs variation in genomic sequence, the 5′ untranslated region containing internal ribosome entry site (IRES) is highly conserved among all genotypes. It is responsible for translation and initiation of the viral protein.

Objectives: In present study, IRES was targeted by designing variants of reported antigen binding fragment (Fab) through affinity maturation approach. Affinity maturation strategy allowed the rational antibody designing with better biophysical properties and antibody-antigen binding interactions.

Results: Complementarity determining regions of reported Fab (wild type) were assessed and docked with IRES. Best generated model of Fab was selected and subjected to alanine scanning. Three sets of Insilco mutations for variants (V) designing were selected; single (1-71), double (a-j) and triple (I-X). Redocking of IRES-Fab variants consequently enabled the discovery of three variants exhibiting better docking score as compared to the wild type Fab. V1, V39 and V4 exhibited docking scores of -446.51, -446.52 and -446.29 kcal/mol respectively which is better as compared to the wild type Fab that exhibited the docking score of -351.23 kcal/mol. Variants exhibiting better docking score were screened for aggregation propensity by assessing the

aggregation prone regions in Fab structure. Total A3D scores of wild type Fab, V1, V4 and V39 were predicted as -315.325, -312.727, -316.967 and -317.545 respectively. It is manifested that solubility of V4 and V39 is comparable to wild type Fab.
Conclusion: In future, development and invitro assessment of these promising Fab HCV3 variants is aimed.

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Harnessing Computational Tools for Drug Discovery: An Integrated Computational Approach to Identify Potential BACE-1 Inhibitors

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Article Info

Keywords:
Pharmacophore modeling, BACE-1, MD simulations, Molecular Docking, ADMET, Virtual screening.

Abstract

Background: The hallmark of Alzheimer's disease (AD), a progressive neurodegenerative condition, is the buildup of amyloid- beta (Aβ) plaque, which is mainly caused by β-secretase 1 (BACE-1) activity. BACE-1 inhibition is a potentially effective treatment strategy to lower the progression of AD.

Objectives: In order to find possible BACE-1 inhibitors using a pharmacophore-driven virtual screening approach, this study uses an integrated computational approach that includes pharmacophore modelling, virtual screening, molecular docking, MM-GBSA, molecular dynamics (MD) simulations, in-silico ADMET profiling, and PBPK modelling.

Methods: A pharmacophore model, was created with known BACE-1 inhibitors to enable virtual screening of both novel and FDA-approved chemical libraries.

Results: Top candidates with good free energy scores and strong binding affinities were found using molecular docking and MM-GBSA calculations. The stability of shortlisted Hits inside the BACE-1 active site was further validated using MD simulations, which showed that some of the important interactions were maintained across a period of 50ns. ADMET and PBPK studies predicted favorable pharmacokinetic and safety profiles for the shortlisted hits, particularly for B2 and B9.

Conclusion: These findings identify potential candidates for future experimental validation, offering an inexpensive approach for identification of compounds as potential BACE-1 inhibitors.

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Comprehensive Safety Assessment and Therapeutic Potential of *Pediococcus Acidilactici* NMCC-B in Attenuating Arthritis Progression

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Article Info

Keywords:
Rheumatoid arthritis, P. acidilactici NMCC-B, Probiotic, Joint inflammation, Toxicity.

Abstract

Background: Dysbiosis of gut microbiota and loss of gut-barrier integrity contribute to the development and severity of rheumatoid arthritis (RA). The available treatments pose a burden of major adverse effects and new treatment strategies are therefore the need of time. Objectives: In this study, *Pediococcus acidilactici* (NMCC-B strain; Probiotic) was evaluated for its safety and efficacy in complete Freund adjuvant (CFA)-induced mice model of RA.

Methods: Mice were treated with either Escherichia coli (1 x 109 CFU/ml) or P. acidilactici NMCC-B (1 x 109 CFU/ml, 2 x 109 CFU/ml) to assess acute, sub-acute, and chronic toxicities. In RA model, mice were either pre-treated with daily dose of *P. acidilactici* NMCC-B treated concurrently (day 1- day 27) or post-treated (day 28 day 42).

Results: *P. acidilactici* NMCC-B inhibited gut permeability, lessened joint inflammation, and ameliorated RA progression. No signs of toxicity, pathogenicity or bacterial translocation were observed in animals treated with probiotic. *P. acidilactici* NMCC-B also restored total body weight, attenuated inflammation, improved antioxidants, alleviated soft tissue swelling, bone damage, and the expression of IL-1Î², NF-ÎºB and TNF-Î± in paw tissue. Based on current findings, it is perceivable that P. acidilactici NMCC-B (NMCC-B strain) could be a promising candidate for the management of RA.

Conclusion: Based on current findings, it is perceivable that *P. acidilactici* NMCC-B (NMCC-B strain) could be a promising candidate for the management of RA.

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Adaptation of AI in Healthcare Using Computational Techniques: Challenges and Solutions

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Article Info

Keywords:
Machine learning, Digital patient, Ethical problems using AI tools.

Abstract

Background: AI and machine learning is very important in healthcare using different virtual tools like natural language processing images, Google DeepMind and Zebra Medical Vision. Competent diagnosis powered by artificial intelligence help to diagnose diseases, resulting in better, faster, and more individualized approaches.

Objectives: The new achievement which is a digital patient model, also called a virtual patient currently used medical research and the development and testing of drugs and treatment. The development of a new drug has always been a long-lasting, expensive, and highly technical process includes clinical trial, animal trials and then human trials are now less time taking using AI and digital patient.

Methods: Machine learning make very simple to dealing with massive medical data such as Electronic Health Records, medical images, genomes, and trial outcomes. Deep learning algorithms have been designed to diagnose diseases such as cancers, pneumonia, and blindness from medical images at the early stages. With other applications of AI in radiology, specializing in chest X-rays for signs of tuberculosis will assist clinicians in early-stage detection and, eventually, treat the disease.

	Results: AI also come with potential risks due to lack of data privacy, transparency in algorithms, and regulation so the ethical challenges also face during AI and machine learning. Conclusion: This analysis reveals that through the potential to assimilate significant volumes of data and discover analytics that were not attainable, AI is poised to become one of the more essential prerequisites to advancing medical science, providing a positive impact, and enhancing the quality of life for patients globally.

Conference on Emerging Trends in Pharmaceutical Sciences 2025 (CETPS 25) May 10, 2025

Repurposing Statins for Smart Antifungal Therapy: Lipase-Triggered Nanoparticles for the Treatment of Emerging Fungal Diseases

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Article Info

Keywords:
Targeted therapy, Lipase-responsive nanoparticles, Film forming spray, Simultaneous equation method, Cutaneous Candidiasis.

Abstract

Background: Fungal infections are increasingly becoming contributors to the world health burden. The limited antifungal drugs, their associated toxicity, and potential drug interactions, justify a clear rationale for alternate therapeutic options. The present research work aims to synthesize lipase responsive PCL-based polymeric nanoparticles co-loaded with Ketoconazole and Atorvastatin.

Objectives: Co-loading of two drugs will augment the antifungal effect and the use of PCL is proposed to provide lipase responsive, targeted release at infection site.

Methods: PCL was utilized to synthesize PNPs through the Nanoprecipitation technique. The Co-loaded KTZ-ATV PNPs were optimized and evaluated by Design Expert particle size (PS), zeta potential (ZP), and polydispersity index (PDI). The optimized formulations were extensively characterized by FTIR, XRD, DSC, and TEM. KTZ-ATV Co-loaded PNPs were loaded in the film forming spray. In vitro release, skin permeation, deposition, and irritation studies were conducted. In vitro and in vivo antifungal efficacy of Co-loaded PNPs based FFS was analyzed

Results: The optimized formulation exhibited PS of 261 Â± 0.8 nm, ZP potential of -23 mV Â± 1.0, PDI of 0.112 Â± 0.01, and %Entrapment Efficiency of 86.7Â± 2.11 for KTZ and 85Â± 1.61. In vitro release studies of KTZ-ATV PNPs exhibited a sustained and lipase-responsive drug release at skin pH. Skin deposition and permeation studies of Co-loaded PNPs based FFS demonstrated significantly enhanced skin permeation and deposition in comparison to marketed cream and exhibited no observable irritation risk. In vitro antifungal assay exhibited a

	profoundly increased zone of inhibition (ZOI) and substantially increased antifungal potential was observed in in vivo cutaneous candidiasis model. Conclusion: The findings suggest that Co-loaded PNPs based FFS could serve as a more promising therapeutic option for treating cutaneous candidiasis, offering an exceptional antifungal potential, targeted activity, enhanced skin deposition, and improved permeation.

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Computational Identification of Potential NF-kB inhibitors: A Pharmacophore driven and Virtual Screening Approach

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Article Info

Keywords:
Pharmacophore modeling, Virtual screening, Drug repurposing.

Abstract

Pharmacophore modeling is an innovative technology to explore and extract potential interactions between a drug or ligand and a target protein complex. On the other hand, virtual screening is an in-silico technique that uses pharmacophore models to analyze extensive databases of compounds or approved drugs to evaluate interactions. These techniques enable to discover, establish, and evaluate therapeutics and other biologically active compounds and also allow the optimization of several hundred and thousand compounds to be tested for interaction against the target protein or receptor, which narrows down the potential molecules that can be used for further studies. Drug repurposing can be done by integrating these techniques into the study design, allowing reduced cost associated with conventional hit and trial testing of compounds, running large databases in shorter duration. The study reported the successful generation and validation of pharmacophore model with subsequent virtual screening and prediction of potential inhibitor(s).

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Exploring the Driving Factors of Irrational Prescribing and Strategies to Improve Rational Use of Antibiotics - A Mixed Method Study on Perspective of Healthcare Professionals

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Article Info

Keywords:
Irrational prescribing,
Rational drug use,
Healthcare professionals.

Abstract

Background: Irrational prescribing undermines treatment efficacy and increases antimicrobial resistance. This study examines healthcare professionals' (HCPs) awareness of irrational practices and strategies to promote rational drug use.

Objectives: To assess HCPs' knowledge of irrational prescribing factors, identify barriers to rational practices, and determine preferred interventions.

Methods: A mixed-methods study with physicians, pharmacists, and nurses using semi-quantitative questionnaires (descriptive analysis) and qualitative interviews (thematic analysis).

Results: The study found that 65% of participants lacked updated training on clinical guidelines, which led to a reliance on empirical therapy and inappropriate antibiotic prescribing. Workload pressures (78%), patient demands for rapid symptom relief (62%), and limited diagnostic resources (55%) were commonly reported as key barriers to rational drug use. In response, healthcare professionals emphasized the importance of regular audits (70%), ongoing education and training programs (85%), and stricter institutional policies (60%). Pharmacists particularly supported interdisciplinary approaches, including collaborative ward rounds (80%) and culture-based prescribing strategies.

Conclusion: Knowledge gaps and systemic challenges perpetuate irrational prescribing. Multifaceted interventions

	targeted education, policy enforcement, and diagnostic improvements are essential for practice change.

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Impact of Pharmacist-Led Interventions in Improving Patient Care in the Emergency Department of a Tertiary Care Hospital

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Article Info

Keywords: Pharmacist-Led Interventions, Patient Care, Emergency.

Abstract

Background: Around 1 in every 10 patients is harmed in health care and more than 3 million deaths occur annually due to unsafe care. In low-to-middle income countries, as many as 4 in 100 people die from unsafe care. Emergency department is a critical area where it is necessary to respond and treat patients urgently and accurately. Some prevalent medicine related issues such as dose adjustments, drug interactions, antibiotic combinations, therapeutic or class duplication may occur in emergency department setting while dealing patients. Pharmacist-led interventions have the potential to enhance patient care through medication management, antimicrobial stewardship, pain management, patient education, and interdisciplinary collaboration.

Objectives: The primary objective of this study is to evaluate the impact of pharmacist-led interventions on improving patient care in the ED of a tertiary care hospital. Specific aims include assessing the influence of these interventions on medication safety, clinical outcomes, patient satisfaction, and healthcare.

Methods: A prospective observational study was conducted to evaluate pharmacist interventions during one year July-2023 to June-2024. Total number of patients who visited emergency department during the year was also collected. MIS data base was used to collect the interventions data. Quantitative data of interventions was collected. Interventions were evaluated in the form of different categories such as wrong dose, wrong route, drug interactions and other such important factors.

Results: A total of 45,625 patients visited emergency department during the study period. Patients who didn't receive any oral or IV medication were excluded from the study. Hence a total of

39769 patients were included in the study. 566 pharmacist interventions were recorded during this period. Among these interventions, 299(56%) were related to dose adjustments, 56 (9%) were related to wrong route, 53(9%) were related to change in the drug prescribed. 43 (7.5%) were related to wrong dosage form/strength. Other interventions were related to wrong frequency, antibiotic combination and others.

Conclusions: This study underscores the importance of pharmacist-led interventions in the emergency department of a tertiary care hospital. The findings reveal that pharmacists play a key role in enhancing patient safety by identifying and rectifying medication-related issues such as dose adjustments, incorrect routes, and inappropriate drug prescriptions. By actively participating in the emergency care team, pharmacists contribute to reducing the risk of medication errors, thereby improving overall patient outcomes. The presence of pharmacists in the emergency department is not just beneficial but essential for ensuring safe and effective patient care, ultimately leading to better clinical outcomes and increased patient satisfaction.

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Therapeutic Drug Monitoring a Framework in Limited Resources Setting: Strategies towards the Elimination of TB from High-incidence Countries

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Article Info

Keywords:
Tuberculosis, Therapeutic Drug Monitoring, Anti Tuberculosis drugs, Dried Blood Spot, Multi-drug Resistance.

Abstract

Background: Therapeutic Drug Monitoring (TDM) has proved to be a key strategy in improving the efficacy of anti-tuberculosis (TB) treatment.

Objectives: TDM aims to complement the WHO End TB Strategy through the improvement of clinical outcomes, protection against adverse effects and manage drug resistance including in MDR and XDR TB cases. This review elaborates TDM as a valuable approach for tailoring TB treatment, particularly in the case of MDR/XDR. It guarantees proper dosing, increase in treatment efficiency and work towards a global TB eradication.

Methods: A literature review was made to compare the evidence behind the use of TDM in anti-TB therapy in the resource limited setting. Studies in English from 2008 to 2019 found in MEDLINE, PubMed, and Google Scholar were searched by using the terms: "Tuberculosis" AND "Therapeutic Drug Monitoring." Observational trials, RCTs and cohort analyses in which there were application of serum drug concentration monitoring and dose adjustment strategies, but not in computer simulations, have been included.

Results: Therapeutic Drug Monitoring (TDM) is found to aid in determining optimum dosage by measuring drug concentration contributing considerably to treatment efficacy. 92% of patients were initially found to be below therapeutical ranges of rifampicin, which was improved with dose adjustments. In the cohorts of MDR-TB, 62% had a successful treatment and 74% of XDR-TB had an untreatable outcome.

	Conclusion: This review elaborates TDM as a valuable approach for tailoring TB treatment, particularly in the case of MDR/XDR. It guarantees proper dosing, increase in treatment efficiency and work towards a global TB eradication. While it is effective, implementation is difficult in low resource settings and requires additional investment in infrastructure and training.

Conference on Emerging Trends in Pharmaceutical Sciences 2025 (CETPS 25) May 10, 2025

The Impacts of the Interaction Between Antibiotics, Supplements, and Gut Microbiota on the Progression and Treatment of Parkinson's Disease

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Article Info

Keywords:
Parkinson's disease, gut microbiota, dysbiosis, short-chain fatty acids (SCFAs), alpha-synuclein, small intestinal bacterial overgrowth (SIBO).

Abstract

Background: Parkinson's disease (PD) is a progressive neurodegenerative disorder primarily characterized by motor dysfunction, which is increasingly recognized to be influenced by gastrointestinal and microbiome-related factors.

Objectives: This review explores the complex interplay between antibiotics, dietary supplements, and gut microbiota in the development, progression, and management of PD.

Results: Accumulating evidence supports the role of gut microbiota dysbiosis in exacerbating intestinal permeability, neuroinflammation, and alpha-synuclein aggregation— central hallmarks of PD pathology. Disruptions in microbial populations, including reduced butyrate-producing bacteria and increased abundance of pro-inflammatory species such as *Akkermansia muciniphila*, have been implicated in the disease's etiology. Furthermore, the microbiota influences immune signaling pathways, including the activation of microglia and cytokine production, contributing to central nervous system (CNS) degeneration. Pharmacological interventions such as levodopa may be compromised by gastrointestinal infections like Helicobacter pylori, and alterations in microbial composition may impact drug bioavailability. Moreover, microbiota-derived short-chain fatty acids (SCFAs) play a pivotal role in gut-brain axis communication and immune modulation.

Conclusion: This review underscores the necessity of a multidisciplinary approach to PD management, incorporating microbial modulation alongside pharmacological therapies.

The CETPS 25 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 25 looked forward to seeing the attendees at the Capital University of Science & Technology

Conference on Emerging Trends in Pharmaceutical Sciences 2025 (CETPS 25)
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