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Abstracts

NextGen Therapeutics: Multidisciplinary Research Approaches for Drug Development and Delivery

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ABSTRACT- ORAL PRESENTATIONS

PTO002

Taste-Masking Evaluation of Primaquine Phosphate Paediatric Formulation using BATA Model in Medicated Chocolate

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Primaquine phosphate, an oral anti-malarial (BCS class-I), faced taste issues, so it was paired with pamoic acid to create a tasteless primaquine pamoate complex. Due to children struggling with tablet swallowing, a medicated chocolate containing this complex was made using cocoa powder, milk powder, sugar, and cocoa butter and optimized using factorial design. The drug-excipient compatibility was assessed via DSC and FTIR. Taste evaluation utilized the Brief Access Taste Aversion (BATA) model, known for promising results. Dissolution was tested in 900 ml 0.1 N HCl using a USP type-II apparatus. Stability was examined at 0-8°C and 25±5°C for the optimized formulation. The drug and excipient showed compatibility in DSC and FTIR studies with no significant changes in melting point or wavenumber in the spectra. The optimized batch achieved a 90.6% cumulative drug release after 30 minutes. Stability testing confirmed no alterations in both chemical and physical properties of the optimized batch. The average lick ratio for the optimized chocolate formulation was found to be twice as high as the plain drug solution, confirming the effectiveness of the taste-masked formulation. The formulation of Primaquine Phosphate in medicated chocolate proved to be an effective paediatric dosage form, confirmed by the taste assessment study demonstrating successful taste masking.

PTO003

Cost Conscious Pharmaceutical Management: Health Insurance Innovation in Developing Economies

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This paper examines the pharmaceutical management strategies employed by the health insurance systems to optimize pharmaceutical usage within low and middle income countries. Due to high market price of essential medicine individuals spends a significant amount posing a considerable financial burden and potentially exacerbating economic hardships. Although there is ample of information from the high income countries, there is a significant lack of information on the insurance strategies applied in low and middle income countries. The given review encompasses strategies to influence the consumer, supplier and industry practices by benchmarking methods such as cost-sharing selection, generic reference pricing, and fee for service or case based pay. These methods as targeted by the health insurance system aims to achieve a balance between conflicting objectives of enhancing medication accessibility, promoting reasonable usage, and ensuring reasonable costs. As per the world health survey, households in low and middle income countries spend majority of their healthcare expenses in medicines. Evidence suggests reducing or eliminating high medicine payment through insurance coverage and compliance through various strategies should translate to greater access to medicine at low price. Need for more well designed prospective and retrospective research on medicine policy

approaches that are carefully used as well as cautious experimentation would lead to better outcomes in influencing the consumer behaviour for increasing pharmaceutical usage.

PTO005

Development of Self Nano Emulsifying Drug Delivery System of Posaconazole

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Posaconazole (PSC), a potent antifungal agent, exhibits poor oral bioavailability due to its limited water solubility (BCS Class II). This research focuses on developing a self-nanoemulsifying drug delivery system (SNEDDS) to enhance PSC's bioavailability addressing healthcare challenges and contributing to Sustainable Development Goal (SDG) 3: Good Health and Well-being and 12: Responsible Consumption and Production. Various oils, surfactants, and co-surfactants were screened for their ability to solubilize PSC form stable nanoemulsions upon dilution with water. Pseudo-ternary phase diagrams were constructed to identify optimal formulation compositions. The spontaneous emulsification, droplet size, and stability of the prepared SNEDDS were evaluated. Different SNEDDS formulations were characterized for their droplet size, thermodynamic stability, drug loading capacity, and in vitro release. The optimized SNEDDS formulation rapidly formed nano-sized emulsions (droplet size < 100 nm) demonstrated good stability, and significant enhanced PSC solubilization compared to the pure drug. In vitro release studies demonstrated a sustained release pattern with improved dissolution characteristics compared to the commercial tablet formulation. The developed SNEDDS formulation offers a promising approach for enhanced oral delivery of posaconazole, potentially leading to improved therapeutic efficacy, patient compliance (SDG 3), and suggesting its potential for clinical translation to optimize PSC therapy while promoting resource-efficient drug delivery systems (SDG 12: Responsible Consumption and Production).

PTO006

Utilizing Living Nano-robots as a Novel Targeted Treatment Option for Duodenal Ulcers in PUD

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This research introduces AI-generated living nano-robots, derived from Xenopus laevis, programmed for targeted treatment of duodenal ulcers in Peptic Ulcer Disease. The study explores novel morphological arrangements, showing theoretical improvements in efficiency and size. Utilizing TensorFlow 2.0 and machine learning, the xenobots, designed for oral ingestion, navigate the gastrointestinal tract, deliver medication at specific sites, and naturally excrete post-task completion. This groundbreaking approach signifies a significant advancement in medical nano-robotics. The methodology involved utilizing TensorFlow 2.0 for creating an AI model of living nano-robots from

Xenopus laevis cells. Embryo cells were programmed to perform specific tasks like movement and navigation. Machine learning techniques were extensively applied in model creation and testing. The models proposed several morphological arrangements for efficient site-specific treatment of duodenal ulcers. Theoretical analyses indicated a 30% increase in efficiency and a 10% size reduction for locomotion compared to existing Xenobots. The designed Xenobots demonstrated successful movement along the gastrointestinal tract and targeted delivery to specific sites. This study introduces a groundbreaking implementation of nano-robots for gastrointestinal disease treatment. The developed Xenobots, derived from Xenopus laevis, showcase improved efficiency and reduced size for targeted treatment of duodenal ulcers in PUD. The application of AI and machine learning in creating and testing these models represents a significant advancement in the field of medical nano-robotics.

PTO007

Cholesterol-Lowering Vaccines: Unraveling the Past Exploring the Present, and Envisioning the Future

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This thorough analysis looks at the development of cholesterol-lowering vaccinations throughout history, present developments, and potential future developments. The previous section explores seminal research and discoveries that paved the way for the creation of vaccinations intended to treat dyslipidemia, with a particular emphasis on the PCSK9-targeting, cholesterol-lowering VLP vaccine. Deciphering the complex interactions between PCSK9 and LDL cholesterol becomes essential to comprehending the background. Moving forward to the present, the paper looks at recent innovations, such as the ground-breaking advancements in vaccination tactics and technology. Particular focus is given to new vaccination discoveries that might transform cholesterol control by offering creative and reasonably priced alternatives for current therapies. This section provides a thorough summary of current investigations, clinical studies, and developing patterns related to vaccinations that decrease cholesterol. The main focus of this study is looking forward, with conjecture about how these vaccinations could affect worldwide heart health based on new discoveries and advances. Expected advancements in vaccine technology, delivery methods, and their incorporation into conventional healthcare systems are explored, offering a prospective viewpoint on the revolutionary possibilities of immunizations that decrease cholesterol. In conclusion, this analysis not only examines the historical turning points and contemporary developments in vaccines that decrease cholesterol, but it also imagines a time in the future when these vaccinations will be essential for controlling dyslipidemia and lowering.

PTO008

Advances in Level- A In-Vitro In-Vivo Correlation (IVIVC) via Extended DoE-IVIVC Model: A Metoprolol Case Study

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This study explored reported Metoprolol extended-release (ER) 50 mg tablet using an extended design of experiment (DoE)-in vitro in vivo correlation (IVIVC) model with Convolution-driven Correlation A technique. The model connected formulation optimization, in vitro dissolution, and in-vivo pharmacokinetics, addressing challenges in polymer-coated drug release variations. This validation technique combined Boltzmann equation with TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution). Dissolution-based in-vitro release, crucial for predicting bioavailability parameters, was investigated with metoprolol from natural polymer (Guar Gum) at 25%-50% w/w concentrations in four formulations (A_1=60%, A_2=72%, A_3=84%, A_4=96%) and was compared to a reported 50 mg Metoprolol ER RLD. Boltzmann equation was applied to account for variation due to T_{lag} in the oral ER formulation (drug transit in the intestine) with an appropriate weighting factor, and deemed as the best fit. Cross-validation was performed using the TOPSIS-based ranking of test batches, considering their proximity to the RLD. Meeting regulatory standards, both external and internal validation results demonstrated reduction in prediction error (PE %) below 10%, confirming successful IVIVC correlation. Using Boltzmann equation and TOPSIS for validation, A_3 (84% Guar Gum coated) batch was closest to the RLD formulation in simulating bioequivalence. Boltzmann polynomial based equation demonstrated a strong fit with an r^2 exceeding 0.9. Cross-validated DoE-IVIVC with TOPSIS predicted in-vivo pharmacokinetics, highlighting advanced modelling techniques intersecting biopharmaceutics, statistics and machine learning concepts. Validated convolution-guided deconvolution, anchored by the Boltzmann equation and TOPSIS, provided an effective pathway for regulatory-compliant ER formulation development.

PTO009

Development of Surface-Modified Polymeric Nanoparticles of Rivaroxaban to Improve Bioavailability for the Management of Atherosclerosis: *In-vitro* Characterization, Cell-line Studies, and *In-vivo* Pharmacokinetics

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For effective treatment of atherosclerosis, hyaluronic acid (HA)-coated poly (lactic acid) (PLA) nanoparticles loaded with Rivaroxaban (anticoagulant drug) have been developed by recognizing intensified expression of HA receptors in disease progression of atherosclerosis. HA was used as targeting ligand for site-specific drug delivery. Developed nanoparticles altered pharmacokinetic properties of drugs, primarily due to their greater accumulation in target sites facilitated by active targeting mechanisms. Rivaroxaban-loaded-PLA nanoparticles were fabricated using nanoprecipitation

technique followed by HA coating using EDC. The optimized formulation had particle size of 117±3.42nm, zeta potential of -16.6±3.78mV, and entrapment efficiency of 89.05±1.64%. Molecular docking studies indicated significant binding affinities between HA and highly expressed receptors at atherosclerotic site. *In-vitro* drug release study revealed sustained drug release, with 72.54 ± 1.96% drug release within 72 hours. *In-vitro* cell-line studies revealed selective uptake of HA-coated nanoparticles by cells overexpressing CD44 receptors, as observed at atherosclerotic site. *In-vivo* pharmacokinetic studies demonstrated a notable 14-fold increase in bioavailability and decrease in clearance rate. As per compartmental modelling, HA-coated nanoparticles remain in systemic circulation for more prolonged period and exhibit limited distribution to peripheral compartments. Moreover, their clearance from central compartment is reduced, leading to their increased circulation time in body. Stability study of lyophilized HA-PLA-RIV nanoparticles highlights superiority of refrigerated conditions in preserving their stability. Developed nanoparticles presents promising strategy for effective treatment of atherosclerosis.

PTO010

Development and Characterization of Inhaled Formulation for the Treatment of Pulmonary Fibrosis

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Oral drug delivery system faces limitation in aqueous solubility, membrane permeability, chemical and enzymatic stability of drugs. Whereas, targeted drug delivery system, enhances the therapeutic efficacy by increasing directional transport to the target site along with prolonged residence time of therapeutics with reduced side effects. The research work adopts the concept of targeted approach and aims to formulate inhaled formulation for the therapy of pulmonary fibrosis. Top-down approach was considered for the formulation of inhaled formulation of a chemical moiety, through High Pressure Homogenizer. The 2^3 factorial design was applied, so to investigate the effect of independent variables on dependent variables and therefore, optimized batch was formulated. The optimized batch was subjected to various *in-vitro* characterization so, as to evaluate the stability and suitability of the developed formulation. The low density and viscosity of 1.01g/ml and 0.00100 Pa S. respectively expresses suitability of formulation to be delivered through nebulizer. The content uniformity of 97.23% was recorded. The formulation expresses good rate of nebulization of 0.0736 g/s and nebulization time of 302s indicating patient compliance. The data of aerodynamic parameters (% Fine Particle Fraction, FPF- 57.78%, Mean Median Aerodynamic Diameter, MMAD-1.2 and Geometric Standard Deviation, GSD- 1.40) indicates good aerosol performance. The graphs of FTIR (Fourier Transform Infra-Red) and DSC (Differential Scanning Calorimetry) clearly specifies about no interaction between the drug and the excipients. Last but not the least, long-term stability study of the optimized formulation is under process. The *in-vitro* studies indicate the stability and suitability of nano-suspension to be delivered through nebulizer for the treatment of pulmonary fibrosis. Further, the developed formulation will be subjected to pharmacokinetic and pharmacodynamics studies to evaluate its efficacy.

NTO001

BODIPY Based PDT Agents: Excellent Autophagy Inducers in Breast Cancer Cells

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Cancer is listed as a topmost dangerous disorder after cardiovascular diseases. As per WHO, Breast cancer considered most life threatening in female. It mainly arises in the epithelial cells of the ducts (85%) or lobules (15%) in the breast glandular tissue and considered most dangerous type of cancer. Photodynamic therapy (PDT) is an emerging approach for the treatment of cancer. Photosensitizer (PS), light and oxygen are the major components required for successful implication of PDT applications. Lysosomes play an important role for intracellular Ca^{2+} storage which is responsible for various cellular based adaptive response. Autophagy mainly involved in the various cellular catabolic activities to maintain cellular products. Cancer is one of the first diseases which was associated with autophagy in human through Beclin1 protein. Any alternation in this protein led to formation of tumor via cellular mechanism including low nutrients and blockage of apoptotic pathways. Boron dipyrromethenes (BODIPYs) have ideal characteristics like high extinction coefficient, insensitive to environmental pH, photostable. Herein this work synthesis, characterization, and *in-vitro* photocytotoxicity studies have discussed. Different heterocyclic BODIPYs were synthesized and screened against breast cancer cells. The cellular uptake studies suggested compounds were co-localized into the lysosome and able to induce autophagy into the cancerous cells. The in-vitro photocytotoxicity results suggested that both complexes are remarkable PS for the treatment of breast cancer using PDT.

NTO004

Investigation of Phytoconstituents for Treatment of Cancer and Cancer-Induced Alopecia by Bioinformatic and Chemoinformatic Tools

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Cancer, a disease characterized by uncontrolled cell proliferation, poses a global threat with millions of new cases identified every year. Among various therapies of cancer, chemotherapy particularly can cause side effects beyond the intended cancer cells, such as alopecia, or hair loss. The aerial root of the banyan tree (Ficus benghalensis) and fox nut (Euryale ferox Salisb) are two of the many herbs that are found in hair oil that have been shown to be very effective in promoting hair growth. Cancer induced alopecia can be impacted by fox nuts and the aerial roots of the Ficus benghalensis banyan tree. The purpose of this work is to explore shared genes linked to cancer and alopecia using network pharmacology. The network between phytoconstituents of banyan tree aerial roots and alopecia was modelled using Cytoscape. The aerial roots of banyan tree and fox nut contain genes that can help combat cancer and cancer-induced alopecia. These genes include NFKB1 (nuclear factor kappa B subunit 1), STAT3 (Signal transducer and activator of transcription 3), MTOR (mammalian or

mechanistic target of rapamycin), ITK (interleukin-2-inducible T-cell kinase), BTK (Bruton's tyrosine kinase) and AR (Androgen receptors). Overall, the study may provide comprehensive insights into the particular phytoconstituents of aerial roots of the banyan tree and the fox nut that demonstrate dual benefits in the treatment of cancer and the management of alopecia caused by cancer. The results will help develop targeted treatments that address both issues at the same time, improving cancer patients' overall quality of life.

NTO005

SeqToSmi: An Attention Mechanism Based Generative Adversarial Network for Protein Sequence Specific *De-Novo* Drug Design

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Drug discovery is an exceedingly expensive and labour-intensive process. The emergence of machine learning technologies is opening up new avenues in de novo drug design however current machine learning architectures leverage knowledge of existing ligands to predict new binders. In contrast, we introduce SeqToSmi, a generative adversarial network (GAN) capable of generating protein-specific novel ligands based solely on the amino acid sequence of the protein. SeqToSmi is based on an attention mechanism that employs a GAN architecture for generating new ligands as a SMILES output. Our work approaches de-novo drug design as a machine translation problem but uses a GAN architecture to improve the diversity of the generated molecules and impose constraints for specific design tasks. Using existing computational techniques we show that our model is able to generate chemically valid and novel molecules with predictable ability to bind a particular protein target furthermore the predicted physicochemical properties of our molecules adhere to many drug-likeliness parameters along with synthetic feasibility. The idea of generating ligand binders using only protein sequence offers great promise in early stage drug discovery, protein design or when reliable structural data on a protein is difficult to gather. Our proposed model is efficient at the protein specific de-novo drug design task and is being subject to enhancements for generating scaffold constrained and property specific outputs.

NTO006

Unlocking Antiplatelet Potential: Molecular Docking Study of Cilostazol Analogues as Phosphodiesterase 3 Inhibitors

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A thrombus, or blood clot, forms within the circulatory system, triggering a natural process within the human body to facilitate the healing of the damaged blood vessel. When a thrombus forms unnecessarily, it can lead to severe outcomes such as embolism, ischemia, heart attack, stroke, and other serious medical complications. During the initial stages of the COVID-19 pandemic, it was observed that hospitalized COVID-19 patients had an elevated incidence of thrombosis, which was linked to a heightened pro-thrombotic condition. Cilostazol is a specific inhibitor of phosphodiesterase type 3 (PDE 3), targeting platelet aggregation triggered by adenosine diphosphate (ADP), epinephrine,

collagen, and arachidonic acid, respectively. By investigating the molecular interaction of cilostazol with PDE3 enzyme, we found that Quinolin-2(1*H*)-one nucleus is important for the crucial interaction. Hence, designing such compounds showed the analog strategy for development of potential antiplatelet agents.The docking of the designed analogues having quinolin-2(1*H*)-one nucleus were docked against the PDE 3using BIOVIA's Discovery studio 2023 software along with the prediction of drug-likeness and pharmacokinetic properties using TOPKAT module of Discovery Studio.The designed compounds were showed far better docking score and molecular interaction with the target when compared with the standard drug cilostazol. Hence, the development of these analogues can be proved as potential antiplatelet drug discovery.

NTO007

Development of Novel Spermatogenic Agents Through Molecular Modification Approach

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Testosterone is the key hormone responsible for the initiation and maintenance of spermatogenesis. Reduced level of testosterone is the primary reason for reduced libido and sperm count. It is synthesized from dehydroepiandrosterone in Leydig cells, with the help of the enzyme β- hydroxyl steroid dehydrogenase (β- HSD). *Argyreia speciosa* is reported to be the activator of the male reproductive system. It has been studied extensively in our research laboratory. A novel molecule- N-methyl ergometrine- was isolated form the plant and was reported to improve testosterone production in the rat Leydig cells. Though potent, its amount is very less in the plant. Therefore, we aimed to structurally simplify N-methyl ergometrine through bond disconnection approach to design a series of molecules. To proceed further, the series of compounds were docked on the β- HSD enzyme. The molecules with the good binding score were synthesized, characterized and pharmacologically screened. The synthesized compounds were subjected to *in vitro* pharmacological assay for assessing spermatogenic potential in isolated Leydig cells, checked by estimating testosterone concentration. The most active compound produced 30.89 ± 0.29 µg/mL testosterone at the dose of 10 µg/mL, as compare to 1.05 ± 0.34 µg/mL testosterone in positive control, measured using the developed HPTLC method. The result of the *in vitro* screening suggest that the synthesized compound possess potent spermatogenic action as it increases the testosterone production in the isolated cells. The results will be further supported by carrying out the *in vivo* screening in the experimental animals.

NTO008

Isolation and Characterization of R and S Guaiphenesin by Direct Chiral Separation Techniques

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To develop a simple, quick, accurate, and precise RP-HPLC technique for the separation and characterisation of chiral impurity of R and S Guaiphenesin in bulk and marketed formulation. To examine the kinetic characteristics of the R&S separations from the API and formulations. The generated solutions were scanned in the UV spectrum and confirmed to be 221nm. Developed in a gradient HPLC LC-10 AT-VP solvent delivery system with a chiral column of 250x 4.6 mm i.d., 5µ. The flow rate was set at 1.2ml/min with an injection volume of 20µl. The approach was linear in the concentration range from 10-100 µg/ml with correlation values of 0.9929 and 0.9921. The created technique has been validated as per guidelines and results presented within the restrictions. The Developed strategy presented for complete method validation to verify the method's reliability. The proposed technique was confirmed as per ICH Q2R1.The devised procedure was accurate and exact, within the limitations. The R&S Guaiphenesin have been isolated and described. Guaiphenesin, acting as an expectorant, plays a critical function in eliminating accumulated pathogens. The chiral structure of Guaiphenesin demands the separation of R&S forms for measuring kinetic characteristics. The devised RP-HPLC technique showed successful in isolating and characterizing chiral impurities of R and S Guaiphenesin. The method's accuracy, precision, and linearity in the given concentration range confirm its dependability for practical applications. The modifying chromatographic parameters is crucial for effective separation and measurement of enantiomers in R & S GUP. The test findings revealed R&S GUP content in dosage forms at 46.1% and 44.7% by weight, and in bulk pharmaceuticals at 48.39% and 51.7% by weight. The Limit of Detection (LOD) and Limit of Quantification (LOQ) for both R&S GUP were determined to be 5 µg/ml and 10 µg/ml, respectively.

NTO009

Analytical Method Development and Validation of Posaconazole and its Pharmaceutical Dosage Form Using RP-HPLC

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Posaconazole is a systemic triazole antifungal agent used in the treatment of broad array of Invasive Fungal Infections. This study aimed to develop and validate a reverse-phase high-performance liquid chromatography (RP-HPLC) analytical method for measuring Posaconazole in both bulk and dosage forms. The method entailed employing isocratic elution to separate the drug on an EVO C18 column utilizing a mobile phase composed of Acetonitrile and acidified water (pH 4.2) in a 55:45 (v/v) ratio. The flow rate was set at 1 ml/min, and the detection of the analyte occurred at a wavelength of 262 nm. Validation of the HPLC method was performed using the International Conference on Harmonization (ICH) Q2 (R1) to show that the developed HPLC method is reliable, accurate, precise, and consistent. The developed HPLC method exhibited excellent linearity in the concentration range of 0.1 to 32 µg/mL. The mean recovery percentage for both intra-day and inter-day analyses of posaconazole was within the range of 85%-115%. This precision analysis indicated that the optimized method is suitable for accurately quantifying Posaconazole. The developed method demonstrated accuracy, precision, specificity, linearity, robustness, and stability making the method suitable for the quality control and assessment of pharmaceutical products containing Posaconazole.

NTO010

Analytical Method Development and Validation of Dasatinib using RP-HPLC

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Dasatinib is an oral Tyrosine Kinase Inhibitor (TKI) which targets both Chronic Myeloid Leukaemia (CML) and Philadelphia Positive – Acute Lymphoid Leukaemia (Ph+ALL). It targets SRC family kinases as well as imatinib-resistant BCR-ABL kinase. Dasatinib is approved for the treatment of individuals with imatinib-resistant and imatinib- intolerant chronic myelogenous leukaemia. Since there is lack of analytical methods for precise quantification of Dasatinib in novel dosage forms, the aim of this study was to develop a method to quantify Dasatinib in novel dosage forms. The HPLC method was developed and validated based on International Conference on Harmonisation (ICH) guidelines. Isocratic elution is done using Phenomenex EVO C18 column using Acetonitrile and acidified water (pH 5.1) in 35:65 (v/v) ratio as the mobile phase. The analyte was detected at 322 nm. The developed HPLC method exhibited excellent linearity in of 0.2 to 4 µg/mL concentration range. The mean recovery percentage for both intra-day and inter-day analyses of Dasatinib was within the range of 85%-115%. The method's specificity, linearity, precision, accuracy, robustness, and stability were evaluated, and the method was suitable for accurately quantifying Dasatinib.The method's accuracy, precision, specificity, linearity, robustness, and stability demonstrate its effectiveness. The developed and validated HPLC method was reliable and efficient for analyzing Dasatinib.

NTO011

Advanced Point-of-Care Calcium Assay: A Novel and Robust Diagnostic Approach

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Calcium (Ca^{2+}) stands as a crucial nutrient, ranking among the most vital minerals for the human body. Its significance lies in fostering the growth and maintenance of bones, teeth, and nails. In its ionized form, Ca^{2+} plays a pivotal role in essential physiological processes like hormone secretion, nerve conduction, and blood coagulation. Lower than normal calcium concentrations may signal the presence of osteoporosis, vitamin D deficiency, eclampsia, or hypoparathyroidism. Conversely, elevated calcium concentrations may suggest hyperparathyroidism, vitamin D intoxication, or myeloma. Therefore, determining Ca^{2+} concentration in body fluids becomes integral for evaluating and safeguarding against diseases that manifest through abnormal calcium levels. In response to this critical need, the development of highly sensitive devices for portable, simple, and rapid deficiency screening in patient care becomes paramount. The novel approach presented here is characterized by its low cost, simplicity, sensitivity, speed, and suitability for real-time on-site detection. The absence of the need for complex and expensive instruments positions this method as a potential breakthrough for point-of-care diagnosis. Starch sheet-based device were fabricated in 1.5ml of eppendorf containing calcium sensitive dye in

alkaline pH which is also sensitive to magnesium at acidic pH. To overcome the magnesium sensitivity masking agent is employed 8-hydroxyquinoline. The maximum liquid volume required for detection zone is 30 µL. Under optimal conditions, a quantitative linearity in the range of 6.5 µg/ml to 11.5 ppm with a detection limit of 6 µg/ml and results are overlayed with the commercial kit (E-lab bioscience). The combination of simplicity, speed, and suitability for on-site detection makes this method a promising tool for efficient and accessible Ca^{2+} detection in various healthcare settings.

NTO012

Synthesis and Computational Study of Prospective Anti-Infective Agents

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The surge of infectious diseases, particularly resistant infections, demands the discovery of new potential anti-infective agents. Pyrimidine-containing compounds have gained significant attention in the area of drug discovery due to their extensive range of pharmacological activities.16 pyrimidine derivatives were synthesized using an environmentally friendly microwave-assisted reaction with green solvents to provide cleaner yield within a shorter span. The antibacterial evaluation was performed against selective gram-positive strains including *Bacillus subtilis, Staphylococcus aureus;* gram-negative strains of *Salmonella typhi, Klebsiella pneumonia, Pseudomonas aeruginosa* and *Escherichia coli.* The study was performed using Agar Disc Diffusion Assay with Ciprofloxacin as positive control and DMSO as negative control. Antioxidant activity was evaluated using the DPPH method with Ascorbic acid as the standard. Among the compounds synthesized, the best yield obtained was 84.38% of compound III-M. A good docking score was attained in compound III-F with a binding affinity of -10.3 with Ciprofloxacin as the reference. The compound III-I exhibited homogeneous antibacterial activity to that of the positive control with MIC value ≥25 against gram-positive and gram-negative bacteria followed by compounds III- A and III-D. The compound III-M when evaluated for antioxidant activity exhibited the least IC50 value of -122.6685. Pyrimidine derivatives were synthesised and their anti-infective activities were evaluated. Compound III showed good anti-bacterial as well as anti-oxidant activity. The results imply that the synthesized pyrimidine derivatives have potential to be evaluated further for development as good anti-infective agents.

NTO013

Computational Exploration of *Costus Specious* Bioactive Compounds: Unveiling Potential Antidiabetic Agents through *In-Silico* Molecular Docking and Screening

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Costus speciosus, a plant deeply rooted in traditional medicine, has been revered for its multifaceted pharmacological activities. This study aimed to explore the novel antidiabetic compounds derived from *Costus speciosus*, shedding light on their binding pattern and affinities towards PPAR-γ, a pivotal protein (PDB ID: 2P4Y) in anti-diabetic action. Through an in-depth literature survey, 10 bioactive phytoconstituents were identified and selected for further in silico docking and screening. The

molecular docking analysis revealed that a majority of these constituents exhibited remarkable protein affinity, surpassing that of rosiglitazone, a known anti-diabetic drug. Stigmasterol and campesterol emerged as best drug candidates, boasting the highest binding scores and demonstrating a profound affinity for PPAR-γ. The drug likeness study was carried out in which, sitosterol emerged with a model drug likeness score of 0.78, showcasing its potential as a promising candidate for further drug development. Furthermore, a detailed analysis of the binding interactions indicated the crucial roles of common amino acids, particularly MET and LEU. This study shows the vast potential of *Costus speciosus* phytochemicals as potent antidiabetic agents. Our findings lead to the exploration of these compounds in the development of effective anti-diabetic drugs from natural sources, employing contemporary methods. The collective evidence presented in this research positions the phytochemicals within *Costus speciosus* as compelling candidates for the development of innovative and effective anti-diabetic therapeutics.

TMO002

To Assess the Implementation of Pharmacological Knowledge and Attitude towards the Usage of Dietary Supplements by Undergraduate Medical Students at a Teaching Medical College in Surat City

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In recent years, eating habits and nutritional patterns have steadily evolved and are influenced by socioeconomic status, cultural influences, medical advice, social media and marketing. Use of dietary supplements is also becoming increasingly widespread. The ready availability and use of dietary supplements by public, requires healthcare professionals to be educated regarding use and problems associated with them. The purpose of this study was to assess the types of supplements taken by medical students, their knowledge in this respect, justifications for usage and sources of information of these products. This cross-sectional, questionnaire-based study was conducted at SMIMER Medical College, Surat. Total 230 undergraduate medical students who gave consent were included in the study. A questionnaire consisting of 18 questions was given to third-first and third-final year medical students. Data was analyzed using descriptive and frequency statistics. Out of 230 students, 71.3% of students used some form of dietary supplements, Multivitamins (35.65%) being the most used dietary supplement, followed by Vitamin B (33.47%). 31.3% of students relied upon herbal supplements. 46.52% students sought professional advice before consumption of dietary supplements. 61.3% students are aware about the adverse effects that may be associated with these products. Prevalence of dietary supplement usage among medical students is high, facilitated by easy availability. A significant number of students were lacking awareness and knowledge of rational utilization and adverse effects associated with these products. Their overall attitude and perception towards dietary supplements indicate the need for further education and awareness in this regard.

TMO004

A Study of Awareness of Generic Drugs amongst Residents and Intern Doctors in a Tertiary Care Hospital in Surat City

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As defined by WHO generic drug is "a pharmaceutical product which is intended to be interchangeable with an innovator product that is manufactured without a license from the innovator company and marketed after the expiry date of the patent or other exclusive rights". They are made with the same active substance as the non-generic drugs which are already authorized and approved for their safety, efficacy and quality before getting licensed. A cross-sectional, prospective, questionnaire-based study was conducted on residents and intern doctors. Awareness and knowledge about generic drugs were checked using pre-validated questionnaire which was followed by an educational intervention and post-questionnaire. Data was analyzed using MS-excel. 115 participants voluntarily responded to the questionnaire. As per the result of pre-test many of them were not aware of the difference between generic and branded drug, but after conducting educational intervention, increase in knowledge about term generic drugs, branded drugs, safety, efficacy, availability and regulation regarding prescription of generic drug was seen in follow up evaluation. 99.09% believed that generic drugs are cheaper and 96.33% agreed that generic drugs are as safe as branded drugs, 98.18% believed increasing awareness regarding generic drugs will increase acceptability of generic drugs. The major reasons for opting branded drugs were lack of awareness regarding efficacy, safety, acceptability and availability of generic drugs. Periodic training program would help in clearing doubts, enhance the prescribing of generic drugs and reduce the health expenditure and economical burden.

TMO005

Evaluation of Secretolytic Molecule in Modulation of Astrocyte Expression in Scopolamine-Induced Cognitive Impairment Model in Rats

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Alzheimer's disease (AD) is a neurodegenerative disorder that impairs memory and cognitive function due to neuronal loss and cerebral atrophy. Scopolamine antagonizes muscarinic acetylcholine receptors and causes neuroinflammation and neurodegeneration. Secretolytic agents have shown potential for the treatment of Parkinson's disease and dementia by targeting alpha-synuclein by acting as a molecular chaperone for glucocerebrosidase. This study evaluated the neuroprotective potential of secretolytic agent as a modulator of neuroinflammation and synaptic plasticity. Scopolamine (2 mg/kg, IP for 6 weeks) was utilized to induce cognitive impairment in rats. 3 doses of secretolytic agent were administered orally for 4 weeks. Donepezil served as the reference standard. The percentage time spent in the closed arm of the modified Y Maze and discrimination index in the novel object recognition test was significantly reduced ($p<0.001$) in the DC group compared to the treatment animals. Scopolamine administration significantly increased ($p<0.05$) GFAP immunoreactivity which revealed astrogliosis and neuroinflammation which was found to be decreased in the investigational drug group. The

synaptophysin immunoreactivity was found to be significantly decreased ($p<0.05$) in the DC group which showed a marked decrease in the synaptic plasticity. The histopathological evaluation showed that the DC group showed marked morphological changes which were found to be improved in the treatment groups. It can be concluded from the results that the secretolytic agent ameliorated memory and cognitive impairments by reducing neuroinflammation and increasing synaptic plasticity and thus possesses neuroprotective potential. Further studies are warranted for the elucidation of mechanistic pathways.

TMO006

Rostral Migratory Pathway: Novel Route of Drug Delivery and Brain Targeting

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Rostral migratory stream (RMS) presents as a novel and promising neural pathway that promotes the migration of neuroblasts or other immature neurons from the subventricular zone (SVZ) located in the anterior forebrain towards the olfactory bulb (OB). Neural stem cells within the SVZ produce these neuroblasts, which subsequently relocate through the RMS. These cells differentiate and mature as interneurons as they reach the OB. Observations have indicated that in cases of brain injury, these neuroblasts exhibit an ability to migrate toward the affected region, where they differentiate into functional neurons, providing an optimum level of regeneration and support. We have comprehensively reviewed recent scientific findings involving the mechanisms controlling neuroblast migration across various brain conditions. It gives a detailed discussion of all the factors along with their implications influencing this migratory pathway. Furthermore, we explore the different delivery systems that utilize the RMS for targeted CNS delivery. Potential challenges, advantages, and clinical applications of implementing the rostral migratory pathway for targeted drug delivery within the brain is highlighted. This approach holds a promising direction for significantly aiding the treatment of various CNS disorders, thus representing a possible solution for future therapeutic interventions.

TMO009

Drug Utilization Pattern of Antihypertensive Drugs among Hypertensive Patients at a Tertiary Care Hospital in Gujarat

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Hypertension represents a significant global public health challenge, contributing to substantial morbidity and mortality from cardiovascular, renal, and cerebrovascular complications. Periodic drug utilization studies guide rational prescribing by physicians. This prospective observational follow-up study aimed to investigate antihypertensive medication utilization patterns in 140 newly diagnosed hypertensive patients at a tertiary care hospital in Amreli, Gujarat. The study, conducted at the General Hospital in Amreli, enrolled patients aged 18 to 70 years, excluding those with comorbidities, under 18

years, and pregnant or lactating individuals. After obtaining written consent, detailed medical histories and demographic information were recorded during each visit over three months. The mean age of the patients was 54.44±8.7 years. Among the 140 patients, 90 individuals exhibited Stage 1 hypertension, while the remaining 50 patients presented with Stage 2 hypertension, as per the JNC 8 guidelines. Among the 140 patients, 60.7% (85) were male, and 39.3% (55) were female. Regarding the treatment modalities, 80 patients received monotherapy, with 62.5% treated using Angiotensin Receptor Blockers and 32.5% using Calcium Channel Blockers. Dual therapy was administered to 60 patients, with 68.33% receiving an Angiotensin Receptor Blocker plus Calcium Channel Blocker combination, and 26.66% receiving an Angiotensin Receptor Blocker plus Diuretic combination. All prescribed drugs belong to the National Essential Medicines List (NEML) 2022, except for losartan and chlorthalidone. Overall, the treatment patterns observed align with standard treatment guidelines. Notably, generic medicines were predominantly prescribed, advocating for their widespread use and encouraging the promotion of generic drugs.

TMO010

Anticancer Effects of Tilorone Dihydrrochloride in DMBA Induced Breast Cancer

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Interferons are known to have anticancer effects. Tilorone is an orally active interferogen. The present study was done to evaluate the anticancer effects of Tilorone in breast cancer. Cytotoxicity of Tilorone was measured in MCF-7 and MDA-MB-231 breast cancer cell lines by MTT assay. Antitumor effects of Tilorone were studied in DMBA induced breast cancer model in SD Rats. Tumors were allowed to grow till their sizes reached to 200-250mm3. Animals were divided into 5 groups: Normal Control without tumor induction receiving normal saline, Disease Control receiving normal saline, Positive Control receiving Doxorubicin (2mg/kg), Test groups T1 and T2 receiving Tilorone (10mg/kg and 20mg/kg) twice a week for 4 weeks. At the study end, blood was collected for biochemical analysis, animals were sacrificed and tumors isolated. ELISA was performed to measure levels of IFN-beta, P53, VEGF-A, and pro-inflammatory cytokines in tumor homogenates. Oxidative stress was measured by determining the levels of lipid peroxidation and enzyme activity of SOD, GSH and catalase. Histopathology and IHC of P53 were performed on tumor sections. Tilorone showed cytotoxicity against MCF-7 and Mda-Mb-231 with IC50 concentrations 41.47µM and 17.32µM, respectively. Tumor regression was observed in animals receiving treatment. Tilorone treatment resulted in decreased levels of VEGF-A and proinflammatory cytokines while increased levels of Inteferon β and P53. Tilorone treatment also increased enzyme activity of SOD, GSH and Catalase and reduced lipid peroxidation. Immunohistochemistry of tumor sections showed increased levels of P53. Histopathology of tumor sections showed normalising morphology of treated animals. Tilorone Dihydrochloride has potential anticancer effects against breast cancer.

TMO011

Unlocking Therapeutic Potential: Computational Screening and In-vitro Profiling of Phytoconstituents as NOX Inhibitors

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Reactive oxygen species (ROS) contribute both to physiological functions and pathological conditions through oxidative stress (OS), driving inflammation and tissue damage in numerous diseases. Targeting NADPH oxidases (NOX) emerges as a promising therapeutic strategy. This study combines computational screening and in-vitro assays to identify potential NOX inhibitors from 140 phytoconstituents. Molecular docking employing Autodock Vina highlighted 35-40 phytoconstituents exhibiting strong NOX inhibitory potential and robust binding affinities to target proteins (3A1F, 1WLP, 1NG2, 5O0X). Fifteen molecules, with docking scores below -6.0, were further scrutinized for physicochemical properties and pharmacokinetic parameters using SwissADME, indicating favourable ADMET profiles and promising oral absorption. To validate computational predictions, MD simulations (50 ns) using GROMACS were conducted on select compounds bound to 5O0X, the dehydrogenase domain of NOX5. In-vitro NOX inhibition studies using WBCs and PC-3 (Prostate cancer) cell lines by NBT (Nitro Blue Tetrazolium) test and Cytochrome C reductase assays were carried out. Molecules 1 and 2 showcased remarkable stability and favourable interactions within the active site, affirming their potential as NOX inhibitors. In-vitro assessments using WBCs and PC-3 (Prostate cancer) cell lines through NBT and Cytochrome C reductase assays revealed compounds with the lowest IC50 values and isoform selectivity. Determining IC50, inhibition type, and Hill slopes will further refine the selection process. This integrated approach merges computational insights with experimental validation, underscoring the potential of identified phytoconstituents as NOX inhibitors. These findings present a promising avenue for the development of novel therapeutics targeting oxidative stress-associated diseases, offering a robust framework for future drug discovery endeavours.

TMO012

The Role of Agmatine in Memory Impairment, Depression, and Anxiety Induced by Chronic Sleep Deprivation

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Chronic sleep deprivation (CSD) refers to the total or extended period of loss of sleep that can occur due to various circumstances, such as staying awake all night to study. This can lead to various short-term and long-term consequences. Short-term effects include heightened stress responses, pain, depression, anxiety, cognitive and memory deficits, and reduced quality of life. The study investigates the use of Agmatine (Agm), a natural polyamine derived from L-arginine, known for its neuroprotective

and antioxidant properties. Agmatine is administered orally to treat behavioural changes induced by sleep deprivation in multiple platform animal model, while mice concurrently received oral treatment of Agm at varying doses (20, 40, and 80 mg/kg). Anxiety, depression, and cognitive performance were assessed right after the CSD protocol. Biochemical assays were used to evaluate the levels of oxidative stress parameters and inflammation in the hippocampus. The study found that administering Agm significantly improved cognitive performance in mice treated with CSD across all behavioural tests. Agm also increased antioxidant capacity by enhancing the activities of reduced glutathione, superoxide dismutase, and catalase enzymes, and reducing malondialdehyde levels. Furthermore, Agm treatment effectively reduced the release of pro-inflammatory cytokines and increased BDNF levels in the hippocampus of sleep-deprived mice. In essence, these results highlight the possibility of using Agm to address anxiety, depression, and cognitive impairments caused by CSD, along with the mechanisms that make it possible.

TMO013

Agmatine-NPY Interplay in Paraventricular Nuclei Regulates Pubertal Endocrine Physiology

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Puberty onset is a complex, organized biological process with multilevel regulation, and its physio-pathological mechanisms are yet to be fully elucidated. Neuropeptide-Y (NPY) is known regulator, however role of agmatine in neuroendocrine physiology of puberty is unknown. On PND 29 to 35 & PND 45-52 daily administration of agmatine (4, 8 µg i-pvn) & l-Arginine (10 µg i-pvn)) in pre- & post-puberty male/female rats was done. Onset of puberty was examined through body weight, age of vaginal opening, oestrus cycle, testis development & plasma hormone levels. Estimation of LH, FSH, ACTH, TSH, oestrogen, progesterone, testosterone, T3 & T4 level in plasma by ELISA. The involvement of NPY was done by implying NPY (peptide) agonist and antagonist - BIBP3226 (1 µg i-pvn). Testes development, vaginal cytology and estrus microscopy verified normal pubertal onset in all experimental groups. Intra-pvn administration of agmatine have significant influenced hormonal levels in HPG axis in pre- & post-puberty male/female rats. NPY receptor antagonist BIBP2336 have shown significant reduction in the effect of agmatine and l-arginine on release and inhibition of hormones in HPG axis. These data suggest the influence of agmatine within paraventricular nucleus on release and regulation of hormones from HPG axis. Furthermore, our study also highlights the implication of NPY within PVN in the regulatory effect of agmatine in pre- and post-pubertal animal. Thus, this interplay can be novel therapeutic target for management of pubertal disorders.

TMO014

Agmatine Modulation Attenuate Simulated Microgravity-Induced Neurological Dysregulation in Rodents

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Extended periods of microgravity during orbital flights can impair astronauts' cognitive abilities, including learning and memory, posing a persistent health concern in aerospace medicine. The present study investigated the role of the agmatinergic system in simulated microgravity-induced neurological dysregulation in rodents. Rodents were exposed to simulated microgravity conditions using the hindlimb model (HU) for 21 days, which induced physiological changes similar to those observed in actual microgravity, as evidenced by impaired motor coordination, increased anxiety-depressive behaviour, and cognitive deficits. Biochemical analysis revealed altered neurotransmitter levels, disrupted oxidative balance, and altered pro-inflammatory cytokines and BDNF levels in the hippocampus in the simulated microgravity group. Chronic agmatine (Agmatine) treatment and its endogenous modulation by L-arginine, arcaine, or aminoguanidine prevented learning and memory impairment. Results indicated that the administration of agmatine and its modulators mitigated the effects induced by HU, as demonstrated by improved motor coordination, reduced anxiety-depressive-like behaviour, and enhanced cognitive performance. Furthermore, agmatine administration normalized the neurochemical imbalances induced by simulated microgravity, alleviated reactive oxygen species production, and enhanced antioxidant enzyme activities in the hippocampus. Moreover, Agmatine treatment effectively suppressed the release of pro-inflammatory cytokines (TNF-α, and IL-6) and improved BDNF levels in the hippocampus of HLU rats. Moreover, agmatine treatment also protected neurons by the preservation of small pyramidal cells of the CA1 region and granular cell layer in the DG region of the hippocampus. The present study suggests that agmatine possesses neuroprotective and neuro-modulatory properties, which can ameliorate simulated microgravity-induced neurological dysregulation in rodents.

TMO015

Prevalence Rate of Depression and Anxiety in Chronic Kidney Disease Patients in Tertiary Care Hospital: A Cross-Sectional Study

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Chronic kidney disease (CKD) is a long-term, crippling medical condition. Due to a variety of physical and psycho- social factors, CKD patients frequently experience depressive and anxiety symptoms. A present study focuses on prevalence of anxiety and depression in all stages of CKD patients admitted at Apollo hospital-a tertiary care hospital. A cross-sectional study was carried out on all patients at Apollo Hospital, a tertiary care hospital, from November 2022 to March 2023. Total 205 patients selected based on inclusion criteria and the severity of mental disorder's assessed using Hospital Anxiety and Depression Scale (HADS) and Hamilton Depression Rating Scale (HDRS) while quality of life and burden of the kidney disease were estimated by using Kidney Disease Quality of Life (KDQOL). Statistical analysis was done in an acceptable manner using ANOVA and t test using the MS-Excel and SSIP software. The prevalence of depression and anxiety disorder among CKD patients was approximately 53.17%, 37.07% and 54.63% respective to the HADS-D, HADS-A, and HDRS scoring scale. Age, gender, CKD stage, and concomitant condition were all substantially correlated with CKD patients with depression and anxiety disease with scoring tool. Current study represents that prevalence

of Depression and anxiety were higher in stage 3b-5 patients as per HADS, HDRS tool and also showed that majority of patients in border line with depression and anxiety. KDQOL analysis indicated that overall health mean was 64.5±4.63 while burden of kidney disease was 47.19±14.07. Study data shows that the prevalence of depressive and anxiety disorders in patients with CKD is extremely high in the Indian patients. The possible reason for the more prevalence could be physical morbidities, burden of disease, as well as reduced quality of life associated with CKD.

TMO017

Agmatine Attenuates Gut-Brain-Axis Dysregulation Induced by Alcohol Addiction

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Chronic ethanol consumption significantly increases the risk of dying, becoming disabled, and experiencing health issues. It can also interfere with one's ability to work and cause one to become distant from their family. Alcohol consumption severely affect the structure and functionality of the gastrointestinal tract and responsible for dysbiosis (Altered gut microbiota level). Agmatine is a novel neurotransmitter critically involved in complications of alcoholism and abundantly present in gut mainly secreted by microbes. Aim of the study is to evaluate the relationship between ethanol administration and gut-brain-axis dysregulation in rat by oral ethanol paradigm and the role of agmatine and probiotics in ethanol-induced dysbiosis. We administered alcohol for consecutive 28 days and observed the different parameters of anxiety and depression, along with ethanol intake, food intake, body weight, locomotor behaviors, etc. Also, we estimate the fecal microbial level in saline, agmatine and probiotics treated groups. Agmatine (20–80 mg/kg, oral) and probiotics (Lactobacillus) (0.5-2.0 ml/rat, oral) treatment significantly decreased ethanol intake in the current study's oral ethanol paradigm and restored the normal gut microbial flora. Agmatine and probiotics at these doses attenuated all the changes made by alcohol consumption including food intake, body weight loss, etc. Similar results were found in administration of sub-effective combination of agmatine and probiotics. Result of the present study revealed that ethanol administration disrupts the gut-brain-axis and agmatine and probiotics are potential therapeutic targets that could revert ethanol-induced dysbiosis and other associated conditions related to addiction.

TMO018

Therapeutic Potential of Agmatine Treatment in Glycerol Induced Muscle Atrophy in Rat

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Skeletal muscle is most common tissue in vertebrate's bodies and serves for different important functions. As skeletal muscle is target of glucose uptake it can regenerate after injury. Skeletal muscle

atrophy occurs due to various conditions such as muscle wasting or reductions in protein associated with aging, injury, and inflammatory processes. It is associated with reduced muscle strength and reduced protein content. Glycerol i.m. induces disruption of skeletal muscle fibers. Animals were randomly divided, each group were sacrificed at an interval of 3,7,14 days. Glycerol (50%) was injected into the left T.A. muscle of animals in all groups, the right T.A. muscle acted as control. Agmatine was administered orally for 14 days in glycerol model. Agmatine solution was freshly prepared at 20mg/kg and 80mg/kg of dose in distilled water and administered orally to rats. Following the treatment various behavioral parameters, biochemical and histopathological examination were carried out. After 3,7,14 days of glycerol injection muscles were removed. Weight of muscle and oxidative parameters such as MDA, Glutathione, Catalase level and creatinine level is estimated. Treatment with agmatine sulfate reduced levels of MDA and serum creatinine kinase level by day 14 and increased the levels of glutathione and catalase. In histopathological examination agmatine treated groups respectively showed better growth of muscle fiber. The study demonstrates the effects of agmatine on weight of muscles and on oxidative parameters in the treatment of glycerol-induced muscle atrophy. The histopathological evaluation of damaged muscle was recovered with the agmatine dose.

TMO019

Molecular Docking and In Silico ADMET Study Reveals Novel Synthetic Tyrosine Kinase Inhibitors as a Potential Lead for Treatment of Diabetes

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Peroxisome proliferator-activated receptor gamma (PPARγ) is a potential target for the treatment of diabetes mellitus. Tyrosine kinase inhibitors are effective in the targeted treatment of chronic myeloid leukaemia. The focus of the discovery and development area was shifted towards newer alternatives of this full agonist which are known as selective PPAR-γ modulators. In current study, we have investigated the interaction of novel synthetic tyrosine kinase Inhibitors with PPARγ using computational molecular docking study. The library of energy-minimized compounds was docked against the PPAR-gamma receptor (PDB: 4r09) using gold software. The compounds having the best PLP fitness score were selected for further pharmacokinetic and toxicity analysis. The in-silico analysis of physicochemical properties, lipophilicity, solubility, pharmacokinetics, drug likeliness, and toxicity predictions was performed using Swiss ADME, ADMET Lab 2.0, and ProTox-II software. The results obtained from these in silico investigations warranted further evaluation of these novel synthetic tyrosine kinase inhibitors as PPARγ ligands in-vitro. The docking studies suggest that the selected PKP13, PKP15, PKM14 interact with PPARγ in the ligand binding domain with high positive predictive values. These three molecules have shown stronger binding and high affinity to PPARγ ligand binding site. The results have also indicated that most of the molecules qualified Lipinski's rule for drug likeliness and passed the other criterion of ADME with no toxicity. The results of invitro studies have also shown glucose uptake promotion. Thus, novel synthetic tyrosine kinase inhibitors can act as potential candidate for the treatment of diabetes.

TMO020

Antidepressant-Like Effect of Agmatine in Dysbiosis Induced Depression Mediated Through Gut-Brain-Axis

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Depression is a common psychiatric disorder characterized to affect mental and physical health. Clinically, depressive episodes are associated with dysregulation of gut microbiota and vice versa indicating the role of gut-brain-axis (GBA) in depression. Chronic administration of antibiotics causes dysbiosis which leads to depression-like characters. Agmatine is a neurotransmitter/neuromodulator, abundantly present in CNS and GIT and it is got secreted by microbes. Agmatine has shown to exert numerous effects on the CNS. Agmatine and agmatinergic system is dysregulated in depressive patients. To identify the effect of antibiotic induced dysbiosis on pathogenesis of depression and role of agmatinergic system in its reversal through gut-brain-axis regulation. Depression was induced through dysbiosis, using antibiotic 5-Fluorouracil (20 mg/kg, orally) administered for 4 consecutive days. Dysbiosis and induction of depression were confirmed by microbial and behavioral studies respectively. Agmatine (10, 20 and 40 mg/kg) and probiotic (1, 2.5 and 5 ml/kg of 107CFU/ml) were administered orally during antibiotic administration and after dysbiosis to evaluate their effect on altered behavior and microbial composition. Agmatine (20 and 40 mg/kg, oral) and probiotic (2.5 and 5 ml/kg, oral) administration on 5th day (after confirmation of dysbiosis) significantly decreased the immobility time in FST in depressive rats, it also increased the concentration of Lactobacillus and decreased concentration of E. coli in gut. Agmatine modulators and combination of agmatine and probiotics produced same effect as above. Agmatine produced antidepressant-like effect through GBA regulation and it is one of the potential regulators/signaling molecules of GBA in depression.

TMO021

Identification of Terpenoids against Gsk-3β, PP2a and CREB Proteins to Attenuate Epilepsy-Induced Cognitive Impairment by In-Silico Approach

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Despite being one of the most prevalent neurological conditions, many people with epilepsy are unresponsive to all forms of treatment. The primary goals of the current pharmacological treatments for epilepsy are to lessen hyper-excitability and prevent seizures; however, are unable to affect the underlying pathophysiology and its related comorbidities like psychotic disorders and cognitive impairment. A well-established literature has proven terpenoids as potential anti-oxidant and anti-inflammatory agents. Glycogen synthase kinase-3β (Gsk-3β), Protein phosphatase 2a (PP2a) and cAMP response element binding protein (CREB) proteins are essential for the cognitive impairment brought on by neuroinflammation related epilepsy. The neuroprotective activity of terpenoids against targets of epilepsy-induced cognitive impairment, such as GSK-3β, PP2a and CREB, was predicted through screening of these compounds (a total of 16 ligands) through a molecular docking study using the GOLD suite (version 3.0). The GOLD score and binding interactions of terpenoids with target proteins

were found to be comparable to those of standard drugs, such as levetiracetam and lamotrigine. Further, the screened terpenoids will be investigated for their neuroprotective activity through in-vitro and in-vivo studies. A total of 4 terpenoids were identified as potential neuroprotective agents. The GOLD score and possible binding interactions of terpenoids with target proteins were found to be comparable to those of standard drugs, such as levetiracetam and lamotrigine. The docking score for the identified terpenoids were found to be higher in comparison to that of standard drugs along with the similar binding interactions for amino acids respectively. Consequently, the results facilitated the process of screening and identifying the potential terpenoids against important targets for epilepsy-related cognitive impairment. Additionally, the docking score cleared the way for additional in-vitro and in-vivo research to determine an underlying mechanism of terpenoids in epilepsy-induced cognitive impairment.

TMO022

Machine Learning for Better Breast Cancer Care: Early Detection and Personalized Prevention

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This study delves into the revolutionary impact of machine learning on breast cancer care. Leveraging sophisticated algorithms, our research aims to transform early detection practices and introduce personalized prevention strategies. Employing a comprehensive approach, we analyzed a diverse dataset of breast cancer cases. Machine learning algorithms were applied to identify patterns, potential risk factors, and correlations crucial for early detection and personalized prevention. The study successfully identified potential breast cancer cases at their nascent stages, demonstrating the efficacy of machine learning in early detection. Moreover, personalized prevention strategies based on individual patient profiles showcased promising results in optimizing healthcare outcomes. In conclusion, the integration of machine learning in breast cancer care holds immense promise. The early detection capabilities and personalized prevention strategies unveiled through this research underscore the transformative potential of machine learning in advancing breast cancer care, offering a glimpse into a future of tailored and proactive healthcare solution.

TMO023

Exploring Neuroprotective Potential: Polyphenolic Compounds Mitigate Quinolinic Acid-Induced Neurotoxicity in Alzheimer's Disease

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Quinolinic acid (QA), a neuroactive metabolite within the kynurenine pathway, is implicated in the pathogenesis of Alzheimer's disease. Its neurotoxic properties contribute to neuronal damage, oxidative stress, and neuroinflammation, thereby exacerbating the progression of cognitive decline in individuals affected by Alzheimer's. In this study, we assessed the neuroprotective potential of polyphenolic

compounds through both in-silico and in-vitro analyses using SH-5YSY cells. In-silico investigations were conducted using GOLD software to assess the binding affinity of polyphenolic compounds towards IDO1 and KMO enzymes. Subsequently, compounds selected based on in-silico findings underwent in-vitro evaluations, encompassing cell viability assays, neuroprotection tests against QA (MTT assay), and measurement of oxidative stress using DCFDA dye. The neuroprotection assay revealed that selected polyphenolic compounds (curcumin, lycopene, curcumin-Zn complex, Bisabolol, bromleine) exhibited IC50 values of 1.36, 0.63, 1.59, 5.99, and 2.58 µM, respectively, against QA-induced neurotoxicity (500 µM). Microscopic examination of DCFDA fluorescence in Cellular ROS assays demonstrated a noteworthy reduction in intense green fluorescence in the lycopene and curcumin-Zn complex treatment groups compared to the positive control group exposed to QA. The findings indicate that polyphenolic compounds, particularly lycopene and the curcumin-Zn complex, display significant neuroprotective efficacy against neurotoxic agents such as QA. Given their ability to mitigate neuronal damage and oxidative stress, these compounds hold promise for potential therapeutic interventions in Alzheimer's disease.

TMO024

A Combined Inhibition of C-Myc and Glutaminase to Manage Triple-Negative Breast Cancer

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In triple-negative breast cancer (TNBC), the transcription factor Myc is overexpressed which is responsible for cancer cell proliferation and drug resistance also TNBC relies more on glutamine for survival. So, a combined inhibition of c-Myc and glutamine will help to block TNBC proliferation and improve anti-tumour activity against TNBC. The effect of simultaneous and sequential dosing of MYCi975 with BPTES and CB839, was determined via combination index using CompuSyn software and was evaluated in-vitro by MTT assay on MDA-MB-231 and MCF-7 cells. A scratch wound assay and colony formation assay was also performed to determine the anti-proliferative activity in breast cancer cell lines. The mean± (SD) half-maximal inhibitory concentration values of MYCi975, BPTES and CB839 were 1.530±2.112 µM, 38.07±2.522 µM, and 49.88±3.252 µM, respectively. The combination index values of different combinations ranged from 0.5 to 0.8, indicating synergistic effects. Furthermore, in combination, the dose of the individual drug has reduced drastically from micromolar to nanomolar range, proving the combination effect. When comparing the two cell lines, higher combination indexes was observed in MDA-MB 231 cells. The selectivity index values of MYCi975, BPTES and CB839 is >3 confirmed their selectivity against MDA-MB-231 cells. In the treatment of heterogenous cancers, combination therapy is more effective than monotherapy. The combination of MYCi975 with BPTES and CB839 shows potent in-vitro cytotoxicity compared with individual drug in MDA-MB-231 cells. Once the MYCi975 enters the clinical trial, this combination is beneficial in the treatment of TNBC.

HTO001

Synthesis, Characterization and Evaluation of Anti-Inflammatory Potential of Beta-Sitosterol-Loaded Functionalized Single-Walled Carbon Nanotubes

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The use of medicinal plants has been rooted in the whole world; many people would draw on the benefits of natural bioactive constituents for numerous ailments, specifically as nutraceuticals. Carbon nanotubes have been widely exploited in various fields from electronics and materials science to nanomedicine. The studies on their effect on the immune system have revealed that they possess intrinsic anti-inflammatory properties reducing the production of proinflammatory cytokines and modulating immune cell maturation. In addition, their large specific surface area associated with high biocompatibility allows their use as carriers for the delivery of anti-inflammatory agents. To substantiate this hypothesis, the objective of the current study was to fabricate functionalized single-walled carbon nanotubes (f-SWCNTs) with carboxyl functional groups, load them with beta sitosterol, and conduct in vitro assessments of their anti-inflammatory activity. Functionalization of SWCNTs was achieved through the acid treatment (H2SO4 + HNO3). Beta sitosterol was loaded into the prepared functionalized CNTs, thereafter; in vitro drug loading capacity and % drug release were calculated. Also, the prepared f-CNTs, beta sitosterol loaded CNTs were distinguished by using SEM and FTIR spectroscopy. The results obtained demonstrate that functionalized single-walled carbon nanotubes (f-SWCNTs) with carboxyl functional groups, load them with beta sitosterol can significantly and dose-dependently inhibits RBC haemolysis by membrane stabilization activity as well as exhibited a inhibition of protein (albumin) denaturation depends on concentration. The research was carried out considering the points as need of society for newer anti-arthritic agents obtained from environmental herbal source with significant readings and fewer side effects. When there is less stabilization of membrane, lyses of RBC membrane take place due to the release of haemoglobin, so cell membrane stabilization is very importantly noted in developing carrier based Phyto anti-inflammatory agents. The Positive result is noted when the lyses of membrane HRBC was prevented. The proposed f-SWCNT presents higher potentiality as a carrier vector nanodevice since it can deliver the beta sitosterol on the studied methods of membrane stabilizing and protein denaturation with simultaneously regulating the inflammatory process.

HTO002

Herbal Emulsion: A Convincing Traditional Approach Ameliorates Symptoms of Atopic Dermatitis

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Atopic dermatitis (AD), also known as atopic eczema is a widespread, enduring, and frequently resurfacing inflammatory skin condition. According to WHO global burden of diseases study, AD

affects around 230 million people worldwide. The typical symptoms of AD are acute flare ups of itchy, oozing or weeping eczematous lesions over dry skin. Current treatment to it includes topical corticosteroids but it comes with various side effects such as atrophy, striae, perioral dermatitis, purpura and others that are considerable. Thus, primary goal is designing solution with power of ayurveda. An emulsion is formulated with herbal components that are proven safe and efficacious for AD as per majority of research works. Different concentration of surfactants and preliminary ingredients such as colloidal oatmeal, coconut oil and aloe vera is utilized in both phases of emulsion to optimize it. To evaluate its efficacy animal study on male BALB/C mice was conducted, briefly their dorsal skin surface was shaved and during 8 days of induction, 1% DNCB was applied followed by challenging period with 0.2% DNCB and treatment. After that they were sacrificed with high dose of ether followed by collection of dorsal skin and blood samples from heart. Various inflammatory markers like IL-4, IL-13, Filaggrin, Ig-E levels were measured. Ig-E, IL-4, and IL-13 levels in the treatment group are lower than in the disease group, and these declines are statistically significant. Filaggrin levels articulated nothing distinctly. A finding was supported by histopathological parameters and these results indicated that emulsion may alleviate Atopic Dermatitis.

HTO003

Phytopharmacological Studies on *Dolichandrone falcata*

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The present study is to carry out the phytopharmacological studies on *Dolichandrone falcata* (bark) and to develop simple and reproducible validated analytical method for identification and quantification of bioactive compounds present in bark of *D. falcata* bark. The plant material was extracted with different solvent to produce different extracts by successive extraction. Extracts were subjected to Co-TLC for different possible bioactive compounds using reference standards to check their presence. The HPLC method was developed for quantification of these compounds. To check the antioxidant potential of plant DPPH and ORAC assay were performed and HPTLC bioautography was performed to evaluate acetylcholine esterase inhibition activity. From, the bark of plant two compounds caffeic acid and verbascoside were identified and estimated by newly developed HPLC method. Acetone extract showed good antioxidant activity as compared to other extracts. Petroleum ether extract showed inhibition zones in HPTLC bioautography assay performed for acetylcholine esterase inhibition activity. The present investigation is the first report of HPLC method for quantification of caffeic acid and verbascoside, evaluation of antioxidant activity by using DPPH and ORAC assay methods and acetyl choline esterase inhibition activity by HPTLC bioautography in bark of plant *D. falcata*.

HTO004

Isolation and Characterization of *Plumbago indica L.* Root Extracts

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The active ingredient of Plumbago indica L., Plumbagin, has long been associated with a number of pharmacological actions; however, little is known about their toxicity. For the purpose to determine the crude drug's purity, it underwent pharmacognostic assessment and standardization. Later that, the extract of plants underwent qualitative phytochemical analysis, and its total phenolic and flavonoid content was quantified. Extract isolation with thin layer Chromatography, Column Chromatography, UV-visible Spectroscopy, FT-IR, NMR, and Mass Spectroscopy. Following the extraction of Plumbago indica L. root powder, the methanolic, ethyl acetate, and chloroform extract contained the highest total flavonoid content, which was determined using rutin as a standard. The total phenolic content of the extract was also measured in relation to gallic acid confirming the primary functional group present in the sample by isolating and characterizing the extraction using Thin Layer Chromatography (TLC), Column Chromatography (CLC), UV-visible Spectroscopy (UV-VIS), FT-IR, NMR, and Mass Spectroscopy. The study project's outcomes indicated that Plumbago indica L., roots are rich in phytochemicals, and the presence of Plumbagin is the main source of Plumbago indica L significant several activities. The identity and purity of the compound was confirmed by Thin layer Chromatography, Column Chromatography, UV-visible Spectroscopy, FT-IR, NMR, Mass Spectroscopy. These data strongly support the possible utility of these extracts in disease prevention and treatment. Further the purpose of this study is to formulate (Herbosome) and investigate the effects of Plumbago indica L root extract and Plumbagin on hepatic malignancy.

ABSTRACT- POSTER PRESENTATIONS (PHARMACEUTICAL TECHNOLOGY)

PTP001

Quantitative Laser Diffraction (qLD) for Characterization of Submicron and Subvisible Aggregates in mAbs and Peptides: Addressing Regulatory Gaps

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The immunogenicity of biotherapeutic products, driven by aggregation, remains a critical concern within the biopharmaceutical industry. The submicron and subvisible aggregates have gained a lot of attention due to their known immunogenic reactions and subsequent fatalities in the patients. Also, the lack of guidelines in the range of 100 nm to 10 µm aggregates accentuates the necessity for characterization of such aggregates. Methodology: There are very few instruments available in the said range for detection and characterization of aggregates and most of these techniques are non-quantitative. This created a gap and need for the orthogonal techniques for analysis of the submicron and subvisible aggregates. One such technique is quantitative laser diffraction (qLD) which can quantitatively characterize aggregates in real time using mie theory of light scattering. In our study, we analyzed aggregates in stressed mAbs and peptides by exposing them to pH and temperature stress and found that, the temperature condition of 42°C for 3 days, and a slight change in pH led to the formation of submicron and subvisible aggregates. These therapeutic molecules were also subjected to stirring shear stress using stirrers made of different materials. To our surprise the steel stirring caused higher aggregates size and concentration compared to other materials such as glass and PEEK. The present study highlighted the gap in the regulatory guidelines pertaining to the submicron and subvisible range of aggregates, emphasizing the need for further scrutiny and comprehensive guidelines in this critical size range for ensuring the safety and efficacy of biotherapeutics to the patients, and also the need for optimization of stirring material.

PTP002

Role of Nanotechnologies in Overcoming Barriers in Diffuse Intrinsic Pontine Glioma

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The brainstem tumor known as diffuse intrinsic pontine glioma (DIPG), also known as pontine glioma, infiltrative brainstem glioma, or pontine glioma, is uncommon and virtually always affects children. A pontine glioma develops in the brainstem's most vulnerable region "pons", which regulates a number of vital processes like respiration and blood pressure. It is particularly challenging to treat due to its location and the manner in which it invades healthy brain tissue. With a particular focus on brain tumors

that are incurable, research is ongoing to discover fresh, practical approaches to target particular areas of the brain. This work presents a comprehensive analysis that investigates multiple therapeutic strategies for DIPG, such as chemotherapy, targeted therapy, focused ultrasound therapy, immunotherapy, and convection-enhanced delivery. The primary emphasis is placed on a variety of nanotechnologies designed to address the challenges associated with treating DIPG, including nanogel, nano emulsion, liposomes, nanoparticles, neosomes, nanobubbles, quantum dots, and several more. In addition to presenting new technologies, this paper also provides a review of current clinical trials and patents, offering insights into innovative approaches and potential avenues for the development of new therapeutic interventions.

PTP003

Advancements in Cancer Therapy: Harnessing Near-Infrared-Light Responsive Nanoscale Drug Delivery Systems

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Among all the methodologies for a controlled release system, the use of light in NR window (650-900nm) shows the most appropriate characteristics for biological applications. Owning to its excellent tissue penetration capacity, near-infrared (NIR) light has received significant attention in nanomedicine research recently, either for the direct photothermal killing of tumors or for precisely regulated medication release. Compared to conventional nanoscale drug delivery systems (NDDSs), NIR-responsive NDDSs exhibit superior tissue penetration compared to visible or UV light with shorter wavelengths, and can preferably kill cancer cells when exposed to NIR light. Multifunctional nanomaterials with the ability to respond to near-infrared (NIR) light stimulation are vital for the development of highly efficient biomedical nanoplatforms with a polytherapeutic approach. Up-conversion nanoparticles (UCNPs), two-photon excitation (TPE), and other NIR-light induced photothermal effects have been used in a large variety of NIR-light responsive drug delivery systems. Near-infrared (NIR) light has been successfully created and demonstrated promising therapy outcomes in preclinical trials. In this review, we will introduce different types of NIR-light responsive systems and the latest progresses in their applications for cancer therapy.

PTP004

Formulation, Development and Characterization of Lutein-Loaded Nano-Liposomal Gel for Management of Psoriasis

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Psoriasis is characterized by red spots that appear, scaling and the lack of effective treatment options. Liposomes are considered promising vehicles for delivering drugs through the skin and improving their therapeutic potential of compounds. Lutein suffers from low oral bioavailability and skin penetration. Hence, the current study objective was to formulate and characterize lutein-loaded nano-liposomal gel for managing psoriasis. The various lipids and surfactants were screened for preparation of liposomes.

Liposomes were prepared by ethanol injection method using suitable lipids and surfactant. The batches' particle size, entrapment efficiency and drug loading were 100-200 nm, 90-98% and 19-24%, respectively. The current research emphasizes several advantages of liposomes as a possible medication delivery strategy for psoriasis. Hence, the lutein-loaded nano-liposomal gel may serve as a promising approach to improve drug deposition on the skin in managing psoriasis.

PTP005

Model-Informed Drug Development (MIDD): Current Applications and Future Considerations

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Model-informed drug development (MIDD) is an approach that involves developing and applying exposure-based, biological and statistical models derived from preclinical and clinical data sources to inform drug development and decision-making. It does this by combining data from animal studies and clinical trials to create a better understanding of how a drug works in the body. MIDD can be used to design clinical trials more efficiently, choose the right dose for a drug, understand how a drug works in different groups of people and predict how a drug will interact with other drugs. The US Food and Drug Administration (FDA) is encouraging drug developers to use MIDD more often. This is because MIDD can help to bring new drugs to market more quickly and safely. MIDD is based on three key elements viz 1. Leveraging a thorough understanding of a drug, a disease, and how a drug affects the human body, as well as how the body responds to the drug, 2. Integrating the information by developing mathematical models based on full use of all available data. The data can come from diverse sources such as in vitro, preclinical, and clinical studies, and 3. Applying this knowledge to address issues pertaining to the development of drugs, biological, and generic products, inform regulatory decisions, and clinical use. MIDD approaches have been broadly used to support various aspects of new drug development, such as clinical trial design, regulatory decision-making and policy development. As a quantitative platform, MIDD approaches allow an integration of information obtained from non-clinical studies and clinical trials in a drug development program. General understandings of the underlying biology, pathophysiology, and pharmacology can also be incorporated into the model. Commonly used modelling approaches include popPK modelling, PBPK modelling, and exposure-response modelling. MIDD approaches are used to assist the design of clinical trials in different clinical development programs. MIDD is a rapidly evolving field, and there are many opportunities for its future development. One area of focus is on developing new MIDD tools and methodologies. MIDD has the potential to revolutionize drug development by helping to bring new drugs to market more quickly and safely.

PTP006

Synergistic Combinational Photothermal Therapy-based Approaches for Cancer Treatment

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Cancer, a complex group of diseases marked by uncontrolled cell growth, poses a significant global health challenge. Its enigmatic nature and diverse forms drive the ongoing exploration of innovative therapeutic approaches. Photothermal therapy (PTT) has emerged as a promising strategy due to its specificity and minimally invasive nature. PTT uses a near-infrared (NIR) light source and selectively targets cancerous tissues by converting light energy into heat within the tumor. The study utilized a systematic literature review to explore the synergistic potential of combining PTT with diverse cancer treatment modalities. The interplay of light-tissue in PTT was discussed by emphasizing identifying relevant articles. A detailed study of PTAs, including inorganic and organic nanomaterials, was reviewed. Strategies to enhance PTT effectiveness and refine photothermal conversion efficiency through nanoparticle engineering were scrutinized. Also, PTT applications, individually and integrated with adjuvant therapies, were reviewed. The article explains strategies to improve PTT by enhancing the accumulation of PTAs, optimizing laser dosage, and optimizing photothermal conversion efficiency through nanoparticle engineering. Nanomaterials with near-infrared absorption are used to fine-tune absorbance peaks, leading to better PTT precision. Combining PTT with biocompatible nanomaterials can enhance therapeutic agent persistence and reduce toxicity concerns. In conclusion, the research tackles the heterogeneity and adaptability of cancer cells, improving therapeutic outcomes. The paper highlights potential breakthroughs by combining PTT with other modalities, providing a holistic and effective approach to cancer therapy and paving the way for a more personalized approach to cancer care.

PTP007

Revolutionizing Drug Formulation: Advanced Approaches for Enhancing Solubility

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In the pharmaceutical realm, the solubility issues faced by potent drugs have become a critical challenge, impeding their successful entry into the market. This obstacle has led to the hindrance of otherwise efficacious drugs, affecting the pharmaceutical landscape adversely. Our focus revolves around elucidating key techniques for enhancing solubility, including particle size reduction techniques (Micronization, Nanonization), drug dispersion in carriers (eutectic mixture, solid dispersion), chemical modification techniques (co-crystallization, co-solvency, salt formation, and hydrotrophy), miscellaneous (hot melt extrusion, solvent evaporation, lyophilization, pro- drug), Morden techniques (phospholipid complex, nano-fibres, spherical agglomeration, cellulose, EPAS-evaporation precipitation into aqueous solution, micro-sponge, and supersaturated DDS). These techniques serve as pivotal methods aimed at augmenting the absorption rate, bioavailability,

dissolution rate, and permeability of poorly water-soluble drugs. By delving into these methodologies, our objective is to address the pressing need to improve the solubilization factor of such drugs, potentially paving the way for the successful introduction of otherwise promising pharmaceutical entities into the market.

PTP008

Assessing the Impact of Functional Excipients on Critical Characteristics of Posaconazole Nanocrystals during Lyophilization

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Posaconazole (PS), a new triazole antifungal, is known to selectively impede the ergosterol production, by binding and inhibiting the lanosterol-14alpha-demethylase, present in almost all fungal species. The drug has poor aqueous pH-dependent solubility and exhibits low and erratic bioavailability. The objective of the present work was to modify the poor solubility of Posaconazole using nanosuspension approach, and assess the impact of cryoprotectants used during lyophilization, on the habit modification of obtained drug nanocrystals. Solvent precipitation method was used to make drug nanocrystals using PEG400 and sodium lauryl sulphate as stabilizer in the ratio (4:1). The nanosuspension was subjected to probe sonication for size reduction (0.5 W, pulse time on /off 1 sec, 50 ml batch size) for 3 minutes. The obtained nanosuspension was characterized for size, PDI and zeta potential before lyophilization. Lyophilization was carried out using (Freezing -5 °C for 2 hr and -35 °C for 4 h: primary drying -30 °C for 19 h 0.05 mbar : secondary drying 25 °C for 26 h 0.05 mbar:) 5 % of mannitol, dextrose, maltose, trehalose, and cyclodextrin (as cryoprotect and Lyoprotectant). The developed nanocrystals were characterized by different method likes cake appearance upon visual inspection, moisture content by loss on drying technique, reconstitution time and crystal habit modification using microscopy techniques. It was observed that change in class of cryoprotectant and Lyoprotectant distinctly affects the cake appearance, reconstitution time and crystal habit of Posaconazole from fine cuboidal crystals to needle shaped in case of mannitol, however the same was not observed in case of trehalose, maltose, dextrose and cyclodextrin. In general, the cake appearance of mannitol containing lyophilized product was better than rest of the cryoprotectant. In general, it was observed that changing the type of cryoprotectants, Lyoprotectant and lyophilization cycle distinctly affects the crystal habit and particle size distribution of lyophilized nanosuspension and thus needs to be closely monitored.

PTP010

Exploring Phytoconstituents and Nanotechnological Approaches in Parkinson's Disease: A Focus on Intranasal Drug Delivery for Enhanced Therapeutic Efficacy

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Neurodegenerative disorders have a substantial global prevalence and exert a notable socio-economic burden on the elderly population. In Parkinson’s disease (PD), some conventional drugs continue to

remain an effective option for management although a variety of motor and non-motor signs make managing the condition more challenging. Numerous studies have been conducted in the last two decades to examine cutting-edge therapy strategies for alleviating both motor and non-motor symptoms of PD. Since the dawn of time, plant-derived natural products have carved out their niche in the treatment of neurodegenerative disorders. Several phytoconstituents were identified on a scientific basis emphasizing behavioral, cellular, or biochemical aspects of neuroprotection as observed in the cellular or animal models of the disease where preclinical research shows promising therapeutic and preventive benefits. The blood-brain barrier is the great hurdle for central nervous system (CNS) drug delivery and from various studies it has been found that intranasal drug delivery could be used to administer drugs directly into the CNS, bypassing the blood-brain barrier. Obstacles including mucociliary clearance, enzyme breakdown, and efflux mechanisms make intranasal drug administration difficult while nanoformulations supplemented with nano-carriers offer solutions to these problems by enhancing brain delivery, preventing degradation in the nasal cavity, and improving transport over the nasal mucosa. This paper discusses the therapeutic efficacy of phytoconstituents in PD considering the vast potential of different nanotechnological approaches with special emphasis on Intranasal drug delivery to potentially alleviate symptoms or slow the progression of PD. Hence, the future of PD treatment appears promising and offers hope for patients and researchers alike.

PTP011

Design, Development, and Evaluation of Nano Carrier Based Formulations: A Comprehensive Review

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Background: The Design, Development, and Evaluation of Nano Carrier Based Formulations represent a groundbreaking approach in pharmaceutical sciences. Utilizing nanotechnology, this field focuses on creating delivery systems employing nano sized carriers to transport therapeutic agents effectively. By encapsulating drugs within these carriers, researchers aim to enhance drug stability, solubility, and targeted delivery while minimizing side effects. Methodology: The Methods employed in designing, developing, and evaluating Nano Carrier Based Formulations encompass a systematic approach. This involves selecting appropriate nanomaterials and fabrication techniques, considering factors like biocompatibility and drug loading capacity. Formulation development integrates precise methodologies to optimize carrier drug interactions and control release kinetics. In vitro and in vivo studies assess bioavailability, targeting efficiency, and therapeutic efficacy. These methods amalgamate material science, pharmaceutical technology, and analytical tools to create robust nano carriers, facilitating the thorough evaluation of their potential in drug delivery applications. The Results obtained from the Design, Development, and Evaluation of Nano Carrier Based Formulations demonstrates promising outcomes. Fabrication efforts yielded nano carriers with high drug loading capacities and controlled release profiles, showcasing their efficiency in drug encapsulation. Extensive characterization revealed optimized physicochemical properties, ensuring stability and compatibility. In vitro and in vivo assessments highlighted enhanced bioavailability, targeted delivery, and improved therapeutic outcomes, validating the efficacy of these formulations. The potential of nano carriers in enhancing drug stability, efficacy, and targeted delivery while minimizing side effects. The successful fabrication of optimized nano carriers, coupled with thorough characterization and robust evaluation, validates their potential for clinical translation.

PTP012

Novel Ethosomal Drug Delivery System in Treatment of Alopecia Areata-A Mini Review

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Alopecia areata is an autoimmune disease characterized by patchy hair loss. It affects about 2% of both the male and female population worldwide, with an increasing prevalence. The current treatment of alopecia areata is time consuming, expensive and have a higher chance ofreoccurrence. Ethosomes, which are phospholipid-based vesicles containing ethanol, have emerged as a promising alternative due to its unique characteristics to penetrate deep into skintissues. The entrapped drug molecule in the ethosomes readily reaches the deeper layers of thescalp and hence resulting in increased efficacy of the drug. This review aims to highlight the advantages, limitation, and application of ethosomes in the treatment of alopecia. This is a review that is based on information collected, analyzed from different research papers,and compressed into one single poster that gives out all the recent advancements, prospects, and newer innovations in the field.

PTP013

Nanotechnology Innovation in the Battle against Coronary Artery Disease: Precision Diagnostics and Targeted Therapeutics

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The emergence of nanotechnology provides a new system for the development and operation of nanomaterials in the medical field. Coronary artery disease is a common heart condition that involves atherosclerotic plaque formation in the vessel lumen. Nanotechnology could give a new reciprocal approach to treat coronary artery disease (CAD) which is now one of the biggest killers in the Western world. Nanoparticles are the most promising tool for diagnosing and treatment of coronary artery disease (CAD). Nanoparticles offer a large surface area, the least toxicity, and more bioavailability with vast t1/2 value. Nanomaterials can enhance imaging and biosensing capabilities which can improve the early detection of CAD. Nanomaterials can be used in magnetic resonance imaging and biosensors for biomarker detection. Moreover, nanoparticles can enhance the effectiveness of the medicines improve original and systemic delivery to atherosclerotic plaque, and reduce inflammation after intervascular intervention. To improve the performance of current stents, nanotechnology provides different nanomaterial coatings, in addition to controlled-release nanocarriers, to prevent in-stent restenosis. Nanocarriers such as liposomes, polymers (PLGA), inorganic nanoparticles (AuNPs), MnO2, etc.), and natural nanoparticles (HDL) have anti-inflammatory and anti-oxidative properties in plaque microenvironment which are pharmaceuticals regarded as the treatment of atherosclerosis. This review underscores the transformative impact of nanotechnology on both the diagnosis and treatment of CAD, offering a glimpse into a future where precision drugs and targeted interventions redefine the landscape of cardiovascular care.

PTP015

Nano-adjuvated Vaccines: A Modern Era of Immunization

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Vaccination is one of the most widely employed and most effective mode of active immunization. Administration of vaccines through various routes have been employed to induce immunity against various pathogens and have played pivotal role in mitigation and prevention of infectious diseases. Modern synthetic and recombinant vaccines are often poorly immunogenic, have high doses and require repeated administration. To overcome these shortcomings, vaccines are often formulated using adjuvants. Adjuvants are synthetic immune-stimulating agents that can protect the antigen from biological environment, increase their half-life, reduce the systemic toxicity and expedite the delivery of antigen to the antigen presenting cells. Many of the currently approved/commercialized vaccine adjuvants are particulates or nano-adjuvants. These distinct classes of adjuvants have unique physicochemical properties that enable them to exert immune-stimulatory action. Various nanoadjuvants currently being used in vaccine delivery systems include but are not limited to colloidal nanosystems like nanoemulsions, nanosuspensions, vesicular nano systems like liposomes, virosomes, aracehosomes, polymerosomes etc. and particulate nanosystems like the metal nanoparticles, mesoporous silica nanoparticles, lipid nanoparticles (SLNs, NLCs, lipo-polymeric nanoparticles), polymeric nanoparticles (dendrimers, micelles). The present article discusses nano-adjuvants administered via invasive and non-invasive routes, their mechanism of immunization, toxicity and adverse effects that have been explored for vaccine development. The article also compares the onventional adjuvants with the novel nanoadjuvants with state-of art research in the domain.

PTP016

Novel Microemulsion Based Formulation for Treatment of PCOS

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PCOS is a hormonal disorder having reproductive and metabolic effects. The symptoms include ovarian cysts, anovulation, insulin resistance, and obesity. Curcumin improves glycemic control and lipid metabolism in PCOS patients while also promoting ovulation. Nigella oil has been demonstrated to cure a variety of other PCOS disorders, including excessive testosterone, hirsutism, acne, and obesity. However, because curcumin has a slow rate of dissolution, it is not utilized in a formulation. So, the aim of the research work is to formulate Nigella oil microemulsion loaded with curcumin. The composition of the formulation was optimized by applying D-optimal design where, Oil (X1), Smix (Surfactant-co-surfactant mixture) (X2), and water (X3) concentrations were chosen as independent variables whereas the globule size (Y1) and solubility (Y2) were chosen as dependent parameters. The optimized microemulsion had 65 nm globule size, 0.32 poly dispersibility index, and -3.5 mV zeta potential. *In-vivo* study was performed in wistar rats, where PCOS was induced by letrozole. Formulation treatment reduced body weight significantly compared to disease control. The estrus cycle was also found to be regular in treatment groups. The treatment also improved insulin resistance, cholesterol, and blood testosterone levels compared to disease control. Histopathological examinations

confirmed a significant decrease in the number of cystic follicles and an increase in the number of developing follicles. In conclusion, the findings revealed that a novel Nigella oil-based Curcumin microemulsion may be a promising therapeutic option for the treatment of PCOS.

PTP017

Phage Therapy: Advancement in the Era of Anti-microbial Resistance

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Antimicrobial resistance is perhaps one of the greatest threats to global health. There is a huge demand for an ideal alternative for the treatment of such infectious diseases. This need has revived bacteriophage (phage) therapy research, which was first implemented almost a century ago but was brought to a standstill after the successful introduction of antibiotics. Several case reports have recognized phage therapy as a potential remedy to the emerging challenge of multi-drug resistance. Bacteriophages (phages) are viruses that can enter and multiply within bacterial cells. Unlike antibiotics, bacteriophages have unique features, such as host specificity, and they do not affect another beneficial microbiome. Phage therapy is defined as the injection of virulent phages directly into a patient to lyse the bacterial pathogens that are responsible for a clinically relevant infection. Phages have co-evolved with bacteria, enabling them to counter emerging resistance mechanisms. In this review, we will discuss the advantages, limitations, and recent developments in this field, such as Phage-antibiotic synergy, Bioengineering, and Phage-cocktail, with specific focus on its current role in addressing antimicrobial resistance and how there is a dire need for advanced clinical trials to overcome challenges. This is a review that is based on information collected, analyzed from different research papers, and compressed into one single poster that gives out all the recent advancements, prospects, and newer innovations in the field.

PTP018

Formulation and Characterization of Risedronate Sodium Sublingual Spray

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Risedronate sodium is a drug of choice for the treatment of osteoporosis and other osteopathy's. It is of BCS class III drug having very poor bioavailability of 0.6%. Currently available oral formulation often causes side-effects and patient non compliance. Sub-lingual spray formulation can be an alternative in the drug delivery. Propellant free Risedronate sublingual spray was formulated using face centered central composite design and optimised by numerical method. Total 16 formulations of Risedronate sublingual spray were prepared and characterised. It was evident that independent variables i.e. Drug Concentration (Risedronate), Concentration of penetration enhancer (propylene glycol), Concentration of polymer (Poloxamer-188) had not caused any significant effect on delivery characteristics spray pattern, spray angle, leak test, prime test, drug delivery uniformity, drug content per spray but influenced the release and permeation study. The spray pattern (ovality ratio), Spray angle (θ) and % drug permeated for the optimized batch FO were 1.1, 64 and 45 respectively. Overall, the study

concluded with satisfactory performance of the device and feasibility of the sublingual formulation of Risedronate sodium.

PTP019

Recent Developments in Drug Delivery Approaches for Treatment of Amyotrophic Lateral Sclerosis

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Amyotrophic lateral sclerosis (ALS) is a progressive disorder characterized by the gradual degeneration of motor neurons. As is the case with all major neurodegenerative diseases, the development of disease-modifying therapies has proved challenging due to many reasons. Additional research is required to develop novel drug-delivery strategies until disease-modifying therapies become available, to facilitate administration and ensure treatment endurance. The review focuses on the marketed treatment options for ALS with their challenges, studies on various types of drug delivery techniques for ALS treatment, emphasizing approaches that lead to simplified dosage regimens, and providing new pharmacological tools. Nanotechnology has the potential to make a significant impact on future drug delivery techniques for ALS. Specifically, drug carrier nano- or microsystems show promise in addressing the limitations of current formulations available on the market.

PTP020

An Overview of Nanofibers as a Novel Approach for the Treatment of Diabetic Foot Ulcers

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Diabetic foot ulcers (DFU) are open sores or wounds that occur due to poor glycaemic control which underlines neuropathy, peripheral vascular disease, or poor foot care. It is mainly seen in patients who have diabetes affecting 7% of the adult population. The current treatment for DFU includes surgical debridement, dressings, wound off-loading, vascular assessment, and glycemic control. Novel treatments like topical fibrin, leucocyte platelet patches, oxygen therapies, and energy-based therapies improve wound healing rates. Nanofiber-based formulations have emerged as promising candidates for DFU treatment due to their unique properties, including high surface area, porosity, and tuneable drug delivery capabilities. This review comprehensively examines the formulation strategies employed in nanofiber-based dressings, evaluation parameters guiding their effectiveness, and the diverse techniques utilized for their preparation. Techniques like template synthesis, self-assembly, temperature-induced phase separation, freeze-drying, and electrospinning contribute to nanofiber formulation. Materials like PLGA, chitosan, and electrospun hydrogels, known for haemostatic and antimicrobial properties, play pivotal roles. Polymer selection plays a significant impact in affecting the durability, biocompatibility, and drug release of the nanofiber. Bioactive agents, growth factors, and antimicrobials enhance wound healing and prevent infection. Evaluation parameters play a crucial role in assessing the characteristics of nanofiber dressings which include mechanical properties, porosity, water absorption capacity, and in vitro/vivo drug release kinetics. As nanofiber formulations advance, cutting-edge materials, controlled

release mechanisms, and personalized medicine indicate a transformative era in DFU treatment. This promises to revolutionize the management of diabetic foot ulcers, offering a novel and effective approach.

PTP021

Recent Advancement in Ocular Drug Delivery System

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Investigators studying Ocular drug delivery, including pharmacologists, face a significant difficulty in understanding the unique physiological and anatomical features that control drug dispersion in the eyes. Many things can stop dilution, lymphatic flow, and tear production when drugs or dosage forms are used. These include static barriers (like blood-retinal and blood-aqueous barriers in the cornea and sclera), dynamic barriers (like choroidal and conjunctival blood), and efflux pumps. Investigating influx transporters on various ocular tissues and devising strategies to deliver parent drugs just to these transporters have garnered significant attention in recent times. Nanoparticles, liposomes, nano-micelles, and microemulsions are some of the colloidal dosage forms that have been looked into in many studies as ways to get around different static and dynamic problems. These colloidal dosage forms have shown promise in improving drug delivery to ocular tissues by bypassing static barriers and targeting specific influx transporters. Additionally, the use of these formulations can enhance drug stability and prolong drug release. Innovative methods for targeted drug delivery have been developed, such as bio adhesive gels and systems based on fibrin sealants. Because of this, developing non-invasive continuous delivery systems and exploring the potential for topical administration to reach the back. Nanotechnology helped deliver the medication at the right concentration. Putting medicines inside liposomes, dendrimers, solid lipid nanoparticles, nanostructured lipid carriers, nano-emulsions, and nanosuspensions makes them more bioavailable, better absorbed, and last longer in the body. This study emphasizes the importance of nanomedicine in ocular medication delivery, highlighting current advancements from recent years.

PTP022

Recent Advances in Microfluidics for the Preparation of Drug and Gene Delivery Systems

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Nanoscale formulation of Drug Delivery System is a challenging procedure though there is a remarkable success ratio, it refers basically the manipulation of fluids at micron scale. It has many applications in the field of biology and pharmaceutical science. Microminiaturization of the large drug particles helps in increasing surface area which in turn increases the better absorption of the drug in the body. The customisation of diverse drug delivery system with distinct characteristics, facilitating the effective dispensing of various drugs and genetic material. There are many Devices influence the nature and characteristics of drug delivery systems formulation, one of it is microfluidic chips that are consumed orally and determine the change in mechanism with respect to body's response. Microfluidic chip drug

delivery system is the most astonishing way to administer a drug for a prolonged period of time. They are used to remote monitoring of health conditions, drug action and vital signs of body which facilitate early detection of health issues. Microfluidic channels are installed to monitor these reactions. Biomedical applications of microfluidic chips include PCR activity, pregnancy, and glucose estimation.

PTP023

Theranostics: Revolutionizing Medicine through Integrated Diagnostics and Therapeutics

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Theranostics, a growing field at the intersection of diagnostics and therapeutics. Various researches have recognized its versatility, particularly in formulations such as nanoparticles, drug conjugates, imaging agents, and targeted therapies. These formulations seamlessly integrate diagnostics and therapeutics in diverse interventions, particularly in oncology (Breast cancer, brain tumours, prostate cancer, and neuroendocrine cancer). The nanosized MRI theranostic, fluorescent dyes, quantum dots, Gadolinium complex and Fe3O4 agents that exhibit responsiveness to endogenous (change in pH, redox environment, or enzymes) or exogenous (temperature, ultrasound, or light) stimulus that are specific to cancer cell micro-enviroment have been explored. The incorporation of various imaging functionality into therapeutic agents renders them particularly appealing for personalized monitoring of in vivo cancer targeting. This current review showcases utility of theranostics in cancer, its varied formulations, applications, and the latest developments propelling this exciting field forward.

PTP024

Polymeric Film Forming Sprays for Topical Delivery: A Critical Review

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Film forming spray systems are novel topical liquid formulation consists of medicament, polymer, plasticiser and solvents, which is being sprayed topically to form film by vaporization. Compared to traditional topical preparations, the film-forming spray provide a numerous benefit, including consistent drug distribution and dosage, higher bioavailability, decreased risk of irritation, sustain drug release, and the ability to manage moisture to speed up wound healing. Polymers and excipients used in film-forming sprays to improve film forming properties and increase the stability of active ingredients. In order to develop an ideal film-forming spray, it is necessary to investigate the different kinds of polymers and excipients based on their assessment criteria. Research on polymers as film-forming matrices and the use of these sprays for current or prospective medical applications were reviewed thoroughly. Natural or synthetic polymers can be used as drug matrices and film formers following the need for increased stability and therapeutic effectiveness of the active substance. Sprayer helps to form droplets with better and more uniform distribution. The formulation is being evaluated for physico-chemical parameters as liquid preparation, as well as, the film formation parameters and specifications of film like transparency, content uniformity, drug release, adhesion, tensile strength, film elongation, etc. Each sprayer to be studied critically as ability to create a uniform film. This review would

summarize various polymers and excipients for film formulations and evaluation parameters. The film-forming spray emerges as a promising, versatile and innovative solution in the realm of pharmaceuticals and may unlock more possibilities in future.

PTP025

Nanotech-based Formulation Approaches for Paediatric Patients: A Systematic Review

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Health officials have actively promoted the advancement of paediatric remedies, giving particular attention to incorporating cutting-edge technologies such as nanotechnology. The utilization of nanotechnology in the pharma sector offers several benefits like enhanced efficacy of treatment, site-specific drug delivery, lower toxicity, and the ability to mask bitter tastes in medications. This review aims to systematically analysing published research work on various nanostructures utilized for treatment of paediatric disorders. A comprehensive literature review was conducted on the Scopus databases, Springer and Web of Science, employing appropriate keywords for the assessment. Relevant data were extracted and analysed from the selected peer-reviewed publications as well as formulation studies leading to patents or commercially available products. The primary factors motivating the application of nanotechnology in developing paediatric formulations were identified as targeted treatment (16%), enhanced taste of medicines (18%), and increased therapeutic effectiveness (22%). The predominant focus in therapeutic medication classes for research are antivirals (24%) and anticancer drugs (55%). Among the various methods for creating nano-formulations, the most frequently cited nanostructures in these investigations included polymeric micelles (31%), followed by lipid-based nanocarriers (25%) and polymeric nanoparticles (12%). The product performance tests designed especially for paediatric evaluations like drug release, palatability, as well as safety and efficacy studies in animal models were reviewed and compared. The review emphasizes the potential of nanotechnology as a valuable tool for paediatric formulation development, and the insights will educate the aspiring formulation scientists to explore nanotech-based formulations and recent evaluation approaches for paediatric patients.

PTP026

Quantum Dots Drug Delivery Systems: Toxicity Evaluation

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Theranostics can benefit by the promised drug transport and imaging capabilities of quantum dots (QDs) as nano-carriers. However, concerns about toxicity which is dependent on an array of intricate components involving size, composition and delivery—overshadow their enormous potential. The shortcomings of QD nano-carriers are the main topic of this systematic review, with particular attention to: (1) Target-specific toxicity: various diseases' QD toxicity vary depending on the drugs that are intended to target them.(2)Comparison: comparing established alternatives to QD toxicity in order to find safer development routes.(3)Mitigation strategies: focusing on biocompatible coatings, controlled release mechanisms, and targeted distribution to address cellular interactions, heavy metal release, and ROS generation.(4)Risks to regulatory environment: examining the existing rules and looking for any loopholes to guarantee ethical clinical translation. In order to pave the path for safer and more responsible future developments in theranostics, this article attempts to offer a critical and nuanced viewpoint on the limitations of QD nano-carriers. A comprehensive systematic review providing qualitative analysis using Google Scholar, PubMed/Medline will be implemented taking into consideration the credible literature from January, 2020 till date. The MeSH criteria will be utilised for the same. highlighting the most significant takeaways gathered for QD toxicity and suggesting specific research avenues to reduce potential risks and improve safety.

PTP027

Optimizing Nanostructured Lipid Carrier Development: A QbD Approach for Safe and Effective Drug Delivery System

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This review will explore the integration of Quality by Design (QbD) principles in the development of Nanostructured Lipid Carrier (NLC), a versatile drug delivery system with unique properties. QbD has evolved as a regulatory requirement, emphasizing a systematic approach to pharmaceutical development, ensuring consistent product quality and performance throughout its lifecycle. The review will show a historical overview of QbD and its incorporation into regulatory guidelines, highlighting its significance in the pharmaceutical industry. QbD, including risk assessment (RA), are discussed as integral components of a comprehensive strategy. Emphasis is placed on the design of experiments (DoEs) as a tool for systematic analysis, allowing researchers to optimize input variables to achieve desired outcomes. NLC, as a drug delivery system, is explored for its versatility in administering therapeutics with diverse physicochemical properties. The application of QbD in the development of NLC ensures the creation of high-quality and robust formulations that consistently meet requirements without compromising safety and efficacy. The systematic development of NLC through DoEs is detailed, showcasing how variations in input parameters can be analyzed to achieve optimal output. Furthermore, the review introduces Process Analytical Technology (PAT) and Six Sigma concepts, emphasizing their potential to enhance the development of optimized NLC formulations. In conclusion,

this review provides a comprehensive overview of QbD principles in the context of NLC development, offering valuable insights into formulation design. The integration of PAT and Six Sigma concepts highlights their potential in ensuring the production of high-quality NLC formulations, contributing to advancements in drug delivery systems. This synthesis of QbD and NLC technologies holds promise for the pharmaceutical industry, facilitating the production of safe, effective, and consistently high-quality drug delivery systems.

PTP028

Advancement in Pharmaceutical Formulation and Therapeutic Considerations of Fenticonazole Nitrate: A Comprehensive Review of Patent

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Fenticonazole Nitrate, an FDA-approved drug was used as a first-line drug for the treatment of vulvovaginal candidiasis. Fenticonazole Nitrate exhibits a broad-spectrum antibacterial action which is commonly associated with the treatment of superinfected fungal skin and vaginal infections. The available market formulation of Fenticonazole Nitrate are tablets, creams, and vaginal capsules. The relevant granted patent applications were located using a patent database, Google patent, and WIPO. The relevant list of patents related to pharmaceutical formulation was analyzed and evaluated. The recent patent literature review emphasized on the limitations of the current market formulation, such as the fact that Fenticonazole Nitrate undergoes first-pass metabolism in tablets, which results in a significant amount of the drug remaining in the gastrointestinal tract and reducing the growth of non-albicans species that are less susceptible to Candidiasis Albicans. This directly affects the absorption and bioavailability issues of a drug. In capsules, long-term placement of this capsule in the vaginal tract is also unstable which further affects the curative effect of fungal infection. This review highlights the different formulation perspectives on patented Fenticonazole Nitrate pharmaceutical formulations to overcome the problems of the current market formulation and drug related side effects of the intravaginal route.

PTP029

Hyaluronic Acid Versatile Excipient for Topical Formulation

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Hyaluronic acid (HA), a vital component found in connective tissues, synovial fluid, and ocular humors, plays a pivotal role as an essential excipient in topical formulations. Discovered in 1934 by Karl Meyer and commonly recognized as Restylane, HA presents a wide array of pharmacological properties, encompassing anti-aging, anti-inflammatory, and wound healing attributes. This abstract delves into the multifaceted role of HA, emphasizing its significance through crosslinking and chemical modifications, amplifying its efficacy in drug delivery systems, tissue engineering, and wound healing applications. HA's diverse molecular weights enable specific functionalities: low molecular weight HA deeply penetrates for hydration and anti-inflammatory effects, whereas high molecular weight HA fosters tissue regeneration. Its adaptability in topical formulations extends to diverse areas including skincare, wound healing, and ocular therapies. Furthermore, a comparative study with PVP K30 in dissolvable

microneedles highlights HA's synergistic advantages in targeted drug delivery coupled with inherent skin benefits. Ultimately, this abstract emphasizes HA's versatility as an indispensable excipient in meticulously tailored topical pharmaceutical formulations

PTP030

An Overview on Carbon Dots and Their Applications in Bioimaging

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Carbon is a fundamental element that makes up nearly all matter on Earth. Carbon dots are a recently discovered type of carbon-based molecule that has a number of promising properties, including water solubility, low toxicity, biocompatibility and photoluminescence. There are two primary methods for synthesizing them: top down and bottom up. The fluorescence property of CDs can be characterized using a variety of spectroscopic techniques. The researcher synthesizes CDs from various precursors and to characterize their fluorescence characteristics. The scientist uses the microwave synthesis method to prepare different batches of carbon dots. The batches were randomized at three different factors: power, time, and urea concentration. The authors concluded that quantum yield of the prepared CDs was measured using absorbance and fluorescence intensity. It has also been shown that CDs work well for detecting heavy metals like Fe^{+3}. In summary, the synthesis process, as well as other factors, can affect the fluorescence of CDs. With the help of bioimaging, it helps to connect the observation of cellular processes, cell structures, and metabolic levels using in vivo and in vitro applications.

PTP031

Nano-Enabled Biodegradable Microneedles: A Futuristic Outlook for Treatment of Psoriatic Arthritis

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The word "arthritis" is used to describe a wide range of inflammatory disorders. Psoriatic arthritis, osteoarthritis, and rheumatoid arthritis, which impact over 7% of the global population. The treatment of arthritis requires long-term therapy, and conventional oral or injectable delivery techniques may create gastrointestinal side effects and inconvenience for the patient over a prolonged period of time. Psoriatic arthritis is a complex condition defined by both arthritis in the joint and psoriatic skin. The disease required specific treatment strategies for delivery of drug in sustained manner to different actions sites. Nanoparticles can improve a drugs solubility and provide controlled drug release in the body. Furthermore, by using a transdermal route, biodegradable microneedles can improve permeability and offer site-specific delivery. Incorporating nano formulations in microneedles can increase a drugs solubility and bioavailability by numerous times while minimizing side effects and facilitating painless drug administration. This review highlights many different types of nano formulations loaded microneedles for psoriatic arthritis drugs and describes their capabilities in achieving various self-enhancement techniques. The difficulties in transferring microneedles from research labs to clinical trials and the marketplace are also highlighted. With transdermal delivery, this innovative technique

offers an alternative to the existing approach of medication administration for the treatment of psoriatic arthritis.

PTP032

Development and Optimization of Herbal Drug Loaded Microemulsion for Treatment of Eczema

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Eczema is a persistent dermatological disorder characterised by parched, pruritic, and irritated areas of the skin. This syndrome is widespread among individuals of all age groups, but it is more often seen in new-borns and young children. Eczema affects 15-20% of children and 1-3% of adults globally. In India, paediatrics varies from 3.1% to 7.21%, while 10% of Indian adults have eczema. A microemulsion is a stable and uniform combination of oil, water, and surfactant, often with the addition of a co-surfactant that is in thermodynamic equilibrium. Extensive research is being conducted on nanoscale colloidal delivery systems that can overcome biological barriers and improve the therapeutic efficacy of drugs. In this study, the Phase Titration technique was used to create Microemulsion. Labrasol and Transcutol P have been shown to be the most effective surfactants and cosurfactants. In order to generate phase diagrams and investigate which one has the largest micro emulsion formulation area, a wide range of Smix to oil ratios were tested, including 1:1, 2:1, and 1:2, as well as 9:1, 8:2, 7:3, 6:4, 5:5, 4:6, 3:7, 2:8, and 1:9. An investigation was carried out to examine the drug's ability to dissolve in different oils, its ability to mix with different surfactants and cosurfactants, and the determination of the appropriate Smix ratio using a pseudo tertiary phase diagram. The optimised batch of the microemulsion was transformed into a micro emul gel. Preparing Microemulgel has many benefits, including enhanced penetration, improved stability, and reduced stickiness. The synthesised herbal drug extract contains flavonoids (81%), phenolics (32%), and other bioactive components. The formation of a transparent, clear, and thermodynamically stable microemulsion has been confirmed by DSC and UV transmittance measurements. The herbal drug extract contains active ingredients that show potential in the treatment of eczema. The micro-emulsion formulations were evaluated for globule size and polydispersity index using a Particle size analyzer. A micro-emulsion formulated with herbal drugs would be more effective for enhancing permeability while reducing side effects. Microemulsion loaded with Herbal drug was successfully developed and characterized. Then animal studies will be done for further evolution.

PTP033

To Formulate and Evaluate Lansoprazole Loaded Nanosponge for Buccal Delivery

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Lansoprazole, a proton pump inhibitor prone to significant degradation in acidic pH, was encapsulated in nanosponge using the emulsion solvent diffusion technique to enhance stability, and protection of

drug. Emulsion solvent diffusion method was used to formulate the LPZ nanosponge. 3^2 factorial design applied to analyses the influence of independent variables, concentration of polymer polyvinylalcohol, concentration of carboxy methyl chitosan, on the responses for dependent variables, particle size and Entrapment Efficiency, PDI Optimized formulation has shown to possess desire PDI and entrapment efficiency. The characterization parameters confirmed the lansoprazole with good stability and no chemical interactions of the drug with the incorporated components. Further, Further, drug release of LPZ from the nanosponge formulations were found to be significantly ($p < 0.05$) higher when compared to the pure drug. Fabricated nanosuspension was found to be stable at 40 ± 2 °C/75 ± 5% RH for the duration of one month and to be continued up to 3 months. In conclusion, LPZ-loaded nanosponge and nanosponge loaded buccal film showed extended release and increase in drug release, which indicated a better way to offer extended release of LPZ in controlling peptic ulcer

PTP034

Optimization and Evaluation of Mixed Polymeric Nanomicelles for the Treatment of Retinoblastoma

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The present study involves development, optimization, and evaluation of sorafenib loaded ocular mixed nanomicelles of soluplus and poloxamer 188 to increase the drug bioavailability posteriorly for the management of retinoblastoma. The drug loaded mixed nanomicelles were prepared (thin film hydration) and optimized by 3^2 factorial design considering amount of soluplus (X_1) and poloxamer 188 (X_2) as independent variables, whereas particle size (Y_1) and *in vitro* drug release (Y_2) was taken as dependent variables. Furthermore, the optimized mixed nanomicelles were evaluated for morphological characteristics, solid state analysis, pH, osmolality, residual solvent, *ex vivo* permeation, cell viability/cell cytotoxicity assays (ARPE 19 and Y-79), ocular irritation and stability studies. The drug loaded polymeric mixed nanomicelles of soluplus and poloxamer 188 were successfully optimized by DoE and validated numerically to arrive at a final formula of drug to polymer ratio of 1:20:50, respectively, attaining desirability of 1. Both the factors X_1 and X_2 has a significant effect on the responses Y_1 and Y_2 with a p-value <0.05. From the equation, it was observed that particle size has an inversely proportional relationship with the independent variables, whereas, drug release has an inversely proportional effect with X_1 and a directly proportional effect with X_2. Further, the optimized mixed nanomicelles showed satisfactory results with other above mentioned evaluation parameters. The final formulation was found to be non-irritant and stable for 6 months on accelerated stability testing. The developed technology is a promising platform for delivering drugs to the posterior eye segment for the treatment of retinoblastoma.

PTP035

Stability Studies of Cocrystals of Mefloquine Hydrochloride

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Mefloquine hydrochloride (MFL) is an antimalarial drug effective against drug-resistant falciparum malaria. As Mefloquine is present as hydrochloride salt, there are no significant attempts had been made for enhancement of solubility. Cocrystallization has emerged as a promising approach to enhance the stability and solubility of pharmaceutical compounds. In this context, the present research focuses on stability studies of cocrystals of mefloquine hydrochloride with different conformers, particularly under accelerated conditions of 40°C and 75% relative humidity for a duration of six months. The cocrystals of mefloquine hydrochloride were prepared by solution cocrystalllization method with different conformers like benzoic acid, aspartic acid, glutaric acid, oxalic acid, salicylic acid and succinic acid. The prepared cocrystals were subjected to solid state characterization by using FTIR, PXRD and DSC before and after stability studies. The prepared cocrystals were also evaluated for solubility and in vitro dissolution performance. The solid-state characterization revealed the formation of cocrystals of mefloquine hydrochloride with different coformers. The results of saturation solubility showed cocrystals prepared with benzoic acid showed 7-fold increase in solubility in SGF of pH (1.2). The PXRD pattern of prepared co-crystals depicted that there was no conversion of crystalline to amorphous form. The prepared cocrystals were found to be stable at accelerated conditions as per ICH guidelines confirmed by FTIR, PXRD and DSC. The cocrystals of mefloquine hydrochloride prepared with different conformers showed improved solubility and rate of dissolution.

PTP036

Cocrystals and Salts of Lornoxicam in Lecithin Based Organogel for Topical Drug Delivery: Optimization of Preservative and *In Vitro* Drug Release

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This study focuses on the development of a cocrystal and salt loaded in lecithin-based organogel of lornoxicam for topical delivery, aiming to enhance drug solubility, stability, and diffusion for improved topical permeation. Lornoxicam, an NSAID, is selected to address the need for effective topical formulations, given the limitations associated with oral administration. The synthesis of cocrystal and salt of lornoxicam is achieved using nicotinamide and proline through the co-grinding method. These cocrystals and salts are then loaded into a lecithin-based organogel. Solid-state characterization involves X-ray diffractometry, DSC, FTIR, and in-vitro dissolution studies, examining structural integrity and drug release profiles. To ensure the stability of the organogel, preservatives such as methyl paraben and potassium sorbate are explored. Characterization confirms the successful integration of lornoxicam, co-crystals, and salts into the lecithin-based organogel. Organogels loaded with co-crystals and salts

exhibit significantly improved drug diffusion compared to lornoxicam-loaded organogels in in-vitro dissolution studies. Methyl paraben and potassium sorbate effectively maintain the stability of the organogel. This study demonstrates the formulation of a lecithin-based organogel for topical lornoxicam delivery, emphasizing enhanced drug diffusion with co-crystals and salts. Methyl paraben and potassium sorbate serve as reliable preservatives, contributing to advanced topical drug delivery systems, especially for NSAIDs, addressing solubility and stability concerns associated with oral administration.

PTP037

A Novel Hydrogel-based Contact Lens of Ganciclovir in the Management of Cytomegalovirus Retinitis

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The present work deals with polymeric microparticles of ganciclovir infused in hydrogel-based contact lens increasing residence time and thus drug absorption providing increased ocular comfort. Hydroxypropyl Methylcellulose (HPMC) microparticles encapsulating ganciclovir (GAN) were fabricated utilizing a solvent evaporation technique and subsequently characterized for encapsulation efficiency, drug loading, and *in vitro* drug release. The contact lens composed of poly (hydroxyethyl methacrylate) (pHEMA), were synthesized via a free radical polymerization reaction. This process involved crosslinkers such as ethylene glycol Di methacrylate and the photoinitiator IRGACURE 1173® under UVB light with a wavelength of 365 nm. The loading of GAN-HPMC microparticles into the pre-polymer mixture, followed by polymerization, resulted in the formation of a particulate dispersion system within the hydrogel contact lenses. The hydrogel contact lens was found to exhibit desirable properties like surface morphology, optical transmittance, and swelling. Notably, sodium ion permeability measured was 3.72×106 mm^2/min. The microparticle embedded hydrogel contact lens demonstrated a sustained release of the encapsulated agent up to 48 hours highlighting its potential for extended ocular drug delivery. Additionally, Hen's Egg Test Chorioallantoic Membrane (HET-CAM) revealed no signs of ocular irritation. The microparticle loaded hydrogel contact lens marks a promising and viable alternative to traditional ocular dosage forms such as eye drops, suspensions, and ointments. The enhanced residence time and sustained release profile accounts for its potential use in near future which could significantly improve therapeutic efficacy and patient compliance for ocular treatments.

PTP038

Cyclodextrin Grafted Chitosan - Hyaluronic Acid Hydrogels Loaded with Curcumin for Treatment of Wounds

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The skin, a vital protective barrier (15% of body weight), faces disruptions through wounds, categorized as acute or chronic, necessitating precise healing strategies. In this study, βCD-grafted chitosan (CS)-

hyaluronic acid (HA) hydrogels were prepared using glutaraldehyde as crosslinking agent for delivery of curcumin, in order to accelerate wound healing. Hydrogel films were developed using solvent casting method which involved dissolving βCD in 0.1 N HCl, adding chitosan and hyaluronic acid, and crosslinking with 2% glutaraldehyde. The films were characterized using ATR-FTIR, DSC, solid-state ^{13}C NMR spectroscopy and evaluated for βCD content, swellability, wound fluid absorption, protein adsorption, drug loading, drug release and hemolysis. βCD-grafted CS-HA hydrogel films showed increase in the active βCD content and crosslinking with increase in the concentration βCD. ATR-FTIR study indicated the formation of crosslinks in between the polymer chains and βCD. DSC analysis confirmed the stability of the crosslinked polymer chains. βCD was found to suppress the swellability of the hydrogel films but it enhanced the loading of curcumin in the hydrogel films. The active βCD controlled the drug release for 48 h. Hemocompatibility was confirmed through a haemolytic assay The overall study suggests that the βCD-grafted CS-HA hydrogel films could be used as a promising biomaterial for the treatment of wounds.

PTP039

Advancements in Nanotechnology for Colon Cancer Treatment: A Comprehensive Review

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Colorectal cancer (CRC) is the third most prevalent cancer among the different types of cancers which leads to cancer-related mortality worldwide, accounting for about 10% of all cancer cases. CRCs are generally adenocarcinoma and initially appear as polyps on the colon or rectum wall which in future leads to malignancy. Available treatments such as radiation, immunotherapy, chemotherapy, and surgery affect the quality of a patient's life as they are long-invasive techniques with unwanted side effects and recurrence issues. Recently, nanotechnology-based therapeutic interventions have gained significant attention due to their potential for accurate targeting and lack of drug resistance. Different types of nanomaterials with the ability for therapeutic and diagnostic applications have been explored for CRC management. These include metal-organic frameworks, carbon nanotubes, dendrimers, liposomes, silica and gold nanoparticles, core-shell polymeric nanoformulations, nanoemulsion systems, solid lipid nanoparticles, nanostructured lipid carriers, liposomes, etc. Nanoparticles provide high specificity, improve tumor targeting, and accumulate in tumor sites which prolongs the blood circulation time, increases bioavailability and minimizes the side effects thereby providing a faster cure in the treatment of CRC. With the use of nanotechnology, early detection and proper treatment of CRC is possible which ultimately decreases mortality. In conclusion, innovative and advanced methods of drug delivery depict significant potential for the effective treatment of colon cancer.

PTP040

Formulation, Optimization and Evaluation of Floating Bilayer Tablets of Valsartan and Hydrochlorothiazide

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Up to 85% of hypertensive patients require two or more antihypertensive medications to reduce their blood pressure. In the present study a combination drug therapy is recommended for treatment of hypertension to allow medications of different mechanism of action to complement each other and together effectively lower blood pressure. Both the drugs valsartan and hydrochlorothiazide have absorption window in the stomach and bioavailability of hydrochlorothiazide was enhanced when given with food through delaying of gastric emptying thus it is suitable candidate for the floating bilayer tablet as it improves bioavailability of drugs. Bilayer tablet were prepared by direct compression technique using kyron T-314 as a super disintegrant for immediate release layer and HPMC K15M and carbopol 940 as a release controlling polymer for floating layer. Based on preliminary trial optimum amount of effervescent mixture and kyron T-314 was selected. 3^2 full factorial design was employed to optimize the polymer concentration. The experimental result of batch B6 shows that 98.18% of drug release of valsartan was achieved within 30 minutes and 98.53% of drug release of hydrochlorothiazide was achieved within 12 hr. So it was selected as a optimized batch. Anomalous release transport was confirmed as the release mechanism from the optimized formulation, which releases the hydrochlorothiazide for 12 hr in sustained manner. The stability data shows that the floating bilayer had good stability. Floating bilayer tablet of valsartan and hydrochlorothiazide prepared using kyron T-314 as a super disintegrant for immediate release layer and HPMC K15M and carbopol 940 for floating layer resulted in increased residence time at their absorption window which shows excellent release properties for the treatment of hypertension.

PTP041

Enhanced Delivery of Hydrophilic Drug through Brain-Targeted Functionalized Mesoporous Silica Nanoparticles

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The brain tumour patients usually suffer from epileptic attacks which is observed in about 40% of patients. This affects the patient's quality of life and lowers the survival rate by causing depression, anxiety, dizziness etc. Levetiracetam (LVM) has a considerable positive effect with fewer side effects

than other available drugs. However, the hydrophilicity, high dose and dosing frequency result in drug resistance and hence poor clinical response. Thus, protein-functionalized LVM-loaded Mesoporous silica nanoparticles (LVM-MSN) were developed for enhanced brain targeting. The optimized LVM-MSN was selected through optimization of different reaction parameters. The pre-mature release of LVM was controlled by coating of the biodegradable chitosan (LVM-Chito-MSN). The coating was ascertained by FE-SEM, XRD, TEM study and through zeta potential. The Apolipoprotein E3 (ApoE3) as a brain-targeting ligand was functionalized on LVM-Chito-MSN (ApoE3@LVM-Chito-MSN). The ApoE3@LVM-Chito-MSN exhibited sustained release of LVM (29%) after 24 h during i*n-vitro* drug diffusion study. The cell viability assay on HEK293 cell-line indicated the safety and potential of cell uptake through U87MG cell line. The ApoE3@LVM-Chito-MSN exhibited about 3 times higher brain uptake than free drug solution as well as lower accumulation in other organs during bio-distribution study. It was proved to be safe owing to the absence of tissue damage in histopathology examination and <5% haemolysis during *in-vitro* haemolysis assessment. Hence, ApoE3@LVM-Chito-MSN might be a prospective approach for the enhanced delivery of hydrophilic molecules to the brain. The decreased dose and dosing frequency might improve the clinical outcome of the therapy for CNS diseases.

PTP042

Surface Solid Dispersion Based Tablet of Tolbutamide for Solubility and Dissolution Enhancement

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Tolbutamide is an oral anti-hyperglycaemic drug used for the treatment of non-insulin-dependent diabetes mellitus (NIDDM). Tolbutamide, belonging to the BCS class II has poor solubility and slow dissolution rate. Various approaches can be used to address the solubility issues of Tolbutamide. This study aims at enhancing the solubility of Tolbutamide by preparing a surface solid dispersion. The formulation encompasses Aerosil serving as an adsorbent, a polymeric carrier, Gelucire and Tolbutamide – the active pharmaceutical ingredient. Furthermore, the surface solid dispersion was punched and shaped into tablets. The designed formulation was evaluated and characterized. All the evaluation parameters were found within the set limits. Thus, this research study resulted in enhanced solubility and dissolution rate of Tolbutamide, ultimately improving pharmacokinetic properties of the historical anti-diabetic drug, Tolbutamide.

PTP043

Design and Development of *Psorlea Corylifolia* Microemulgel for the Management of Vitiligo

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Vitiligo is a skin condition where a person's epidermis develops uniform white macules. It begins on lips, ankles, wrist as well as forearms. Bakuchi oil which is extracted from the plant *psoralea corylifolia*

which has '*psoralean'* as a main chemical constituent. Topical application of bakuchi oil microemulsion may give more benefit compare to using essential oil and oral formulation. Aqueous titration method was used to formulate the microemulsion, 3^2 Factorial design applied to analyse the influence of Independent variable which are oleic acid and smix ratio and response for particle size, PDI, % transmittance was observed and the optimized batch was used to determine the concentration of gelling agent for which Carbopol was used. Micro-emulgel comprise of microemulsion and gel which can provide better penetration power and moreover adding gel to an emulsion boost its stability. This study aimed to prepare Bakuchi oil microemulsion and then incorporate them into a gel using different types of gelling agent such as Carbopol. Potential benefits of using a topical gel containing bakuchi oil repigmentation in vitiligo, anti-inflammatory properties and treatment of skin disorders.

PTP044

The Confluence of Nanotechnology and Heat Shock Protein 70 (HSP70) in Pioneering Glioblastoma Multiforme (GBM) Therapy: Unveiling Pathways to Precision Targeting and Transformation

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Glioblastoma multiforme, with its aggressive nature and complex characteristics, presents a formidable challenge in cancer treatment. Conventional therapies face obstacles like the blood-brain barrier, tumor heterogeneity, and resistance. Innovative strategies, including the role of HSP70, are crucial for improving diagnostic and treatment outcomes in GBM. Recent research leverages HSP70 in addressing GBM challenges. Overexpressed in GBM, HSP70 is a valuable biomarker and therapeutic target. Its roles in protein processes and cellular survival offer diverse avenues for intervening in GBM progression. Engineered nanoparticles, guided by HSP70 targeting, enhance precision in diagnostics, therapeutics, and imaging. Strategies include photothermic, photodynamic, chemo-phototherapy, CDT, and SDT, overcoming resistance. Advanced imaging enriches diagnostics and treatment monitoring, promising personalized GBM interventions for improved outcomes. Nanoparticles, including SPIONs, Metal nanoparticles, micelles, liposomes, cadmium selenide quantum dots, and dendrimers, have been employed for targeted drug delivery and diagnostics in GBM. Functionalized with HSP70-specific ligands, these nanoparticles enable precise targeting, enhanced drug accumulation, and controlled release, potentially revolutionizing GBM therapy. Therapeutic strategies, including photothermic and photodynamic therapies, show promise against GBM resistance. Advanced imaging techniques enrich diagnostics. HSP70-targeted nanoparticles enhance drug delivery in GBM, revolutionizing therapy. Strategies like photothermic therapy show promise against resistance. Advanced imaging techniques enrich diagnostics.

PTP045

A Review on Oral Fast Dissolving Film: A New Approach to Oral Drug Delivery

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Recently, fast dissolving films are gaining interest as an alternative of fast dissolving tablets. The films are designed to dissolve upon contact with a wet surface, such as the tongue, within a few seconds, meaning the consumer can take the product without need for additional liquid. Mouth dissolving films offers an elegant route for systemic drug delivery. The improved systemic bioavailability results from bypassing first pass effect and better permeability due to a well supplied vascular and lymphatic drainage. Also, large surface areas of absorption, easy ingestion and swallowing, pain avoidance make the oral mucosa a very attractive and selective site for systemic drug delivery. Solvent casting method, semisolid casting method, rolling method, hot melt extrusion method, solid dispersion extrusion method**.** Fast dissolving films are the novel approach in oral drug delivery systems. It promises patient compliance especially in case of pediatrics and geriatrics patients. They can also be used when quick action is required. They possess many advantages over conventional dosage form and can also be used in cases of dysphagia, Parkinson's disease, mucositis and vomiting. Over-the-counter films for pain management and motion sickness are commercializes in the US market. However, for the future growth point of view the fast dissolving oral films sector is well-positioned. It seems that the value of overall thin film market will grow significantly.

PTP046

Formulation, Characterization and Evaluation of Mucoadhesive Microemulsion Loaded with Anti-Psychotic Drug for Brain Targeting

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Haloperidol molecule used for schizophrenia possesses pharmacological mechanism of action which it is believed that competitively blocks post synaptic receptors in the brain. Nose to brain targeting renders many advantages over any other delivery route. Mucoadhesive microemulsion by nasal route provides better targeting and also avoids First pass metabolism. Initially screening of surfactant, cosurfactant were done based on Pseudo Ternary Phase Diagram. Capmul MCM, Tween 80 and Peg 400 were used as oil, surfactant and cosurfactant respectively. Optimization were done by D-Optimal design. Here initial coarse macroemulsion was made by adding the oil-surfactant mixture to some of the aqueous phase in temperature-controlled container with agitation. Then system was titrated with cosurfactant, and further diluted with water to give desired concentration. Globule size of the formulation was found to be optimum for nasal delivery of drug. PDI and Zeta potential were found to show desirable properties and stability of formulation. Haloperidol Mucoadhesive Microemulsion releases rapidly (more than 50 % in 2 hrs) in comparison with plain drug (less than 11 % in 2 hrs). The in vivo pharmacokinetic and biodistribution studies showed that the higher concentration of drug in plasma and brain homogenate of Mucoadhesive Microemulsion compared to drug suspension The study data confirmed the stability of the formulation in refrigerated temperature. The result illustrated the potential

and safe intranasal use of Haloperidol Mucoadhesive Microemulsion to increase solubility and bioavailability.

PTP048

Protein Engineering Responses to the COVID-19 Pandemic

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Protein engineering has played the utmost important part for formulating a vaccine to fight with the pandemic. Viral Glycoprotein structure has played the crucial part for developing the covid-19 vaccine. RBD (receptor binding domain) is used from the covid 19 patient as a part of immunity generated through infection. Glycine Serine linkers have been used to fuse RBD to Foldon which is trimeric form of viral fusion protein. Ectodomain antigens also have more t cells epitope that effectively stabilized the MERS-CoV and SARS-CoV spikes in the perfusion conformation. Major goal of this vaccine is that it can protect human body from not only covid 19 but also viruses like SARS-CoV-2 VOCs and Sarbecoviruses, for that conserved helix at the base may provide direction for epitope focused design.

PTP049

Formulation and Characterization of Bosentan Loaded Oral Liposomes for Enhancing Bioavailability

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Bosentan molecule used for the treatment of pulmonary arterial hypertension. It is BCS class II drug with absolute bioavailability of 50% and half-life is 5.4 hrs. Oral Liposomes increases the drug solubility, oral bioavailability by avoid first pass hepatic metabolism and provide sustain release to overcome dose dependent hepatotoxicity. Initially screening of excipients were done based on particle size, zeta potential and entrapment efficiency. Optimization were done by Box-Behnken Design. Method used to formulate oral liposome is thin film evaporation. Initially oral liposome made by solvent evaporation and hydrated with aqueous medium then sonicate to reduce the particle size. Particle size, Zeta potential, Entrapment efficiency and Drug loading of oral liposome were found optimum. Oral liposomes give sustain releases of the drug. The pharmacokinetic parameters demonstrate that the oral liposomes formulation exhibited favourable characteristics, including higher AUC values, prolonged elimination half- life, slower clearance rate, and increased bioavailability, when compared to the drug suspension. The study data conformed the stability of the formulation in refrigerated temperature.

PTP050

Innovative Fast Dissolving Strips in Oral Drug Delivery: Formulation, Characterization and Application

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As an alternative to fast-dissolving tablets, fast-dissolving strips have gained recent interest. These strips are designed to be ingested without water, disintegrating within seconds upon contact with wet surfaces such as the tongue. Fast-dissolving strips are widely accepted by both geriatric and paediatric populations, addressing concerns related to choking. Notable features of these strips include their thin and elegant design, availability in various sizes and shapes, adhesion to the oral cavity, and rapid disintegration. The formulation typically comprises water-soluble polymers and other ingredients, forming the film base in which the active ingredient is incorporated. Various preparation methods, including solvent casting, semisolid casting, hot melt extrusion, solid dispersion, and the rolling method have been explored. Solvent casting and semisolid casting are commonly favoured due to their ease of preparation, low processing costs, and straightforward application. The hot melt extrusion method emerges as an innovative alternative for oral film formulation. It effectively masks the bitter taste of drugs without the need for taste-masking agents and eliminates the use of organic solvents. Characterization of these strips involves assessing parameters such as thickness, dryness, tensile strength, percent elongation, folding endurance, disintegration, dissolution studies, organoleptic tests, surface pH, transparency, and stability studies. Fast-dissolving strips find application in cases of dysphagia, mucositis, and vomiting. This review underscores the innovative nature of strips in oral drug delivery, emphasizing their additional features compared to conventional dosages which include the elimination of the need for water, the possibility of taste masking, a large surface area facilitating better disintegration and dissolution in the oral mucosa and ultimately improved patient compliance.

PTP051

Bilayer Tablet: A Novel Drug Delivery System

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Bilayer tablets are the medicines which consist of two same or different drugs combined in a single dose for effective treatment of the disease. Controlled release dosage forms have been extensively used to improve therapy with several important drugs. Therapeutic strategies based on oral delivery of bilayer and multilayer tablets are gaining more acceptances in product development. This tablet technology is an improved beneficial technology to overcome the shortcomings of the single-layered tablet. The technology has proven tremendous accessibility to counter several diseases and ailments that require both functionalities. It is also possible to deliver multiple drugs to achieve different therapeutic effect using a single dosage form. Bilayer tablet system has successfully used in the treatment of chronic diseases such as diabetes mellitus, cardiovascular and inflammatory diseases. This article provides an overview of the bilayer tablet technology, highlighting the benefits of this type of oral dosage forms, the different manufacturing processes used for preparation of bilayer tablet, reveal the challenges that

appear during the preparation of bilayer tablets, formulation aspects of bilayer tablets are mentioned to better understand the bilayer tablet.

PTP052

PLGA Based Polymeric Nanoparticles for Parenteral Drug Delivery System

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Polymeric nanoparticles, particularly those based on Poly (lactic-co-glycolic acid) (PLGA), have emerged as promising vehicles for parenteral drug delivery systems. PLGA's biocompatibility, biodegradability, and FDA approval make it an ideal choice for encapsulating a variety of therapeutic agents. This review explores the significant advancements in the design and application of PLGA-based polymeric nanoparticles for parenteral delivery. The unique properties of PLGA, such as its tunable degradation rate, provide control over drug release kinetics, ensuring sustained and controlled release. These nanoparticles exhibit stability in the bloodstream, enhancing drug circulation time and improving therapeutic efficacy. Furthermore, the versatility of PLGA allows for the encapsulation of diverse drugs, including hydrophobic and hydrophilic compounds, expanding the range of therapeutic applications. The review covers the various formulation strategies employed in developing PLGA-based nanoparticles, including nanoprecipitation, emulsion-solvent evaporation, and coacervation methods. Additionally, it discusses the impact of particle size, surface charge, and drug loading on the nanoparticles' performance. The biodegradability of PLGA ensures the safe elimination of the carrier material, minimizing potential toxicity concerns. Furthermore, the ability to modify the surface of PLGA nanoparticles enables targeted drug delivery, improving site-specific accumulation and minimizing off-target effects. In conclusion, PLGA-based polymeric nanoparticles offer a versatile and efficient platform for parenteral drug delivery, with the potential to revolutionize the treatment landscape by enhancing drug bioavailability, improving therapeutic outcomes, and minimizing adverse effects.

PTP053

Formulation, Optimizaton and Ex-Vivo, In-Vivo Evaluation of Transdermal Patch of Sertraline HCL Loaded Nanostructured Lipid Carriers

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The aim of the present work was to develop nanostructured lipid carriers (NLCs) and NLC-loaded transdermal patch of Sertraline HCl which is a Selective Serotonin Inhibitor for effective treatment of depression. It was hypothesized that the NLCs formulated as a transdermal patch will avoid first pass metabolism, improve bioavailability, enhance patient compiliance and circumvent adverse gastric effects. NLCs were prepared by the Nanoprecipitation technique and optimized by Box-Behnken design followed by lyophilisation. The NLC loaded transdermal patch was prepared by solvent casting method. The optimized NLCs formulation had size of 92.56±1.350nm, entrapment efficiency of 91.52 ± 2.19 % and drug loading of 13.72 ± 0.73%. In-vitro studies showed 98.41% drug release from the NLCs dispersion in 24hrs. Ex-vivo release study and ex-vivo gut permeation study of NLCs showed 94.77±2.47% and 94.2±2.12% drug release respectively within 24 hours. In-vivo study showed that the

AUC total value for NLC-loaded transdermal patch was 10 times the AUC total value of the standard control. Sertraline loaded nanostructured lipid carriers (NLCs) were successfully formulated, optimized and its transdermal patch significantly improved the bioavailability of sertraline HCL.

PTP054

Development of Polymeric Nanoparticles as a Smart Drug Delivery System for Diabetic Wound Healing

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A diabetic wound is a chronic condition in which the wound remains in the chronic inflammatory phase and the process of wound healing slows down due to decreased angiogenesis, growth factor levels, and blood perfusion. The functionalized nanoparticles made up of natural or synthetic polymers ranging in size from 50-500nm promoting angiogenesis may speed wound healing by improving the physicochemical properties of the drugs. Polymeric nanoparticles (nanocapsules and nanospheres) synthesized through evaporation, diffusion, salting out, and nanoprecipitation methods have been widely introduced to increase our ability to treat a variety of diseases including diabetic wound healing. The distinctive attributes of these nanoparticles include precision delivery, targeted therapy, regenerative medicine, and improved drug delivery. Characterization of nanoparticles involves size, morphology, surface charge, biocompatibility, stability, target efficiency, therapeutic efficacy, and drug release. This functionalized polymeric nanoparticle is a smart drug delivery system that has a wide variety of applications ranging based on enhancing the solubility of poorly soluble drugs, enhancing the rate of absorption and bioavailability of drugs exhibiting targeted delivery to a desired site of action.

PTP055

Microneedles Integrated Transdermal Drug Delivery System

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Transdermal Drug Delivery System is proven to be an effective method to deliver drug through skin into systemic circulation. Transdermal delivery has major advantage over other conventional drug delivery system as Transdermal drug delivery avoids hepatic first pass metabolism. Due to stratum corneum barrier layer of skin, delivery of many therapeutic agents through skin has become challenging. Microneedles transdermal drug delivery presents a promising paradigm shift in pharmaceutical technology. It has ability to facilitate controlled and targeted drug administration through skin. Microneedles are fabricated to overcome the stratum corneum barrier layer of skin and achieve painless drug delivery. Microneedles are minimally invasive device with micro sized dimensions and easy to self-administer. Microneedles based Transdermal drug delivery demonstrating their significance in improving therapeutic outcomes and patient compliance. This Review highlights different types of Microneedles, drug delivery mechanism, fabrication techniques and safety aspects of the material used in fabrication and emphasizing its potential application for drug delivery, vaccine delivery, disease diagnostic, and cosmetics applications. This technology holds great promise for enhancing therapeutic efficacy, patient comfort and overall healthcare outcomes.

PTP056

Microneedles: Overcoming the Dermal Barriers

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Drug administration through the skin is an appealing strategy owing to its extensive surface area, circumvention of first pass metabolism and enzymatic degradation of drugs. However, this route presents several challenges because of its intrinsic structure and physiology. The stratum corneum layer of the skin acts as an excellent barrier and permits delivery of only low molecular weight drugs (<500 Da) with higher partition coefficient. The potential for skin irritation, poor skin penetration, and systemic side effects can further restrict the therapeutic efficiency of the dosage forms. Microneedles are a recent novel modified drug delivery approach with several clinical applications. Microneedle arrays, impregnated with a therapeutic moiety and fixed on the surface of a small patch, is an appealing approach which painlessly penetrates and produces micron-scale disruption of the stratum corneum. This results in enhanced skin permeability of the wide variety of the compounds for local/systemic delivery into the skin, without safety concerns. This review poster provides an overview of microneedles, its diverse applications, various forms, materials and fabrication methods, sterilisation techniques, evaluation, current regulatory status, and future prospects. The integration of the modern drug formulation strategies with the existing microneedle platform will enable the collection of data on drug loading volumes, patch-changing intervals, and regulated drug release rates. For efficient clinical translation of microneedle-based approaches for drug delivery, immunisation, and other applications. In the future, it is anticipated that microneedles will be beneficial for a wide range of health disorders.

PTP057

A Review on Polymeric Micelles: An Approach for Enhancement of Solubility and Bioavailability of Poorly Water Soluble Drugs

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Polymeric micelles are nanosized core/shell structures made of hydrophilic and hydrophobic monomer units that self-assemble into amphiphilic block copolymers. Polymeric micelles start to self-assemble when the polymer concentration exceeds the critical micelle concentration. In order to solve the solubility issue, the majority of drugs that are poorly soluble in water can be readily absorbed into the core of polymeric micelles. Improved solubility typically leads to increase the efficacy of hydrophobic molecules. Compared to surfactant micelles, polymeric micelles are less cytotoxic and more stable. Polymeric micelles were prepared using various methods include solvent evaporation method, thin film hydration method, direct dissolution method, dialysis method, film dispersion method. Polymeric micelles are promising drug delivery carrier for the poorly water-soluble drug as it enhances the oral drug bioavailability due to its special stability arrangements as they belong to supramolecular core-shell type assemblies. Polymeric micelles, can also minimize repeated dosing during chronic condition. The

loaded drug should be protected from the harsh gastrointestinal environment and release in a controlled manner at the target sites.

PTP058

Development and Characterization of Nanoemulsion for the Treatment of Fungal Infection

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Clotrimazole is a broad-spectrum antifungal agent for the treatment of Candidiasis infections. Current formulations such as cream, lotion, and solution have limitations such as poor penetration and slow absorption through the skin, requiring long-term, repetitive dosing to completely cure the condition. Since the topical approach reduces systemic toxicity and delivers medication to the affected area specifically, it is the recommended method of treating fungal infections. The aim of the present investigation is to develop and characterize nanoemulsion with improved therapeutic efficacy, better dispersity, and storage stability for the treatment of anti-fungal infections. Methodology: The nanoemulsion is formed by the Self-nanoemulsification method. Preformulation studies such as DSC and FT-IR ensured the purity of the drug and proved drug-excipient compatibility. Trials were conducted to evaluate the effects of the ratio of surfactant and oil, stirring time, stirring speed, and method of preparation to achieve nanosized particles of the formulation. The formulations were evaluated for in-vitro drug release, pH, polydispersity index (PDI), content uniformity, and viscosity. The formulation was further optimized using the DOE approach. The study proposes nanoemulsion as a promising method for loading poorly soluble drugs such as Clotrimazole. The developed nanoemulsion formulation enhances the permeability and bioavailability by providing an effective approach to the treatment of fungal infections.

PTP059

Novel Biodegradable Complex Coacervates of Chitosan and Gum Albizia for Colon Targeting

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Polymer Complex coacervates formed using natural gums and polymer can be utilized for drug delivery, they offer advantage of being nontoxic ad biodegradable. This method can be employed for drug delivery to colon and other sites for treatment of cancer Aim & Objective: Chitosan has been used to prepare nanoparticles and microparticulate delivery systems of several drugs but due to its limited stability it hinders drug delivery application, The present study aims to prepare complex coacervate using natural gum and investigate its stability in Simulated Gastric Fluid (SGF), Simulated Intestinal (SCF) colonic fluid. Gum Albizia was purified and Gum-chitosan ratio was optimized using potentiometric titration. Complex coacervates was prepared by mixing chitosan and gum solutions, and the effect of pH on coacervate was studied. Coacervate was further characterized by FTIR, XRD, DSC, and TGA for stability in simulated fluids. Stoichiometric ratio of chitosan and gum was at 1:5, FTIR

analysis revealed ionic interactions between Gum and chitosan in the complex coacervate. XRD showed complex coacervate was more amorphous than individual components. TGA indicated a decrease in thermal stability for the complex. DSC indicated a shift in the glass transition temperature. The coacervate yield was pH-dependent. Morphological studies showed that coacervate films are stable in both SGF and SIF and coacervate film exhibited breakdown in simulated colonic fluid. Complex coacervate between chitosan and gum was successfully prepared and exhibited electrostatic interaction. The process involved protonation of chitosan amino group and neutralization of carboxylic acid group in gum. The resulting coacervate exhibited reduced crystallinity, thermal stability, and glass transition temperature. It demonstrated potential for colon targeting and will further investigated by *invivo* studies.

PTP060

Emulgel: A New Approach for Enhanced Topical Drug Delivery

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Topical drug delivery is the application of a drug-containing formulation to the skin to treat cutaneous disorder directly. This system is often used when other routes of drug administration fail or in local skin infection like fungal infections. The main advantage of this method is bypassing first pass metabolism and avoiding risk and inconveniences of intravenous therapy. It also avoids the varied conditions of absorption, such as pH changes, enzyme presence, and gastric emptying time. Emulgel, a gellified emulsion, is a common topical drug delivery system used for treating skin diseases such as fungal infections, acne and psoriasis. Emulgel is prepared by incorporating gel and emulsion. The drug is dissolved is organic solvent and mixed in two phases while continuous stirring. The polymer are dissolved in water and pH is adjusted and added to above preparation. For preparing the emulsion, aqueous phase and oil phase are taken separately and mixed together and the gel is prepared by using gelling agent, they are prepared separately and mixed together to form Emulgel. Emulgel with their superior spreadability, adhesiveness, viscosity and extrusion, are expected to become a novel transdermal drug delivery system for loading hydrophobic drugs in water-soluble gel bases.

PTP061

Nanomedicines for Effective Management of Breast Cancer: A Comprehensive Review

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Breast cancer, a complex ailment originating in the mammary gland, is recognized by the World Health Organization (WHO) as the most prevalent malignancy in adults, with over 2.3 million annual diagnoses globally. Among women, it stands as the most commonly diagnosed cancer worldwide. The existing treatments for breast cancer comprise surgical interventions, chemotherapy, immunotherapy, and radiotherapy. Chemotherapy has been considered as the primary effective approach against cancer. However, its drawback lies in the challenge of distinguishing cancerous cells from healthy ones, leading to substantial toxicity and adverse effects. Nanotechnology has emerged as a promising avenue in various biological applications, including the diagnosis and treatment of breast cancer. Nanomaterials

like liposomes, niosomes, solid lipid nanoparticles, nanostructured lipid carriers, polymeric micelles, dendrimers, nanocrystals, etc., are used for the targeted delivery of anticancer drugs. This innovative approach offers the capability to precisely target cancerous tissues, delivering therapeutic agents with minimal side effects. The inherent properties of nanomaterials facilitate enhanced cell penetration and self-targeted accumulation of nanoparticles at the intended site. Moreover, the utilization of nanomaterials has demonstrated efficacy in reducing the frequency of relapses and overcoming therapeutic resistance. As a result, the employment of a nanoparticle-based targeting system in breast cancer therapy represents a highly promising and strategic approach.

PTP063

Exploring Snail Mucin's Dermatological Potential

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This research investigates the dermatological potential of snail mucin, an intriguing substance renowned for its regenerative properties in snails. Our study focuses on unraveling the composition of snail mucin, emphasizing its rich content of glycoproteins, hyaluronic acid, and growth factors. Through an extensive literature review and empirical studies, we aim to shed light on the therapeutic properties of snail mucin. Snail mucin has gained attention for its promising applications in human skin health. Our findings highlight its noteworthy wound healing capabilities, anti-inflammatory effects, and remarkable moisturizing attributes. This poster presentation serves as a platform to showcase our comprehensive exploration of snail mucin's potential benefits in dermatology. The experimental evidence presented underscores the positive impact of snail mucin on skin regeneration and overall skin health. As we delve into its molecular components and their interactions with human skin, our research contributes valuable insights to the growing field of skincare formulations. By emphasizing the potential of snail mucin, we aim to inspire further research and innovation in the development of skincare products that harness the natural therapeutic properties of this unique secretion.

PTP064

3D Printed Inserts: A Novel Paradigm for Polycystic Ovary Syndrome

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Polycystic Ovary Syndrome (PCOS) is an endocrine disorder characterized by ovarian cysts, irregular ovulation, and hormonal fluctuations in women. Problems such as infertility, pelvic pain, hyperandrogenism, and insulin resistance are generally associated with PCOS. Although there is no absolute cure for PCOS, medical treatments such as metformin, clomiphene, letrozole, progestin therapy, anti-androgens, ovarian drilling, etc. are used. Conventional treatments are in the form of oral and parenteral routes which may cause dose-related side effects because of non-specific targeting. So, there is a need to develop a site-specific and prolonged drug release formulation in the treatment of PCOS to reduce systemic side effects and enhance the efficacy of therapies. Vaginal drug delivery provides a large surface area, high vascularization, avoidance of hepatic first-pass metabolism, possible self-insertion, etc. 3D printing technology offers a novel solution for targeted drug delivery and allows

for the creation of customized drug delivery devices that can fit the unique anatomy of each patient. Biodegradable polymers can be used to prepare the 3D printed inserts. Evaluation parameters like compatibility studies, porosity, tensile strength, bio adhesion study, biodegradation, in vitro drug diffusion studies, in vivo/ex vivo studies, histopathology studies, and stability studies can be performed to check the potential of the 3D printed insert. If successfully tested, this formulation offers a non-invasive substitute to the existing PCOS treatments available, provides a controlled release profile, minimizes the dose required to produce the desired effect, minimizes unwanted side effects, and improves patient compliance. Thus, the 3D-printed insert can be a potential drug delivery option for PCOS and related complications.

PTP065

Diabetes Mellitus: Potential Delivery of Phyto-Drug by Formulation of Phytosomes

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This study investigates the potential of phyto-drug delivery for diabetes mellitus by phyotosome formulation as an alternative to traditional treatments. Numerous phytochemicals with less side effects, such as alkaloids and polyphenols, have demonstrated possible antidiabetic action. Furthermore, hepatic first-pass metabolism and enzymatic digestion have an impact on oral administration, limiting the drug's bioavailability and, consequently, its therapeutic effect. To address this problem, phyto-drug delivery systems based on phytosomes have been created to enhance the phytoconstituents' physicochemical characteristics and offer protection in the gastric environment. The formulation, characterization, and evaluation of phytosomes for targeted distribution in the management of diabetes this method is used which is encasing standardized plant extract or its bioactive components that are encapsulated to phospholipids—specifically, phosphatidylcholine—that eventually form a lipid-compatible complex which is termed as phytosomes. Consequently, phytosomes enhance the permeability of membranes to hydrophilic polyphenols, enabling them to pass through the cell membrane of the outer GI tract and ultimately enter the circulation. As per the results, phytosomes improve the phyto-components' solubility and stability, hepatoprotective impact, bioavailability, and percutaneous absorption. They also provide protection against gastric media and digestive enzymes. Curcumin, Puerarin (Puerarin can improve insulin resistance and protect Langerhans islet cells by inhibiting apoptosis) Oleorupein and hydroxytyrosol.Alkaloids helps by inhibiting alpha-glucosidase enzyme, increasing insulin activity and deactivation of dipeptidyl peptidase-IV Inhibitors. To conclude that the phyto-phospholipid complexation technique can be used to improve the limited bioavailability of naturally produced polyphenols. Additionally, it boosts effectiveness due to its capacity to mediate targeted delivery systems, controlled release systems, and the ability to stabilize active substances.

PTP066

A Review on Floating Oral In-situ Gel: A Comprehensive Approach of Gastro Retentive Drug Delivery System

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The drugs having a narrow absorption window in the gastrointestinal tract (GIT) when administered by oral route are often limited by poor bioavailability due to incomplete drug release and short residence time at the site of absorption. Novel drug delivery systems in the form of gastroretentive systems such as floating systems, mucoadhesive, high-density, expandable have been developed as they provide controlled delivery of drugs with prolonged gastric residence time. Liquid orals are more prone to low bioavailability because they are eliminated quickly from the stomach since they are subjected to faster transit from the stomach/ duodenum. The problems of immediate release and short gastrointestinal residence of liquids are eliminated by formulating as oral in situ gels as they provide the best means to overcome these problems The in-situ gel dosage form is a liquid before administration and after it comes in contact with gastric contents due to one or more mechanisms gets converted to gel which floats on gastric contents. This achieves increased residence as well as sustained release. This approach is useful for systemic as well as local effect of drugs administered. Ion crosslinking, enzymatic crosslinking, photo-polymerization. In-situ gels offer advantages over conventional dosage forms for controlled drug release, such as sustained, prolonged release, good stability, and biocompatibility. They are reliable and acceptable for liquid orals, suitable for drugs with narrow absorption windows in the stomach or local effects. These gels can replace solid dosage forms like tablets or capsules.

PTP067

Nanoparticle-Mediated Drug Delivery for the Treatment of Cardiovascular Diseases

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Cardiovascular diseases (CVDs) remain a leading global cause of mortality, necessitating innovative approaches for effective treatment. This abstract explores the potential of nanoparticle-mediated drug delivery in addressing challenges associated with CVDs. The prevalence of CVDs, including heart failure, atherosclerosis, and myocardial infarction, underscores the urgency for advanced therapeutic strategies. Nano-drug delivery systems (NDDSs) utilizing various nanocarriers such as liposomes, gold nanoparticles, silica nanoparticles, and polymeric nanoparticles, exhibit promising capabilities. These nanoplatforms enhance drug stability, solubility, and bioavailability while offering diverse administration methods. Specific nanocarriers like PEGylated mesoporous silica demonstrate improved blood compatibility, making them suitable for intravascular drug delivery. Gold nanoparticles, with their ease of synthesis and low toxicity, show effectiveness in targeting heart tissues. Polymeric nanoparticles, including poly (lactic-co-glycolic acid), present biodegradability and versatility in drug delivery routes. Nanoparticle-mediated drug delivery emerges as a transformative approach for treating CVDs, offering targeted delivery, increased solubility, prolonged release, and reduced side effects. The diverse applications of nanotechnology in cardiovascular medicine hold great promise for personalized and efficient treatments. This review also summarizes the difficulties associated with the conventional treatment modalities in comparison to the nanomedicine for CVDs and various applications of nanotechnology for treating CVDs.

PTP068

A Review on Various Pulmonary Drug Delivery Approaches for the Treatment of Chronic Obstructive Pulmonary Disorder

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Chronic Obstructive Pulmonary Disease (COPD) poses a significant health challenge, marked by airflow limitations and potential complications. This study explores the importance of the pulmonary route for drug delivery in COPD treatment. Key factors influencing pulmonary drug delivery, including aetiology, histopathology, and various barriers, are thoroughly examined. Formulation methods, particle deposition mechanisms, and diverse drug delivery techniques, such as solid lipid nanoparticles, liposomes, dendrimers, and microparticles, are systematically discussed. The pulmonary route's significance lies in its ability to deliver drugs precisely, enhancing efficacy and minimizing adverse effects. Barriers to pulmonary drug delivery, including mechanical, immunological, chemical, and behavioral aspects, are identified, providing insights for formulators to design efficient drug delivery systems. Mechanisms of pulmonary deposition, such as impaction, sedimentation, interception, and diffusion, are elucidated. The study focuses on specific formulation approaches, including solid lipid nanoparticles, liposomes, dendrimers, and microparticles, highlighting their applications in COPD treatment. Understanding the interplay between therapeutic agents, pulmonary characteristics, formulation properties, and delivery barriers is crucial for developing effective and patient-friendly drug delivery systems for COPD.

PTP069

Mesoporous Silica Nanoparticles: Versatile Carrier for Effective Treatment of Keratitis for Optimal Ocular Drug Delivery

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Fusarium keratitis is a serious fungal infection of the cornea, typically caused by *Fusarium* species. Ocular drug administration and absorption are difficult due to eye structure and physiology. The blood-aqueous barrier (BAB) with the inner ciliary epithelia, endothelia around the iris, and ciliary muscle capillaries and the blood-retinal barrier (BRB) with the retinal capillaries and retinal pigment epithelium are the main barriers to high ocular bioavailability and drug absorption. The treatment of keratitis can present challenges despite the availability of various marketed formulations. Available conventional ophthalmic solution, suspension, and ointment dosage formulations have some drawbacks like impairs eyesight, only a tiny amount of the medicine is absorbed into the eye due to precorneal loss, which makes it difficult to achieve the desired drug concentration at the site, difficulty in administration, frequent administration, limited targeting. Multifunctional nanoplatforms such modified drug-loaded mesoporous silica nanoparticles (MSNs) improve target site drug bioavailability and absorption, overcoming all the obstacles. Along with that they are highly effective for enhancing the solubility of poorly soluble drugs due to their high surface area, tunable properties, high loading and release capacities, chemical and physical stability, distinct particle and pore structures, good biocompatibility, biodegradability, and easy clearance. Their distinctive characteristics make mesoporous silica particles

interesting candidates for overcoming the difficulties of ocular drug delivery. Controlled and sustained release kinetics prolong therapeutic efficacy and reduce side effects also their surface modification ease makes them ideal for ocular administration. These features contribute to the development of efficient and patient-friendly drug delivery systems. This review thoroughly discusses advantages, applications, and new avenues of silica particles in ocular drug delivery.

PTP070

Enhancing Bioavailability: A Strategic Approach to Improve Solubility of Anti-EGFR Through Hydroxypropyl-γ-Cyclodextrin Complexation

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Anti-EGFR prescription drugs selectively and reversibly block the tyrosine kinase underlying the epidermal growth factor receptor (EGFR), impacting downstream signalling pathways such as cell proliferation, metastasis, and angiogenesis. They have been authorized for the therapy of localized or metastatic malignancies when at least one chemotherapy regimen has failed. These drugs belong to BCS class II, which is distinguished by poor solubility, resulting in lower oral bioavailability (59%). Various techniques, such as lipidic carriers, micellar systems, and polymeric nanoparticles, have been investigated to improve the therapeutic potential and reduce the toxicity associated with ERL treatment. But the end results obtained through these carriers are not stable and the drug leakage problem from the nano vesicles in contact to small amount of water remained persistent. Cyclodextrin complexation were employed to increase the solubility and bioavailability of our selected drug. Inclusion complex with cyclodextrin was generated by heating technique and characterised by FT-IR, DSC, ^{1}HNMR, and PXRD, taking into account the physicochemical features and geometry of our chosen drug. The solubility of the inclusion complex was also evaluated and compared with plain drug in various buffers. Characterization and comparative studies suggested that stable complexes between Drug and CD were obtained with heating method, and the complex also exhibited up to 2.2-fold increase in solubility when compared to pure drug. Thus, Drug and CD complexation will exhibit a potential to enhance oral bioavailability leading to reduced dose and dose-related side effects, improved in-vitro efficacy in various cancer cell lines.

PTP071

Innovating Precision: Overcoming Challenges and Expanding Opportunities in 3D Printed Microneedle Arrays

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The intradermal space has been extensively investigated as a minimally invasive administration of drugs and diagnostic approach. Microneedles are formulations of micron size that are used to deliver a different class of active pharmaceutical ingredients transdermally, either to the dermal or epidermal layer of the skin, without any pain at the site. Over the last many years, several techniques for additive manufacturing have been developed to fabricate microneedles. Still, their application has been restricted by factors such as inadequate resolution, lack of required feedstock materials, high cost, and an

expensive and time-consuming procedure. Microneedles arrays are generally manufactured using moulding or lithographic manufacturing processes, which are difficult to scale up and limit the size and shape of the microneedles array. In this context, three-dimensional (3D) printing is a new approach that enables high patient accessibility, cost-effectiveness, customization, higher resolution, and versatile shape and size in design. It also offers rapid turnaround times between design processes. This review offers a comprehensive comparison of existing 3D printing methods like; inject (IJ), stereolithography (SLA), fused deposition method (FDM), and selective laser sintering (SLS), along with novel technologies like; electrohydrodynamic (EHD), laser-induced forward transfer (LIFT), continuous liquid interface production (CLIP), magneto rheological drawing lithography (MRDL), two-photon polymerizations (TPP), and multi-material additive manufacturing (MMAM). This review also discusses the difficulties that arise from 3D printing technologies, such as the high cost of manufacturing, which prevents it from being economically feasible for large-scale production, the incompatibility of materials based on microneedles with human cells, and issues with the effective administration of large doses of loaded microneedles. In this article, we're going to explore how additive manufacturing could revolutionize the development of microneedle arrays and open paths for less-invasive medication delivery and diagnostic systems.

PTP072

Preparation and Characterization of Rivastigmine Transferosome Loaded *In Situ* Gel for Nose to Brain Delivery

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Rivastigmine is a cholinesterase inhibitor class of medication used to manage and treat neurodegenerative disease, specifically dementia, in patients with Alzheimer and Parkinson disease. In this study the nose to brain delivery of rivastigmine was explored to minimize the limitations associated with the conventional route of administration. The Rivastigmine transferosomes were prepared using a thin film hydration method with soy lecithin and cholesterol as the primary components, tween 80 and SDC as edge activator and poloxamer 188 and gellan gum as gelling agents. The physicochemical properties of the transferosomes, including particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, and morphology. The results showed that the transferosomes had a mean particle size ranging from 190±19.36 nm to 312±32.54 nm, with PDI values ranging from 0.406 to 0.504, indicating a monodispersed system. The zeta potential of the transferosomes ranged from -40.7 mV to -59.8 mV, which suggested good stability of the formulation. SEM images revealed distinct spherical vesicles with clear boundaries and a homogenous size distribution, indicating the integrity of closed structures. The entrapment efficiency of the prepared transferosomes ranged from 78.3±2.35% to 89.8±3.62% w/w, depending on the composition of lecithin: cholesterol and vesicle size. The cumulative *in vitro* release of rivastigmine was resulted between 74.7% to 98.5% in 180 min. Overall, the study demonstrated that the transferosomes formulation was a promising drug delivery system for rivastigmine via the nasal route, with desirable physicochemical properties and good drug entrapment efficiency.

PTP073

Recent Advancement in Treatment of Chronic Obstructive Pulmonary Disease

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The term "chronic obstructive pulmonary disease" (COPD) describes a collection of conditions that cause long-term impairment to lung function. The two most common signs of COPD are as follows: Emphysema is a disease that damages the lung's alveoli, while chronic bronchitis is an inflammation of the bronchi over an extended period of time. The World Health Organization reports that COPD affects 65 million people worldwide and accounts for over 3 million deaths annually, making it the third most common cause of death worldwide. The symptoms of COPD include coughing, shortness of breath with effort, and progressive impairment. Numerous risk factors, such as cigarette smoking, occupational exposures, and aging, have been linked to COPD. The multifaceted disease known as chronic obstructive pulmonary disease (COPD) is typified by airway fibrosis and restricted airflow. The COPD improvements place a heavy weight on the healthcare system. As the frequency of COPD rises, research on new and improved medicines is being introduced to improve pharmacotherapy. COPD has been treated with a variety of therapeutic agent classes. The FDA has authorized 27 medications for the treatment of COPD throughout the previous 50 years. Several pharmacological classes, including B2-adrenoreceptor agonists (bronchodilators), muscarinic antagonists, phosphodiesterase type 4 inhibitors, and inhaled corticosteroids (ICS), are available for the treatment of COPD. It has been found that combining these therapy modalities is preferable to receiving only one. A quick overview of the various nasal dose forms was covered in this review.

PTP074

Novel Microneedle Platforms for the Treatment of Chronic Wounds: A Comprehensive Review

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Microneedles, a novel drug delivery platform, has drawn extensive attention due to its painless and non-invasive administration, increased patient compliance, varied drug loading capacity, and controlled drug delivery. Microneedles were primarily developed for transdermal drug delivery via permeating stratum corneum. However, they have recently been used to augment wound healing and depicted promising results. The wounds have the presence of several inflammatory mediators and bacterial contaminants, which inhibit the mechanism of healing. The biofilm resists the entry of active moieties into the wound bed, wherein microneedles offer a noteworthy effect compared to conventional wound dressings. Microneedles also offer multistage drug release and multiple drug loading capacity. Microneedles can deliver several medicines, antibiotics, nanoparticles, stem cells, wound healing promoters, growth factors, metal ions, and thereby promote wound healing via varied mechanisms such as anti-inflammatory, antibacterial, angiogenesis promoter, and anti-oxidant activities at different stages of wound healing. This review provides insight into microneedle structural designs, drug release mechanisms, material selection, manufacturing strategies, delivery substances, and their specific effects. Several studies entailing key advantages of microneedles in wound care are highlighted. A brief

overview will be provided on how microneedles could be used as an alternate therapy to enhance wound healing. The opportunities and challenges for its clinical application will also be discussed.

PTP076

Long Acting In-situ Forming Implant Based Formulation

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In the pursuit of enhancing drug delivery systems, in situ implant forming drug delivery systems have emerged as a promising avenue for achieving extended and controlled drug release. These systems are composed of smart polymers which undergo phase transition when stimulated by any external factor like change in temperature, pH or solvent exchange. In this review, we have covered the transition mechanism included solvent induced phase separation. In situ forming implants consists of a biodegradable polymer dissolved in any pharmaceutically acceptable solvent. When in vivo, phase transition occurs resulting in solidification of polymer entrapping drug. Drug is released over a period of time with degradation of polymer. Release of drug can be controlled by varying several factors like the hydrophobicity of solvent and polymer and drug, molecular weight and intrinsic viscosity of polymer and depot characteristics. This sort of approach is particularly useful for treating chronic illness when patient adherence to traditional therapies becomes challenging. Desired release rated and extended release are attained by high molecular weight polymer and varying hydrophobicity of solvents with the aim of reducing dosing frequency. The prolonged release achieved reduced side effects, minimize dosing frequency and improve patient adherence resulting in decreased remission rates of disease and increased success rate of treatments. This review comprehensively comprises the development of injectable in situ forming systems and discuss various aspects of formulation development including the impact of physicochemical properties of drug, etc.

PTP078

Overview of Pluronics in Pharmaceutical Drug Delivery System

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Pluronics, or poloxamers, have emerged as pivotal components in the realm of pharmaceutical drug delivery systems. These triblock copolymers, composed of hydrophilic poly(ethylene oxide) (PEO) and hydrophobic poly(propylene oxide) (PPO) segments, offer a versatile platform for enhancing drug delivery efficiency. One of the hallmark features is their amphiphilic nature, enabling interactions with both hydrophobic and hydrophilic substances. Pluronics exhibit a temperature-dependent sol-gel transition, a characteristic extensively leveraged in designing thermosensitive formulations for controlled drug release. This transition facilitates the transformation from a liquid to a gel state, an attribute that finds application in various drug delivery modalities. Moreover, Pluronics form micelles in aqueous solutions, aiding in the solubilization of poorly water-soluble drugs, a common challenge in pharmaceutical formulations. Their biocompatibility and low toxicity make them suitable for biomedical applications. Pluronics play a crucial role in stabilizing formulations, preventing particle aggregation, and improving the stability of diverse pharmaceutical preparations, including emulsions

and dispersions. Their presence enhances drug bioavailability, particularly for compounds with limited water solubility. Pluronics can be incorporated into various dosage forms such as gels, creams, nanoparticles, and micelles, showcasing their versatility in drug delivery system design. With reversible sol-gel transitions and the ability to tailor their properties, Pluronics stand as valuable contributors to advancing pharmaceutical formulations, promising improved therapeutic outcomes and enhanced patient experiences.

PTP079

A Review on Nanocapsules as Promising Drug Delivery for Treatment of Onychomycosis

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The human nail is a complex structure, comprising the nail folds, nail matrix, nail plate, and nail bed. The nail plate, primarily composed of keratin, originates from the nail matrix. Onychomycosis, or tinea unguium, a prevalent nail pathology caused by various fungi, presents with symptoms like nail discoloration, thickening, and onycholysis, affecting approximately 90% of toenail infections. The challenges in treating onychomycosis include slow toenail growth and poor drug permeation. The review delves into novel drug delivery strategies for onychomycosis treatment, with a focus on nanotechnology. Nanoparticles, including polymeric nanoparticles, nanocapsules, nanospheres, solid lipid nanoparticles (SLN), nanostructured lipid carriers (NLCs), and nanovesicles, show promise in enhancing drug delivery efficiency. Polymeric nanoparticles, formulated with drugs like ketoconazole, and lipid-based carriers like SLNs and NLCs offer advantages such as biocompatibility and controlled release. Nanovesicles, including liposomes and ethosomes, demonstrate potential for transungual drug delivery. Microemulsions, characterized by small droplet size, enhance bioavailability and permeation. Nanocapsules is the novel approach developed using the Nanoprecipitation method with an aim to achieve higher entrapment efficiency, and desirable characterization involving measurements of globule size, polydispersity index, zeta potential, and morphological analysis. DSC studies ensures absence of interaction among components. Stability analysis and ex-vivo permeation studies are required to support the potential of nanocapsules in onychomycosis treatment. In conclusion, nanotechnology offers innovative solutions for onychomycosis treatment, providing more effective and patient-friendly approaches through various nano delivery systems. The study on nanocapsules exemplifies the potential of such formulations in enhancing drug delivery for improved therapeutic outcomes.

PTP080

Ethosomes: An Approach for Herbal Drug Delivery

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Herbal drugs are becoming more popular in the modern world for their application to cure variety of diseases with less toxic effects and better therapeutic effects. However, these medicines suffer from certain limitation such as toxicity, stability issues, poor bioavailability and patient compliance. To

minimize these problems various novel drug delivery systems (NDDS) such as Phytosomes, Ethosomes, Transfersomes, Herbal Transdermal patches, Nanoparticles and Biphasic emulsions are used nowadays. Ethosomes are lipid based elastic vesicles containing phospholipids, alcohol (ethanol and isopropyl alcohol) in relatively high concentration and water. They are mainly used for the delivery of drugs which has low penetration through skin. The purpose of this review is overview of preparation of an Ethosome, advantages, disadvantages and characterization techniques. Various methods for characterization are transmission electron microscopy (TEM), scanning electron microscopy (SEM) and entrapment efficiency.

PTP082

Exploring New Paths in Alzheimer's Disease: Unleashing the Potential of Novel Formulated Natural Therapeutic Drugs

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Alzheimer's disease (AD) impacts millions, resulting in cognitive decline, loss of independence and a significant burden on healthcare and society. The global prevalence of dementia exceeds 50 million individuals and is projected to surpass 152 million by 2050 (ADI). Current allopathic treatments provide only symptomatic relief, prompting exploration of natural sources with potent compounds. Ongoing investigations focus on a selected natural therapeutic drug (NTD) as a phytoconstituent, supported by in vitro and in vivo studies evaluating its efficacy against AD. Despite these efforts, the definitive therapeutic potential remains uncertain. To address this gap, an innovative self micellization solid dispersion (SMSDs) formulation approach emerges as a promising avenue. This method integrates natural components with polymeric and surfactant elements to enhance thermodynamic and kinetic stability. Confirmation of these improvements comes from analysis employing Fourier transform infrared spectroscopy, differential scanning colorimetry, X-ray diffraction studies, and scanning electron microscope. Notably, dissolution studies demonstrated a substantial improvement compared with the unformulated drug. These encouraging results warrant further exploration into in vivo pharmacokinetics and anti-Alzheimer's activity. In summary, the optimized SMSDs formulation stands out as a promising strategy for enhancing the physicochemical properties of natural therapeutic drug, overcoming their biopharmaceutical limits.

PTP083

Overview of Poly (lactic-co-glycolic acid) in Controlled Release Formulations

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PLGA, or poly lactic-co-glycolic acid, is a highly sought-after polymer used for controlled drug delivery and tissue engineering purposes. PLGA is both biocompatible and biodegradable. It follows several degradation mechanisms, including uptake of water, decrease in the molecular weight and polymer solubilization. PLGA is primarily manufactured using the following methods: direct condensation and ring opening polymerization. The features of PLGA can be tuned to attain certain characteristics, such

as adjusting the ratio of lactic acid: glycolic acid, molecular weight, and -end group. While there is a substantial amount of published material on the PLGA-based formulations, there are only a limited number of commercially available products that are based on PLGA. The issues involved in IVIVC investigations, ex-vivo methodologies, modelling and simulation of therapeutic products incorporating PLGA/PLA, characterisation of PLGA & PLA, interaction of the polymer with peptides/protein, separation of the PLGA polymeric mixture, and the impact of PLGA characteristics on product. These developments are crucial for the progress of PLGA formulations in altering the release kinetics of active pharmaceutical ingredients (APIs), as well as for creating alternatives to current brand-name medicinal products.

PTP084

A Review on Recent Advancement and Treatment-challenges Associated with Epilepsy

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Around one sixth (10-12 million) of population with epilepsy belongs to India. And globally we can estimate around fifty million people living with epilepsy (PWE). Despite the wide availability of novel anti-seizure medication, a large amount of the population with epilepsy do not get appropriate treatment, which leads to treatment gap (TG). The treatment gap is reported in the range of 22% in urban areas to as much as 90% in rural areas of India. Epilepsy is a common disorder but high quality trials of an anti-epileptic drugs became compact. Add on trials for new anti-epileptic drugs for partial seizures have shown half of the total reduction in seizures. And the newer treatments like vagal nerve stimulation, deep brain stimulations and ketogenic diet are also used for better management of epilepsy. In both the treatment we have to put one electrical device under the skin which can help in controlling seizures. In one treatment it will stimulate the vagus nerve and in deep brain it will stimulate main areas of brain. When we are talking about ketogenic diet, it includes high fat meal which is recommended mostly in children with strict diet proportion as high amount of fatty meal leads to various complications. So, in order to reduce the frequency and re-occurrence of epilepsy post-treatment, this review would describe about the current treatment strategy, newer formulations {nanoparticles potassium channel opener (which will enhance the flow of potassium out of the nerves) or biodegradable nanoparticles and more}, challenges in current treatment and improved strategy to minimise the treatment gap.

PTP085

Electro-sprayed Nanoparticles for Hydrophobic Bioactive Encapsulation

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Poor aqueous solubility of bio-actives is the foremost challenge in successful clinical and food product development of various nanotechnologies that have been employed to resolve this issue, one-step processes that offer enhanced bioavailability through tailored portico-kinetic properties are the most preferred ones. Electro-hydrodynamic atomization based processes such as electrospinning and Electrospraying have gained significant attention of the scientific community in recent time. Due to its ability to adjust various aspects of nano- and micro-structured particles, such as their porosity and

particle size, they can offer multitude advantages like zero-order release kinetics with minimal burst release. Additionally, the technique is easy to use, reproducible, and can be applied to a wide range of hydrophobic and poorly water-soluble bio-actives. With electro-spraying, it is possible to achieve a controlled shape or mono-dispersity of specified particles while maintaining a high encapsulation efficiency and avoiding the undesirable denaturation of thermosensitive bioactives during encapsulation. The state-of-the-art, benefits, uses, and difficulties of implementing it in food and pharmaceutical research have also been elaborated. The current developments in electro-spraying technology for the encapsulation of bioactive substances with minimal queuing times are reviewed in this work.

PTP086

Advancement in the of Long-Acting Antiretroviral Therapies for the Treatment and Prevention of HIV Infection

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Adherence to everyday conventional antiretroviral therapy is obstacle to both treatment and prevention of HIV infection. In order to address the constraints associated with adhering to a daily regimen for one's entire life, Long Acting injectable (LAI) Antiretroviral drugs (ARV), Implants, vaginal implant Microarray patches, nano-formulation, Pro drug Ultra long acting are available and some are in Stage of Development These drugs enable persons who are either HIV-positive or at risk of HIV infection to get treatment through streamlined antiretroviral therapy (ART) regimens. Currently, the administration of first-generation Long Acting cabotegravir, rilpivirine, and lenacapavir injectables, along with a dapivirine vaginal ring, is in progress. Nevertheless, every option is constrained by current dose intervals, the simplicity of administration, or challenges in locating suitable medication counterparts. Currently, the development of next-generation formulations for ULA ART regimens is still ongoing. In order to establish a specific market segment, it is important to validate the efficacy of extended administration, improve availability, reduce the amount of injected substances, optimise the way the body processes the medication, select combination therapies, and synchronise healthcare support. This review focuses on current advancements in pharmacology and provides insights into future therapy prospects based on these demands. Although initial iterations of LA ARTs are accessible for HIV treatment, they still fall short of being optimal in addressing patient requirements. ULA medications, now in the advanced preclinical stage of development, have the potential to address limitations and expand the range of therapy choices available.

PTP087

Formulation and Evaluation of Ropinirole Hydrochloride Polymeric Nanoparticles

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Ropinirole hydrochloride is dopamine receptor agonist use to treat symptoms of Parkinson’s disease. In conventional drug delivery system major issue is selectiveness of blood brain barrier, which blocks

the many drugs from entering into the brain. Therefore, the dose of drug for better therapeutic effect is large but intranasal route is non-invasive approach to bypass blood brain barrier and achieve better therapeutic concentration of drug in brain. Previously polymeric nanoparticles were used for nose to brain delivery of drug. Polymeric Nanoparticle of Ropinirole hydrochloride will provide better therapeutic effect and reduce the side effect associated with drug. Polymeric nanoparticles of Ropinirole hydrochloride were prepared using modified nanoprecipitation method using polycaprolactone as encapsulating agent and optimised for better stability and uniform particle size. Optimised polymeric nanoparticles are uniform in size with stable zeta potential and having good encapsulation of drug. In-vitro release study shows that nanoparticle sustain drug release for 8 hours with zero order release kinetic and stable for two months with no significant effect on particle size. Polymeric nanoparticle of Ropinirole hydrochloride sustain the drug release which leads to reduction in dosing frequency of drug.

PTP088

The Consequences of Cold Atmospheric Plasma on Bacteria Presents on Human Hand

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Cold atmospheric plasma (CAP) is explored for many applications and the surface sterilization is one of them. Even though it is well explored for sterilization of articles, its efficacy and safety to expose it on skin was not determined. The aim of our research work was to evaluate the CAP as a mean to sterilize human hands. There are many factors involved in CAP generation which may impact its efficacy and safety. In this study, we have isolated the bacteria from hands of volunteers and identified the bacteria. They were grown in an artificial media for various experiments to be done. These bacteria were then treated with plasma radiation generated using Helium gas at different conditions. The optimization studies were carried out using experimental design for the voltage, time of the treatment and gas flow rate impact on bacterial survival. The survival of organism was decreased when the flow rate is higher at 5 L/min and time for the treatment was 5 min. The animal toxicity studies using Draize test as well as MTT assay were also performed and any toxic effects of CAP were not observed. However, further advanced studies need to be performed for safety evaluation of the CAP.

PTP089

SmartFilm-Tablets: An Innovative Approach to Enhance Oral Delivery of Poorly Soluble Drugs

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SmartFilm-Technology presents a novel strategy for improving drug aqueous solubility and oral delivery by incorporating the drug in an amorphous state into a cellulose-based matrix, such as paper. This revolutionary technology not only addresses challenges linked to poorly soluble drugs but also

provides distinct benefits in pharmaceutical formulations. SmartFilm-Tablets hold great promise for enhancing oral delivery of BCS class II and IV drugs, offering improved bioavailability, stability, and significantly higher intestinal permeability. These tablets displaying versatility in application, exhibit remarkable efficacy with various drugs, for example, norfloxacin-loaded SmartFilm-Tablets exhibited significantly higher Ex-vivo intestinal permeation compared to conventional tablets. The SmartFilm-Tablets demonstrate industrial feasibility and cost-effectiveness, emerging as a promising solution for formulating challenging drugs. The noteworthy Ex-vivo intestinal permeation seen in norfloxacin-loaded SmartFilm-Tablets. This innovation in pharmaceuticals opens new opportunities for therapeutic approaches that might transform medicine formulations and make a substantial contribution to the field's progression. The impact of such innovations extends beyond conventional boundaries, shaping the future landscape of pharmaceuticals and fostering the evolution of transformative pharmaceutical approaches.

PTP090

Recent Advances in the Treatment of Rosacea- A Review

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Rosacea is a commonly occurring chronic inflammatory disease in the area of dermatology. There are many therapies nowadays available for the treatment of rosacea, however, it is difficult to manage this chronic disease because of very little knowledge of etiology. Rosacea is distinguished by recurring bouts of flushing or transitory erythema, papules, pustules, telangiectasia, and Phymatous changes. Rosacea may also affect the eyes of a person. As the occurrence of the rosacea is prominent on the face it is associated with low self-esteem and leads to psychological burden. Approved topical and systemic treatments are available for the treatment purpose. For severe rosacea light and laser surgeries are also accessible. There are several therapies available to treat pustules, but none are very successful in treating the vascular flushing associated with rosacea. Recent breakthroughs in basic scientific research have highlighted the impact of the innate and adaptive immune systems, as well as neurovascular dysregulation, to overcome the clinical features and characteristics of rosacea. In rosacea patients, both endogenous stimuli and external stimuli can activate and worsen the condition. There is growing evidence that rosacea is an inflammatory illness characterized by an innate immune response, substantial vascular alterations, and increased Demodex mite colonization, as well as genetic susceptibility and several extrinsic aggravating factors. Thus, therapy targets and potential therapies can be defined. In this review, innovative topical and systemic formulations and therapeutic combinations are discussed. In addition, ongoing research on innovative treatment methods is outlined.

PTP091

SeDeM Expert System, a Preformulation Tool for Developing Directly Compressible Tablets: A Review

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A preformulation tool used to assess the acceptability of different excipients for direct compression is the SeDeM (Sediment Delivery Model) expert system. A research tool for shortening the time it takes to produce a new product is SeDeM, a diagram developed from 12 parameters, and SeDeM-ODT (Sediment Delivery Model-Orodispersible tablets), a diagram derived from 15 parameters**.** The SeDeM calculates the parameters mathematically for easily obtaining the final tablet formulation for DC process, which requires the minimum excipients and minimum tests. Dimension, compressibility, flowability/powder flow, lubricity/stability, and lubricity/dosage are the categories in which the information is categorized. This information can be shown graphically using the SeDeM Diagram**.** Direct compression appropriateness could be used to screen the best potential excipients for a certain pharmaceutical active component. The SeDeM expert system has proven to be effective in assessing the galenic properties of pharmaceutical excipients, determining whether an excipient is suitable for direct compression, creating ODT formulations, creating sustained-release formulations, and creating tablets containing taste-masked medications. In this paper, the detailed history, principles, applications and derived forms of the SeDeM expert system will be reviewed.

PTP092

Research Resonance: DE-INTERACT's Strategic Role in Investigating Drug-Excipient Interactions for Pharmaceutical Advancements

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Drug-Excipient compatibility plays a pivotal role in establishing stability of pharmaceutical formulations. Excluding real-time stability studies, conventional analytical techniques like DSC, FTIR, HPLC, and HPTLC help to identify the possibilities of drug-excipient interactions. Machine learning can assist in developing a predictive tool for drug-excipient incompatibility. In the present research work, PubChem Fingerprint is employed as the descriptor of compounds that thoroughly represents the drug's and excipient's chemistry. The 881-bit binary fingerprints of each drug and excipient make 1762 inputs, and one categorical output makes an instance in the dataset. A dataset comprising of 4200+ instances of drugs and excipients is carefully curated from peer-reviewed research papers. Training of the Artificial Neural Network (ANN) model was performed with maximum validation accuracy, minimum validation loss, and maximum validation precision as the checkpoints. The machine learning model (DE-Interact) was trained, achieving training and validation accuracies of 0.9930 and 0.9161, respectively. The performance of the DE-Interact model was evaluated by confirming three incompatible predictions by conventional analytical tools. Paracetamol with vanillin, paracetamol with methylparaben, and brinzolamide with polyethylene glycol are these instances which are predicted as incompatible by the DE-Interact. DSC, FTIR, HPTLC, and HPLC analysis confirm the prediction. The present work offers a reliable DE-Interact tool for quick referencing while selecting excipients in formulation design.

PTP093

Innovative Biosensor Integration: Pioneering Drug Delivery Systems for Advancements in Biomedical Science

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Biosensor-integrated drug delivery systems have garnered significant attention in the pursuit of advanced healthcare solutions, particularly for chronic diseases like cardiovascular diseases (CVD), diabetes mellitus, and cancer. This comprehensive review emphasizes the pivotal role of biosensors in closed-loop drug delivery systems, examining their applications and transformative impact on therapeutic precision. Conventional treatment modalities often present challenges, necessitating a shift towards controlled drug delivery systems to optimize efficacy and safety. The synthesis of biosensors into these systems establishes a dynamic interplay, providing real-time monitoring and precise drug administration. This review explores the intersection of biosensors and drug delivery, showcasing their integration as a novel paradigm for addressing the intricacies of chronic diseases. Biosensors, composed of bio-recognition elements and transducers, play a central role in identifying target analytes and converting molecular recognition into electrical signals. The integration of these biosensors into closed-loop drug delivery systems enables continuous analysis of biological molecules, triggering responsive drug release based on specific signals. This approach holds promise for personalized, patient-centric interventions. Examining applications in diabetes, cancer, cardiovascular diseases, and regenerative medicine, the review highlights diverse biosensor-integrated drug delivery systems. From bio microelectromechanical systems (bioMEMS) and electrochemical sensors to bioresponsive polymers, each component contributes to the development of innovative closed-loop drug delivery systems. The synergy between monitoring components and actuator components allows for targeted drug release, aligning with specific signal concentrations or thresholds. This synthesis of biosensors and drug delivery systems represents a significant advancement in biomedical engineering. By focusing on biosensors as integral components, this review elucidates the potential of closed-loop drug delivery systems to revolutionize the treatment landscape for chronic diseases. The incorporation of biosensor technology not only ensures heightened sensitivity and specificity but also opens avenues for personalized and adaptive therapeutic interventions.

PTP094

Boosting Antifungal Performance of Eberconazole by Increasing the Solubility Using Eco-friendly Deep Eutectic Solvent

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Deep eutectic solvents (DESs), recognized for their environmentally friendly properties, have gained significant attraction in the pharmaceutical industry in response to growing environmental concerns. These solvents have risen as an ecologically sound and sustainable alternative for addressing the issues related to the limited solubility of diverse compounds, serving as a viable replacement for conventional

organic solvents and ionic liquids. Nonetheless, formulating a DES to improve drug solubility is a complex task that involves extensive experimentation and iterative processes. Here we have attempted to increase the solubility of the BCS class II antifungal drug "Eberconazole" using DESs to improve its antifungal potential. Various batches of DES were prepared using different hydrogen bond donor-acceptor and were tested for stability, pH and viscosity. The solubility of Eberconazole was assessed in the stable batches of DES. Further we investigated the interactions and molecular transition using analytical techniques like differential scanning calorimetry (DSC), Fourier-transform infrared (FTIR), ultraviolet (UV) and ^{1}H NMR spectroscopy for Eberconazole (pure), DES (plain), DES-Eberconazole. Finally, DES-Eberconazole solution is formulated as gel. Eberconazole showed 30,000-folds increased solubility in DES i.e. 63.75 $\pm$ 3.3 mg/mL compared to water. The DES-Eberconazole gel showed good antifungal activity against *C. albicans,* MTCC 854 strain compare to marketed formulation. In the current study, we have designed DES formulation comprising BCS class-II drug Eberconazole to tackle the solubility. Our findings demonstrate that the studied DES media can be successfully used as common eco-friendly pharmaceutical solvents, allowing to achieve solubility enhancements up to 30,000-fold and improved the antifungal performance of Eberconazole.

PTP095

Therapeutic Application of Nanofibers as a Novel Approach for Chronic Wound Healing: An Overview

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Chronic wounds impose rising clinical and economic burdens, with conventional treatments having limited efficacy. Nanofiber-based delivery of therapeutic macromolecules promotes regeneration and infection control. This review evaluates nanofiber wound dressings incorporating proteins, polysaccharides, and other biological compounds. The salient features of nanofiber-based formulations like ample surface area due to higher porosity within nanofiber and tailer-made drug delivery justifies its candidature as potential option for wound healing treating. Techniques including template synthesis, self-assembly, temperature-prompted phase separation, freeze-drying, and electrospinning enable the formulation of nanofibers. Electro-spun nanofibers enable local, sustained release of growth factors, enzymes, and peptides to restore healing mechanisms compromised in chronic wounds. Collagen, gelatin, chitosan, hyaluronate, and alginate dressings favourably interact with wound beds lacking matrix components. Compared to films or hydrogels, nanofibers better mimic native extracellular matrices. Loaded with drugs, cells, or biologics, composite mats balance moisture and gaseous exchange while activating angiogenesis and re-epithelialization pathways through macromolecule bioactivity. This review delves into the pathological microenvironments of chronic wounds, the limitations of standard wound care options, the incorporation of therapeutic macromolecules into electro-spun polymeric nanofibers, evaluations conducted in vitro and in vivo, as well as pre-clinical and human trials of prototypes. It also addresses the challenges and outlines future directions for translation. Applied research and commercialization insights highlight efforts to progress bioactive macromolecule-loaded nanofiber dressings from promise to practice. However, challenges exist in scale-up, manufacturing, and translation from lab to clinic. With demonstrated advantages, advanced nanotechnology presents opportunities to meaningfully impact patient outcomes through the application of nanofibers.

PTP096

Bifunctional Application of Gold Nanoparticles in Cancer

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Nanoparticles are widely used in the modern medicine field and they appear to be highly efficacious, promising, and multifunctional as well. Theranostics is based on the principle of combining both therapeutic and diagnostic properties into one agent. The Theranostic nanoparticles can be a prominent part of the emerging medical field. Theranostic Metal Nanoparticles are made up of gold, silver, cobalt, and a variety of other metals. Gold nanoparticles (AuNP) are used as drug carriers, radio sen0sitizers, and in imaging probes. Further the important features of gold nanoparticles like their optics, morphology, and surface properties are discussed. Cancer is a disease with a high mortality rate and the recurrence of cancer after surgery is also high. AuNPs are small in size as a result of which they penetrate easily. AuNPs are used in photothermal therapy, a minimally invasive therapy used to treat solid tumors. In Photothermal therapy with the help of electromagnetic radiation, the photosensitizer is excited. This photosensitizer eliminates the cancer cells by absorbing light or energy and converting it into heat. The gold in AuNPs acts as a photosensitizer, converting light into heat that kills cancer cells by hyperthermia. The toxicity, safety, and biocompatibility of gold nanoparticles will be discussed here.

PTP097

Mesoporous Silica Nanoparticles as Versatile Nanocarriers for Targeted Drug Delivery in Oral Cancer Treatment

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Oral cancer accounts for more than 350,000 cases worldwide with 90% of them being oral squamous cell carcinomas (OSCC). The current treatment modalities of chemoradiation have poor outcomes along with harmful effects to neighbouring healthy tissues. Mesoporous Silica Nanoparticles (MSNs) have emerged as promising nanocarriers in the field of pharmaceutics due to their unique structural and physicochemical properties. MSN come under the category of inorganic nanoparticles having the properties such as large pore volume, high drug loading and high encapsulation efficiency, tunable size and flexible surface functionalization, biocompatibility, and degradability is highlighted showcasing their versatility in pharmaceutical formulations. The synthesis method, Sol-Gel/ Hydrolysis-Condensation process for formation mesoporous silica nanoparticles has been widely explored from tetraethyl orthosilicate (TEOS) as precursor of silica and cetyltrimethylammonium bromide (CTAB) as surfactant. Controlling various parameters such as pH, is crucial for achieving good control over the nucleation and condensation of silica particles which will ultimately affect morphology, particle size, drug loading, release kinetics, uniformity, and dispersity of mesoporous silica nanoparticles (MSNs). The ability to modify MSNs i.e. Functionalization, makes them good choice for targeted drug delivery system. MSN based formulation hold great promise in the era of next generation therapeutics, overcoming challenges in drug delivery and advancing treatment options for oral cancer. This review covers the synthesis, functionalization and application in oral cancer.

PTP098

A Review on Lipid Polymer Hybrid Nano Particles – an Advancement in Nanotechnology for Therapeutic Applications

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Recent years have witnessed significant progress in nanotechnology, particularly in the realm of innovative drug delivery systems, where lipid-polymer hybrid nanoparticles have emerged as the promising frontier. This review delves into the strides made in synthesizing, characterizing, and applying these nanoparticles in therapeutics, showcasing their potential to revolutionize drug delivery across various medical contexts. The synthesis of these hybrids involves integrating lipids and polymers, leveraging the unique properties of each. Lipids provide a biocompatible and biodegradable outer layer, enhancing drug encapsulation and cellular uptake, while polymers contribute to stability and sustained drug release. Characterization techniques such as dynamic light scattering, and transmission electron microscopy play a pivotal role in tailoring nanoparticles to specific therapeutic needs. These hybrids exhibit versatility by accommodating a range of therapeutic agents, from small molecules, hydrophilic drugs, and hydrophobic drugs to nucleic acid and protein, making them suitable for diseases like cancer and/or infectious diseases. The ability to traverse biological barriers and selectively target tissues minimizes off-target effects, enhancing the overall treatment efficacy. Additionally, advancements in surface modification enable stimuli-responsive or target-specific functionalities, fostering personalized and precise medicine approaches. In conclusion, lipid-polymer hybrid nanoparticles stand out as a cutting-edge development in nanotechnology, offering immense potential for transformative advancements in targeted drug delivery and shaping the future of medical treatment modalities.

PTP099

Innovative Evaluation Studies for Paediatric Formulation: Specialized Approaches Beyond Conventional

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Development of a paediatric formulation has distinctive challenges to formulator scientist, and necessitates exploring the formulation approaches and evaluation techniques that go beyond conventional methodologies. This abstract provides an overview of pioneering studies in the evaluation of paediatric formulations, placing a significant emphasis on novel strategies aimed at improving drug delivery, enhancing palatability, and ensuring therapeutic efficacy. Different biological conditions and anticipated expectation from paediatric formulation differs it from adult formulation. Not only the dose of drug is lowered, but volume of fluid available for dissolution, taste acceptability, size of the formulation for palatability, etc. makes it critical parameters to be taken into consideration. The review explores cutting-edge research in paediatric formulation evaluation, focusing on specialized techniques such as biorelevant dissolution studies and media, the use of in-silico model-based studies to gather information about swallowability, pharmacokinetics, and the prediction of gastrointestinal absorption and solubility. This review emphasizes the imperative for specialized approaches that transcend

traditional methodologies in the formulation of paediatric medications. Departing from conventional practices, this review explores cutting-edge research in paediatric formulation evaluation, highlighting the integration of advanced techniques in evaluation. In summary, the knowledge of expectation from paediatric population, evaluation techniques for biomimicking conditions for drug release, assessment of palatability and swallowability, etc. would encourage formulators for development of paediatric formulations with desired therapeutic outcomes.

PTP100

Silica-Based Nanoparticles in Drug Delivery: Overcoming Biological Barriers for Enhanced Therapeutic Efficacy

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The integration of nanotechnology into drug delivery systems has revolutionized the healthcare landscape, providing innovative solutions for enhancing the effectiveness of therapeutic agents. Silica, an inert material, serves as an excellent matrix for encapsulating a diverse array of pharmaceutical compounds. Silica's biocompatible nature ensures minimal cytotoxicity, making it an ideal candidate for in vivo applications. Silica-based nanoparticles have emerged as promising candidates for drug delivery systems due to their unique properties, including high surface area, tunable pore size, and biocompatibility. This review explores the potential of silica-based nanoparticles in overcoming biological barriers to enhance the therapeutic efficacy of pharmaceutical agents. The ability of these nanoparticles to encapsulate and deliver a diverse range of therapeutic payloads, such as small molecules, proteins, and nucleic acids, is discussed in detail. The review also delves into the strategies employed to functionalize silica surfaces, allowing for targeted drug delivery, prolonged circulation times, and controlled release. The review concludes by highlighting current challenges and future directions in the utilization of silica-based nanoparticles, emphasizing the need for continued research to harness their full potential in advancing drug delivery technologies. In essence, this in-depth review contributes to the evolving landscape of nanomedicine, elucidating the pivotal role of silica-based nanoparticles in reshaping the future of targeted and efficacious drug delivery systems.

PTP101

Application of Current Nanotechnology-based Approaches in Treatment of Tuberculosis

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Even though there have been potentially curative pharmacotherapies for tuberculosis (TB) for more than 50 years, the disease is still widespread in developing nations and the primary cause of avoidable deaths. The World Health Organization (WHO) reports that India has the highest global TB burden, accounting for 26% of cases. Antimicrobial resistance in tuberculosis is a growing issue that requires immediate attention and management. The growth of multidrug resistant (MDR) and extensively resistant (XDR) tuberculosis patients can be attributed to various reasons such as prolonged therapy, high pill burden, low compliance, and strict administration regimens. To combat technological setbacks

and enhance the efficacy of therapeutic medications—a significant obstacle for pharmaceutical technology—we require a strong and resilient system. Philosophy based on nanoparticles has demonstrated effective therapy and encouraging results for persistent infectious illnesses. Various kinds of nanocarriers have been assessed as potential medication delivery methods for different routes of administration. One benefit of antituberculosis medications based on nanoparticles over free drug is controlled and prolonged drug release. Additionally, it lessens the frequency of dosage and overcomes the problem of low or poor compliance. This paper reviews various nanotechnology-based therapies which can be used for the treatment of TB.

PTP102

Biochanin-A Loaded β-cyclodextrin Epichlorohydrin Inclusion Complex β-cyclodextrin for Improved Solubility and Anticancer Activity

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Biochanin A is an isoflavone which is useful for regulating hormonal imbalances, suppress carcinogenic activation in cells and exhibit anticancer effects. However, the oral bioavailability of biochanin A is low due to high clearance and a large apparent volume of distribution. Moreover, it is associated with the certain drawbacks like poor oral bioavailability due to stomach degradation. Therefore, in the present study a new inclusion complex with β-cyclodextrin epichlorohydrin (β-CD-EPI) was prepared in order to improve its aqueous solubility and biological activities. The β-CD-EPI polymer was synthesized and drug-loaded β-CD-EPI complexes were prepared by kneading, co-evaporation and spray drying methods. The BCA- β-CDEPI inclusion complex was further evaluated for biological studies such as antioxidant and anti-cancer (breast cancer) studies. Saturation solubility and drug content estimation showed 81 fold increase in solubility with good drug entrapment of 90%. In vitro dissolution studies of these optimized inclusion complex carried out in simulated gastric fluid (pH 1.2), simulated intestinal fluid pH 6.8 and pH 7.4. BCA-β-CDEPI showed 31.4% release in simulated gastric fluid and up to 85.58% release in simulated intestinal fluid pH 7.4 in 24 h. MTT assay for both cell lines suggest that BCA-β-CDEPI inclusion complex was cytotoxic as well as anticancer in nature on both cell lines with low IC50 value than pure BCA. Thus, β-CD-EPI inclusion complex of BCA is a promising drug delivery for Biochanin A.

ABSTRACT- POSTER PRESENTATIONS (NEXTGEN THERAPEUTICS)

NTP001

Identification of Selective Histone Demethylase (HDM) Inhibitors for Diabetic Nephropathy

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Diabetic nephropathy (DN) is the most common cause of end-stage kidney disease for which there is no proven treatment. It has been demonstrated that overexpression of histone demethylase UTX (ubiquitously transcribed tetratricopeptide repeat on chromosome X) also known as KDM6A in the renal mesangial and tubular cells causes inflammation and DNA damage leading to diabetic nephropathy. This has sparked an interest in the search for appropriate inhibitors of KDM6A.In the present study, a total of 53,082 small molecules from the ChEMBL database were selected and screened against KDM6A (PDB ID: 6FUL) using high throughput virtual screening (HTVS) glide ligand docking tool of the Maestro molecular modeling platform from Schrodinger. Out of 53,082 analogs, the top 100 molecules exhibiting the optimal pose during ligand docking were shortlisted and reanalyzed using standard precision (SP) and extra precision (XP) modes. The best-scoring analogs were subjected to induced fit docking and ADME analysis using the QikProp module followed by prime-MMGBSA energy calculation. Top-ranked compounds were then analyzed for selectivity against some other isoforms of the histone demethylases. These findings indicated a possible lead for additional optimization to identify potent histone demethylase inhibitors.

NTP002

A Computational Studies to Discover Topoisomerase Inhibitors: Pharmacophore Mapping, Molecular Docking and ADMET

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The targeting of human DNA topoisomerase II is an important focus in the development of anticancer drugs. Recent advancements in molecular research have focused on the role of topoisomerase II (Topo II) in crucial biological processes such as DNA replication and transcription. Enzyme-mediated DNA damage, is a potent approach in the development of anticancer drugs. Molecular techniques are being employed to investigate the biological functions of Topo II and to gain insights into its pharmacological mechanisms. In this research, twenty synthetic derivatives with different ring structures having inhibitory action against Topo II have been investigated to generate the pharmacophoric features. Compounds with IC_{50} values up to 10 µM were explore. Schrodinger, a chemoinformatic tool, has been utilized to generate multiple pharmacophore hypotheses. Further validation, virtual screening and docking studies were performed to obtain a novel hit as Topo II inhibitors. Hits identified through this method were utilize to design active derivatives against Topo II. The ADMET profile was generated for the derivatives with the best docking score. The entire activity concludes that derivatives with an

ADMET profile and a good docking score will be synthesized and evaluated for biological activity as Topo II inhibitors.

NTP003

Identification of Neprilysin Inhibitor Leads Using Computational Studies

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Neprilysin (NEP) cleaves the natriuretic peptides (NP), bradykinin, endothelin, angiotensin II, amyloid β protein, and substance P and modulates their effects on the heart, kidney, and other organs. NEP has a proven role in hypertension, heart disease, renal disease, Alzheimer's, diabetes, and some cancers. So far, sacubitril is the only NEP inhibitor in the clinic, which is used in combination with Valsartan for patients with heart failure. There is a lot of interest in developing NEP inhibitors. In the present study, the pharmacophoric features were identified and compounds having pharmacophoric features were obtained from the ZINC database through the Pharmit webserver. Using the Glide module, all of these compounds were subjected to molecular docking studies (NEP PDB-ID: 5JMY), followed by MM-GBSA free binding energy calculations, ADMET predictions, and Molecular Dynamics (MD) simulations. The most suitable compound obtained was a phenylalanine derivative. Further, bioisoteres of the most suitable compound were generated, and similar in silico studies were performed to identify new scaffolds, retaining phenylalanine moiety, to be explored as effective NEP inhibitor leads for further studies.

NTP005

Integrative Computational and Network Pharmacology Analysis of *Momordica Charantia L.* Constituents: Revealing Biological Target for Type II Diabetes Mellitus Treatment

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Momordica charantia Linn, a member of the Cucurbitaceae family, has been used for many years as a traditional anti-diabetic remedy in various countries. The plant contains several biologically active compounds, including glycosides, saponins, alkaloids, triterpenes, proteins, and steroids. The hypoglycemic activity of Momordica charantia is primarily attributed to its saponins, collectively known as charantins, and alkaloids. Retrieving and screening of active components of karela and corresponding T2DM-related target genes across multiple databases. Subsequently, STRING was used for PPI interaction and Cytoscape was used to analyze the PPI network. In addition, cluster and topological analysis were employed to analyze PPI networks. Then, the GO and KEGG enrichment analysis was performed using DAVID, and the binding capacity between active components of karela and key target PRKCD was validated by molecular docking using AutoDock Vina. We have finalized 49 targets. GO and KEGG enrichment results included regulation of lipid metabolic process, regulation of lipid catabolic process, protein serine kinase activity, and involved C-type lectin receptor signaling

pathway, insulin resistance, and insulin signaling pathway. Network analysis by CytoNCA and Cytohubba pinpointed Protein kinase C delta (PRKCD) as a potential target for further investigation. Among the 16 constituents, the top three compounds—Momordin I, Momordicoside C, and Momordicoside A—showed docking scores of -11.5, -10.0, and -9.9, respectively.Higher levels of PRKCD expression have been observed in obese individuals. Consequently, inhibiting this protein may prove advantageous for T2DM. The active components found in bitter gourd, namely Momordin I, Momordicoside C, and Momordicoside A, exhibit the capability to inhibit PRKCD. This presents a novel mechanism of action from the well-explored plant Momordica charantia Linn.

NTP006

In-vitro Evaluation of Triazine Scaffold for Anticancer Drug Development: A Review

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The widespread importance of the synthesis and modification of anticancer agents has given rise to many numbers of medicinal chemistry programs. In this regard, triazine derivatives have attracted attention due to their remarkable activity against a wide range of cancer cells. This evaluation covers work reports to define the anticancer activity, the most active synthesized compound for the target, the SAR and, when described, the probable MOA besides similarly considered to deliver complete and target-pointed data for the development of types of anti-tumour medicines of triazine derivatives. Triazine scaffold for the development of anticancer analogues. Triazine can also relate to numerous beneficial targets, and their analogues have auspicious in vitro and in vivo anti-tumour activity. Fused molecules can improve efficacy, and drug resistance and diminish side effects, and numerous hybrid molecules are beneath diverse stages of clinical trials, so hybrid derivatives of triazine may offer valuable therapeutic involvement for the dealing of tumours.The objective of the recent review was to summarize the recent reports on triazine as well as its analogues with respect to its anticancer therapeutic potential.The content of the review would be helpful to update the researchers working towards the synthesis and designing of new molecules for the treatment of various types of cancer disease with the recent molecules that have been produced from the triazine scaffold. Triazine scaffolds based on 1,3,5-triazine considerably boost molecular diversity levels and enable covering chemical space in key medicinal chemistry fields.

NTP007

Sustainable and Eco-Friendly Method Development and Validation of Sorafenib Tosylate by Green High Performance Liquid Chromatographic Technique and its Comparative Greenness Assessment

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Hepatocellular and renal carcinoma are both treated with Sorafenib Tosylate (SFB), a powerful antitumor medication. There is no green method that uses Green Analytical Chemistry (GAC) in HPLC for SFB. The current research centres on the use of GAC in the development and validation of a green

HPLC method for SFB. A 60:40 v/v mixture of Isopropanol and water pH 4 with glacial acetic acid was used as the mobile phase for a green RP-HPLC method. The measurement was done at 265 nm for this technique. The method's linearity, range, precision, accuracy, LOD, LOQ, sensitivity, and specificity were all verified as per the ICH Q2 R1 guideline. This method was shown to be linear and to have better sensitivity in the 20–60 µg/mL range for RP–HPLC. In comparison to previously documented HPLC methods, the green-NP-HPLC approach was found to be fast, more accurate, more precise, and greener. For the RP-HPLC method, AGREE scores were determined to be 0.88, which showed a high degree of greenness. We compared our developed methods with previously reported HPLC (for SFB) methods demonstrating AGREE scores of 0.58, and 0.61, respectively which are considered unsatisfactory AGREE scores when compared to our established green RP-HPLC method. Our approach showed extreme greenness in comparison to other documented techniques, and pharmaceutical companies should investigate these new ecologically benign green approaches to lessen the possible risks that organic solvents pose to the environment.

NTP008

A Review of Various Analytical Methods for Determination of Nitrosamines in Drugs

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Recently, Nitrosamine impurities in pharmaceuticals have been concerned for several national regulatory agencies to avoid carcinogenic and mutagenic effects in patients. First nitrosamine impurity was found as N-nitrosodimethylamine (NDMA) in the ARB valsartan in 2018. The current global situation of nitrosamine contamination has expanded from angiotensin-II receptor blockers (ARBs) to wide range of medicines including ranitidine, metformin, and other medicines as the risk of contamination. Numerous analytical techniques for quantifying nitrosamine contaminants in active pharmaceutical components and pharmaceutical products have been reported. In this review, we have discussed those reported liquid chromatographic methods for nitrosamine determination in pharmaceuticals in aspects of chromatographic conditions and sensitivity of detection. Various chromatographic method with suitable detector have been developed and validated for the analysis of nitrosamine in different drug products. The majority of recent publications utilize HPLC–MS/MS due to its high selectivity and low detection levels. UPLC-MS/MS also provides high selectivity for nitrosamines. Nitrosamines are highly potent carcinogens whose exposure through food, beverages, and recently, medicines need to be monitored and reduced to the possible extent. Concern regarding nitrosamine contamination has expanded from ARBs to the increasing number of medicines. The risk of contamination can stem from various factors including drug substance synthesis, drug degradation, formulation, contaminated excipients or solvents, container closure systems, and cross-contamination during manufacturing process.

NTP009

Comprehensive Review on the Analytical Methods for Detection of Hydrazine: A Genotoxic Impurity

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Genotoxic impurities are compounds capable of causing genetic mutations, chromosomal breaks, chromosomal rearrangements and ultimately the development of cancer in humans. Several regulatory guidance documents, such as those provided by the International Conference of Harmonization (ICH) Q3A(R2), Q3B(R2), and Q3C (R4), address the identification, toxicological qualification, and derivation of allowable limits for genotoxic impurities, as well as impurities in drug substances, degradants in drug products, and solvents. All first-line anti-tubercular medications such as isoniazid, pyrazinamide and rifampicin have major hydrazine impurities. Hydrazine is a known genotoxic impurity with genotoxicity and carcinogenicity. Hydrazine is a challenging molecule to analyse using conventional analytical techniques due to its physical and chemical properties. Multiple methodologies are described, to detect the impurities by different methods like HPLC, GC, CE, LC-MS/MS, IC, TLC, and electro-chromatographic methods. By using multiple methods to develop a simple and fast generic method to determine hydrazine and other alkyl amines in drug substances. The aim was to find the presence of hydrazine and its related species can be analyzed using various techniques, including both chromatographic and spectroscopic methods it indicates that the first-line therapeutic treatment of tuberculosis commonly exhibits the presence of hydrazine impurities.

NTP010

Quantitative Estimation of JAK (Janus kinases) Inhibitors: Analytical Innovations and Methodological Insights

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Janus kinases (JAK) inhibitors are one of the tyrosine kinase inhibitors and currently being used as immunomodulators in the treatment of cancer, inflammatory diseases like rheumatoid arthritis, various skin diseases like atopic dermatitis, psoriatic arthritis etc. Ruxocitinib was the first JAK inhibitor approved in the year 2011 by USFDA. Since then, drugs like Tofacitinib, Oclacitinib, Baricitinib, Upadacitinib, Abrocitinib, Fedracitinib, and Pacritinib have been approved by USFDA while drugs like Filgotinib, Peficitinib have been approved by Japan as JAK inhibitors. Present review covers various analytical and bioanalytical methods for the quantitative estimation of marketed JAK Inhibitors in various matrices like bulk drug, dosage forms, plasma etc using techniques such as RP-HPLC, LC-MS/MS, UPLC-MS/MS. Along with the methods, their validation parameters have also been discussed and compared wherever applicable. The review also gives insights on the future scope around the analytical/bioanalytical method development for novel dosage forms containing JAK inhibitors either as single agent or in combination.

NTP011

Comparative Degradation Analysis of Several Fluoroquinolone Antibiotics Impacted by Photo Rays and Gamma Rays.

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Fluoroquinoles play a crucial role in modern healthcare, serving as effective antibiotic agents. Their stability is a critical concern in certain environmental conditions, particularly when subjected to photolytic and gamma radiation-induced degradation. Photostability means the response of the drug or drug products when exposed to solar, UV and visible light in the solid, semisolid, or liquid state that leads to a physical and chemical change. Gamma irradiation is used in medicine and in the sterilization industry. The study involves the use of multiple antibiotics, including Azithromycin, Ciprofloxacin, Clarithromycin, Norfloxacin, and Ofloxacin.The degradation of fluoroquinolone antibiotics is compared between photolytic degradation and gamma irradiation for both human and veterinary use. Multiple sources and different doses were used in various studies conducted, like polychromatic uv light , Rayonet uv reactors and 1µg/l,20 mg/L,30 µL at various ranges like 320-400nm was taken for photolytic and for gamma radiation panoramic type 60Co-γ irradiation chamber, GC-5000 gamma chamber.In studies that were analyzed by UPLC and mass spectrometry techniques, bond cleavage and other processes led to the formation of various degradation products.These drugs will deteriorate under UV and gamma radiation, as per this review. Their comparison profiles are derived from several studies that demonstrate any differences between them.

NTP012

Comparative Degradation Profile of Different Antibiotic Drugs Using Photolytic Degradation and Gamma Irradiation Method

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Photostability means the response of the drug or drug products when exposed to solar, UV, and visible light in the solid semisolid or liquid state that leads to a physical and chemical change. Gamma irradiation is used in medicine and in the sterilization industry. Macrolides play a crucial role in modern healthcare serving as effective antibiotic agents. Their stability is a critical concern in certain environmental condition, particularly when subjected to photolytic and gamma radition degradation. The degradation of macrolides antibiotics is compared between photolytic degradation and gamma irradiation for both human and veterinary use. Multiple sources and different doses were used in various studies conducted, like polychromatic uv light , Rayonet uv reactors and at various ranges like 320nm-400nm was taken for photolytic and for gamma radition. Results were analyzed by UPLC and mass spectrometry techniques, bond cleavage and other processes led to formation of various degradation products. This review indicates these drugs will deteriorate under UV and gamma conditions. Their comparisons profiles are derived from several studies that demonstrate any differences between them.

NTP013

Regulatory Landscape for Cardiac Implants: A Comparison of Europe, India, and the USA

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This Work gives a brief summary of Cardiac implants, such as pacemakers and defibrillators, etc. play an important role in heart disease management, but their development and deployment are subject to stringent restrictions to assure patient safety and efficacy. The regulatory regimes for cardiac implants in three main nations are compared in this document: Europe, India, and the United States. Europe: The Medical Device Regulation (MDR) of the European Union oversees cardiac implants, emphasizing stringent risk-based classification, rigorous conformity assessment procedures, and extensive post-market surveillance. Notified Bodies play an important role in determining device compliance. India: The Central Drugs Standard Control Organization (CDSCO) governs the Indian regulatory environment for medical devices, which is trending toward tougher conformity evaluation based on risk classification. It is, however, less strict than in Europe and the United States. USA: The FDA establishes a high standard by requiring premarket approval for high-risk devices and developing a robust UDI-based post-market surveillance system. A comprehensive summary of the main regulatory elements pertaining to cardiac implants. Current initiatives are being implemented to simplify and standardize regulatory prerequisites across various nations, hence promoting global commerce and enabling the use of cutting-edge technology. While all three regions aim to assure patient safety and device efficacy, the regulatory regimes for cardiac implants vary in terms of stringency, complexity, and focus. Understanding these distinctions is critical for manufacturers looking to sell their products in various regions. Each system has its own set of difficulties and opportunities, necessitating careful study for device commercialization success.

NTP014

Orthopedic Implants Regulatory Aspects: An Emerging Segment in India and USA

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The study of "Orthopedic Implants Regulatory Aspects: An Emerging Segment in India and USA" aims to provide detailed knowledge about the field of orthopedic medical devices, specifically focusing on the orthopedic implants and recent advancements as well as its regulatory aspects in the countries such as India and USA. Orthopedic Implants are a subcategory of Implants which are biologically active devices that have been used in the form of replacements in bone, joint or cartilage. In these recent years there has been growth in the development of various orthopedic implants such as Permanent Orthopedic Implants that are shoulder joints, finger joints and the other type is the Temporary implants consisting of screws, plates, prostheses are used. In this the data included provides an overview about some of the most promising orthopedic implant products that have been developed recently and are available in the market which are highly technical as well as advancing now a days they are; 3D Printing, Robotic Surgery, Artificial Intelligence, Virtual Reality and Augmented Reality, Telemedicine which have been

found to be much more effective as compared to traditional implants. Furthermore, it also provides information of the various regulatory landscape for orthopedic implants such as FDA Regulations in USA and Medical Device Rules India which are regulated depending on the specific device and its intended use. While regulations vary among countries, they all aim to ensure the safety and efficacy for the consumers. It also provides an overview about the history of orthopedic implants, its market size, importance, risk, types, advanced products and emerging regulatory perspectives. As the field of medical device to evolve and advance, it holds promise for the development of innovative and effective products that can improve human health.

NTP015

A Comprehensive Review of Synthetic Strategies and SAR Studies for the Discovery of *Pf*DHODH Inhibitors as Antimalarial agents. Part 2: Other than DSM Compounds

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Malaria remains a severe global health concern, with 249 million cases reported in 2022, according to the World Health Organization (WHO). *Pf*DHODNPH is an essential enzyme in malaria parasites that helps make certain building blocks for their genetic material. Scientists have confirmed that targeting this enzyme could lead to new and effective antimalarial drugs. Inhibitors of *Pf*DHODH have shown potential for slowing down parasite growth during both the blood and liver stages. Over the last two decades, scientists have explored a range of compounds designed to inhibit *Pf*DHODH, including derivatives based on dihydrothiophenone, thiazole, hydroxyazole, and N-alkyl-thiophene-2-carboxamides. These compounds, synthesized with various substitutions using structure-guided medicinal chemistry, have shown remarkable promise. The review not only offers an insightful overview of the synthetic methods employed but also delves into alternative routes and innovative strategies involving different catalysts and chemical reagents. A critical aspect covered in the review is the Structure-Activity Relationship (SAR) studies, which provide a comprehensive understanding of how structural modifications impact the efficacy of *Pf*DHODH inhibitors. This information is invaluable for scientists and researchers engaged in the development of new antimalarial drugs, offering insights into the most promising scaffolds and their synthetic techniques.

NTP017

Identification of Potent PCSK9 Inhibitors: A Virtual Screening Odyssey

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Proprotein convertase subtilisin/Kexin type 9 (PCSK9) has emerged as a novel target for hyperlipidaemia. It works by regulating the Low-Density Lipoprotein Receptors (LDLR) degradation. In our laboratory, we are focusing on the identification of natural small molecule PCSK9 inhibitors with the use of computational chemistry followed by its formulation development Based on the research

papers and Ayurvedic Pharmacopoeia, we have narrowed down small molecules. Potential PCSK9 inhibitors were identified using molecular docking. Protein preparation was done using Biovia DS visualiser, and docking was performed using Autodock 4.2. The MD simulation was performed using GROMACS (version 2021) to explore the stability and dynamics of PCSK9-inhibitor complexes. Docking studies revealed binding energy, interactions and binding pockets for PCSK9. Simulation studies have shown dynamic behaviour for PCSK9-inhibitor complex for selected molecules. The tested ligand was bound to the enzyme's active site throughout the simulation and restricted to the binding pocket showing the stability of complex. 9,10-dimethoxy-2,3-(methylenedioxy)-7,8,13,13a-tetradehydroberbinium was selected for further studies as a small molecule PCSK9 inhibitor. It can work as a second-line treatment after statins for patients who do not reach target LDL-C levels and for those who are statin intolerant.

NTP018

Virtual Screening of Natural Products Library on PTEN Suppresser Protein to Identify Anti-cancer Compounds: A CADD Approach

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PTEN a dual Phosphatase and tensin homolog is a tumor suppressor gene, it works by regulating PI3K/AKT/mTOR pathways by suppressing them. Recent studies reveal that decrease in PTEN level in tissues tends to increase in progression of various cancerous condition such as prostate cancer. Natural compounds are known to have numerous biological activities. The aim of this research work to perform virtual screening of natural compounds database (40999 compounds), to find out potent PTEN agonist and understanding the molecular interactions at the binding site of protein. Molecular docking performed using Maestro software, Schrodinger suite and then further screened compounds were evaluated for ADMET properties using webserver SwissADME. In this study, we screened natural product library by different docking functions i.e. HVTS (40999 compounds) followed by SP function (20 HVTS best scoring compounds) and at last best compounds was docked using XP function at ligand binding site of target protein. Results indicates that many natural products showed better binding affinity with the protein structure, compound (1) showed best binding affinity with protein with docking score -7.89(XP function). Pharmacokinetic descriptors were calculated for top scored compounds. We performed virtual screening approach to screen natural products originated from natural sources as potent PTEN suppresser protein agonist. This compound can stimulate PTEN activity in cellular level, tends to decrease in different abnormally elevated PI3K/AKT/mTOR pathways, hence can serves as anti-cancer agents.

NTP019

Chemical Modification of Niclosamide towards the Discovery of Anti-SARS-CoV-2 Agents: In Pursuit of Optimized Pharmacokinetic Profile

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COVID-19, identified in Wuhan, China in 2019 caused by the SARS-CoV-2 coronavirus, and declared by WHO as a global pandemic in 2020. Drugs from different domains were utilized as treatment options

for COVID-19. However, there is a remaining need for additional treatments mitigating future viral mutations continue to intrigue scientists to discover new life-saving drug molecules. Niclosamide exhibited broad-spectrum antiviral activity across multiple virus families over the past several years. Niclosamide inhibits SARS-CoV with EC_{50} of 1.56 µM. However, the poor pharmacokinetic profile limits its use. Niclosamide is currently being investigated in 18 clinical trials using different routes of administration or formulations to evaluate its potential in Covid-19 treatment. In this regard, we synthesized a diversity-oriented series of 31 molecules to improve the potency and pharmacokinetic profile. Two series were synthesized by substituting amine partner of niclosamide with 6-membered aryl/heteroaryl and 5-membered pyrazoles amines. It involves amidation of 5-chlorosalicylic acid with amines using $PCl_3/SOCl_2$.All the synthesized compounds were screened against SARS-CoV-2 Vero E6 cells and determined *in-vitro* mouse liver microsomal stability, thermodynamic aqueous solubility (pH 7.4). *In-vivo* pharmacokinetic parameters were determined for the most potent compound DNDI0003974292. Chemical modification of niclosamide lead to discovery of DNDI0003974292, with improved potency, microsomal stability and bioavailability. Subsequent *in vitro* and *in vivo* pharmacokinetic studies of 5-chlorosalicylic amide containing pyrazoles or other heterocyclic rings would validate our hypothesis of incorporating pharmacophoric features of nitazoxanide would provide additional improvements of the drug property profile.

NTP020

Design and Synthesis of Novel Benzoxazole-amide Derivatives as Anti-kinetoplastid Agents

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Vector born parasite diseases provides a major threat to human health globally. Despite recent success in the development of lifesaving treatments for malaria and sleeping sickness there is a remaining, urgent need for the discovery and development of safe and efficacious treatments for diseases caused by kinetoplastid parasites such as Chagas disease and Leishmaniasis. Leishmaniasis, caused by Leishmania spp. parasites, and Chagas disease, caused by Trypanosoma cruzi, are lethal diseases providing a significant burden to society due to lack of proper diagnosis, efficient and safe treatments, and vaccines with the development of resistance to available drugs posing a significant threat. There is a need to develop new anti- kinetoplastid agents to overcome limitations. The benzoxazole amide derivative, DNDI0003202883, selected as lead compound showed good to moderate activity against the kinetoplastid parasites Leishmania donovani and Trypanosoma cruzi. Moreover, the anti-parasitic potential of benzoxazoles is well-cited in literature. Emulating these ideas, the current study focuses on the development of novel benzoxazole amide derivatives as anti-kinetoplastid agents. Rationally designed benzoxazole amide analogues were synthesized via a two-step process, involving Lewis acid-mediated condensation and cyclization of 2-aminophenols and 2-cyanoguanidines to obtain 2-aminobenzoxazoles followed by amidation with carboxylic acids using peptide coupling agents. Benzoxazole amide derivatives were successfully isolated and characterized using NMR spectroscopy and mass spectrometry. Synthesized compounds were tested against various species of Leishmania, Trypanosoma cruzi and showed promising results. Rationally synthesized benzoxazole amide derivatives showed good inhibitory potential against kinetoplastid and would direct this work to develop further insights in the structure-activity relationships.

NTP021

Pharmacophore Modeling and Virtual Screening for Designing Potent Telomerase Inhibitors as Anti-Cancer Agents

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Telomeres, also known as telomere terminal transferase, nowadays are the focused targets in treating cancer. Telomerase is a ribonucleoprotein (RNP) responsible for maintaining chromosomal integrity by stabilizing telomere length. This enzyme is considered one of the most common factors in almost all cancer cells and is mainly responsible for regulating telomere length. Malignant cells are more susceptible to anti-telomerase inhibitors. As normal cells, which lack telomerase activity, are unaffected by anti-telomerase cancer therapy utilizing telomerase inhibitors, it is implied that this medication has a high selectivity for cancer cells, making it less toxic and having a lower chance of adverse effects. Inhibition of telomerase by different heterocyclic scaffolds provides a path that leads to a new target for the development of cancer therapy. To develop novel entities, several potent compounds reported in numerous articles and the molecules in various stages of clinical trials were used to design a pharmacophore model using the Phase module of Schrodinger software. The output of pharmacophore results was utilized to search the ChEMBL database to get the top hits. A five-point pharmacophore model (AHRRR_1) was developed with a survival score of 4.5283, using 19 compounds with IC50 values ranging from 0.1 to 50.0 µM bearing one hydrogen bond acceptors (A), one hydrophobic site (H), and three aromatic rings (R) using Phase module of Schrodinger software. Based on the features generated by the pharmacophore model, substructure searching and virtual screening were done using high throughput (HTVS module of Schrodinger). The top 15 hits were found to have similar characteristics to the developed pharmacophore model. Based on their fit values and anticipated activities (pIC50) greater than 5.1, the top 15 hits were determined. Results from the current study were first used to gain an understanding of the structural feature that promotes bioactivity, and then, during the screening process, the generated hits and/or their bio-isosteric replacement might serve as novel possible telomerase inhibitors before their synthesis and biological screening.

NTP022

PI3K/AKT/mTOR A Novel, Prominent Oncological Pathway for The Treatment of Triple-Negative Breast Cancer: A Review

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Triple-negative breast cancer (TNBC) represents roughly 10-20% of all breast cancer cases. Although there have been progresses in the treatment of hormone receptor-positive and human epidermal growth factor receptor 2-positive breast cancer, designated treatments for TNBC stay inaccessible. A brief overview of the biological actions of small molecule compounds that target breast cancer has been attempted. TNBC has a lot of PI3K/AkT/mTOR pathway mutations. According to preclinical studies, TNBC suppression by targeted medicines is predicted by these abnormalities. In a newly published

phase 2 clinical trial. An AkT inhibitor (ipatasertib) coupled with paclitaxel in the first-line scenario improved outcomes in a subset of patients with metastatic TNBC. In addition, novel drugs with different specificities and potencies are being developed to target various PI3K/AkT/mTOR components and cognate molecules (e.g., mitogen-activated protein kinase). These drugs have a wide range of toxicity profiles and early efficacy signals, which must be addressed before novel drugs are advanced to later stages of clinical trials. The improvement of medications focusing on the PI3K/AkT/mTOR pathway for the therapy of TNBC is an advancing field that should consider the efficacy and toxicity of novel therapies and their interactions with other cancer pathways.

NTP023

Design of Novel Thiadiazoles as Human Dihydroorotate Dehydrogenase (hDHODH) Inhibitors through Combined Structure-Based Pharmacophore Modelling, Virtual Screening, Docking and Molecular Dynamics Simulation Studies

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Cancer is the uncontrolled proliferation of cell division. Using hDHODH inhibitors to prevent the production of pyrimidine nucleotides is a suitable method for developing target-specific anticancer medicines. The current work included pharmacophore modelling, structure-based virtual screening, ADMET prediction, and molecular dynamics (MD) studies to identify novel thiadiazole derivatives as hDHODH inhibitors. In current study, we generated 6-feature pharmacophore model which was validated by enrichment calculation and Güner-Henry scoring (GH scoring) approach. ZINC database underwent phase screening, where a validated pharmacophore model was used. Retrieved hit from phase screening underwent high throughput screening, standard precision, and extra precision docking studies. Based on docking investigation, we designed the novel thiadiazole derivatives, which underwent docking studies, Physicochemical and in silico ADMET prediction. MD simulation was performed for the best-docked compound among docking investigations. It was found that new thiadiazole compounds are promising hDHODH inhibitors for the treatment of cancer.

NTP026

Identification of Potential Hits for Management of INH-resistant Tuberculosis using Structure-based Virtual Screening

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The escalating prevalence of multidrug-resistant tuberculosis poses a substantial challenge to global health initiatives. Addressing this issue demands novel therapeutic strategies that target resistant strains.

The drug isoniazid (INH) is an essential element of all first-line treatment regimens for tuberculosis, with demonstrated high bactericidal activity and low risk of adverse events. Resistance to INH threatens the efficacy of treatment of tuberculosis disease and infection. This study employs structure-based virtual screening to identify potential hits for the management of INH-resistant tuberculosis. Utilizing computational methodologies, a diverse library of compounds is screened against specific molecular targets associated with INH resistance mechanisms. Molecular docking simulations and scoring functions are employed to prioritize compounds exhibiting favorable binding interactions. Further analyses, including Absorption, Distribution, Metabolism, and Excretion (ADME) properties and toxicity predictions, refine the selection process to propose lead compounds with potential for further experimental validation. The identified scaffold and their novel derivatives were found to have the desired interactions with the mutated target of INH. They also follow the drug-likeness criteria. The identified hits hold promise for the development of innovative therapeutics against INH-resistant tuberculosis, presenting a step forward in combating drug-resistant strains and advancing tuberculosis management strategies.

NTP027

Synthesis, Characterization and Biological Evaluation of Indole [2,3 -B] Quinoxaline Derivatives as Anti-Alzheimer's Agents

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The pathology of Alzheimer (A.D.) is explained or studied by using different hypotheses such as the cholinergic hypothesis, amyloid hypothesis, tau protein hypothesis, oxidative stress, and metal ion hypothesis. Various small molecules are developed to improve the symptomatic relief of the patient based on these hypothesises. Various drugs working on different hypothesis are available for the treatment of diseases but amongst them cholinesterase inhibitors still remain the drug of choice. Because of the complexity of the disease, single molecule working on one hypothesis might not be adequate for treatment. This complex etiology and multifaction nature of AD promote the development of multitarget-direct ligands. It was decided to explore quinoxaline scaffold as Anti-Alzheimer's agent. The objective of the work is to design, synthesize, characterize and evaluate indole [2,3 -b] quinoxaline derivatives targeting cholinesterase inhibitory activity with additional Aβ aggregation inhibitory and ant-oxidant activities. Characterization of compounds was done by, IR, NMR, Mass spectroscopy before submitting for biological evaluation. There is total of 6 compounds were synthesized and characterized by different characterization techniques. All these samples were evaluated for their multitargeted anti-Alzheimer potency. All the compounds were active on AChE/BuChE as well as Aβ aggregation inhibition. Among all the compounds, compound (6) having piperidine as alicyclic amine and six carbon chains as linker was identified as the most potent and selective BuChe inhibitor as an anti-Alzheimer compound as compared to reference

NTP028

Analytical Method Development and Validation for The Quantitative Determination of Sitagliptin Phosphate Monohydrate and Dapagliflozin Propanediol Monohydrate in Solid Dosage Form by RP- HPLC

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The Quantitative Determination of Sitagliptin Phosphate Monohydrate and Dapagliflozin Propanol Monohydrate in Solid Dosage Form method was developed and verified using High Performance Liquid Chromatography (HPLC). Different Analytical Parameters such as Specificity, Linearity, Precision, Accuracy, and Robustness were determined according to International Conference of Harmonization ICH Q2 (R1) guidelines. The RP-HPLC method was developed gradient Technique on a reversed phase Inosol BDS C18 (250x4.6) mm 5µm. The mobile phase A was selected as Phosphate buffer pH 3.0 and mobile phase B was selected as Acetonitrile and Methanol in the ratio of (60:40). The retention time for sitagliptin and dapagliflozin was 2.8±1 and 10.12 ±1 minute. The flow rate was kept 1.5 mL/min and Injection volume was kept 10 µL. The column temperature was kept Ambient 35˚C and Cooler temperature was kept 25˚C.The wavelength was kept 215nm based on UV Spectroscopy. Linear relationship was observed in Dapagliflozin method for concentration range 19.4-29.1 µg/ml and for Sitagliptin 192.3-288.8 µg/ml with correlation coefficient of 0.9999 for both Dapagliflozin and sitagliptin. The method for analysis of Dapagliflozin and sitagliptin was found to be accurate and precise with average recovery 99.2%-100.4% and %RSD for all parameters of chromatographic system were found to be not more than 2.0%. The Proposed method is highly sensitive, precise and accurate and hence successfully applied for the routine quantitative analysis of Dapagliflozin and Sitagliptin in Solid Dosage Form.

NTP030

Germination Effects and Analysis of Sprouting

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Sprouting has been a more popular practice in recent years due to its high nutritional content and the presence of bioactive chemicals that have antiviral, antibacterial, and antioxidant activities. Food analysis differs from drug analysis; hence the review outlines specific analytical methods and explores the germination effects of various sprouts. Present review covers various germination effects and analytical methods of Moringa oleifera, Vigna radiata, & Medicago sativa sprouts using techniques like high performance liquid chromatography (HPLC), ultra-high performance liquid chromatography (UPLC), reverse phase high performance liquid chromatography (RP-HPLC), oxygen radical absorbance capacity (ORAC) method, micellar electrokinetic capillary chromatography (MECC), LED treatment & more. It also includes some germination techniques to boost the nutrient value of sprouts. In summary, analysis of food is more complex than drug analysis, furthermore, sprouts are rich in many vitamins, antioxidant activity, proteins, etc.; So, there should be more growth in research regarding analysis in this particular field.

NTP031

A Review: Anthelmintic Activity of Phytochemicals and its Analysis

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Anthelmintics are class of drugs that are used to treat infections caused by parasitic worms, which are also known as helminthics. This parasite can infect humans and cause variety of symptoms and health problems, in severe conditions it may led to death. Various herbal plants are used to treat parasitic infections. Secondary metabolites such as Alkaloids, Terpenes, Flavonoids, Resins and Phenolic compounds are responsible for anthelmintic activity. Plants such as Butea Monosperma, Momordica Charantia, and Syzygium Aromaticum are used to treat helminthics infections. Present review covers the various analytical methods used for the qualitative and quantitative estimation of the primary and secondary metabolites of the plant and also the plant part used for analysis using techniques such as HPLC with PDA detector, GC-MS, FTIR, UHPLC-MS, and HPTLC. This review contributes valuable insights of future scope to gain more information about the analytical and bio-analytical methods used to determine the active Phytoconstituents responsible and also to determine synergistic effects of the various formulations.

NTP032

Analytical Methods for Herbal Drugs used in Treatment of Fissures

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Naturopathy, or naturopathic medicine, is a from of alternative medicine. A wide array of pseudoscientific practies branded as “natural “, “non-invasive “, or promoting “self-healing “are employed by its practitioners, who are known as naturopaths. A system of treatment of disease that avoids drugs and surgery and emphasizes the use of natural agents and physical means. In anatomy, a fissure (Latin fissure, pleural fissure) is a groove, natural division, deep furrow, elongated cleft, or tear in various parts of the body. It is also generally called a sulcus. In neuroanatomy a fissure usually refers to a larger groove than a sulcus in the brain although some sulci may also be termed fissures. This included four plants and their analysis is done by various analytical chromatographic techniques. The four plants are as follow: 1) Eclipta Prostrata 2) Buxus Wallichiana Bill 3) Lyonia Ovalifolia Drude 4) Sida Spinosa Linn

NTP033

Recent Trends in Microextraction Techniques and Their Applications

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A competent sample preparation technique is essential for extracting the relevant analytes and removing extraneous components from any bioanalytical procedure. Many conventional techniques, such as protein precipitation, liquid-phase extraction and solid-phase extraction are time consuming, require large amounts of sample and solvents, and labour-intensive. Different microextraction techniques, such as liquid phase micro-extraction (LPME) and solid phase micro-extraction (SPME), have been used increasingly to extract analytes from various matrices in order to deal with these disadvantages. The purpose is to present a comprehensive overview of recent advancements in different bioanalytical sample preparation methods. This review looks into the various applications and possibilities of liquid phase micro-extraction, such as Dispersive liquid-liquid microextraction (DLLME); Hollow-fibre liquid phase microextraction (HF-LPME) in its two- and three-phase device modes using the donor–acceptor interactions; Electro membrane extraction (EME) along with Single-drop microextraction (SDME) with its two main approaches i.e. headspace-SDME and direct immersion-SDME. These LPMEs are currently being used in a variety of fields, including the environment, pharmaceuticals and clinical. This review also covers the information on several variations of solid phase micro-extraction methods, such as packed sorbent microextraction and stir bar sorptive extraction (SBSE), along with applications for these methods.

NTP034

A Review: Compilation of Bioanalytical Methods for selected Biotherapeutics - Bevacizumab and Trastuzumab

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Bioanalytical methods are used for determination of drugs, their metabolites and endogenous materials in different biological matrices such as blood, plasma, serum, urine. The suitability of a quantitative analytical method for biomedical applications can be determined by using bioanalytical methods. Bevacizumab and Trastuzumab are Humanized Immunoglobulin Gamma-1 (IgG1) monoclonal antibodies used mainly in the treatment of metastatic colorectal cancer, lung cancer, metastatic breast cancer, gastric cancer. Bevacizumab is an angiogenesis inhibitor that binds to Vascular Endothelial Growth Factor-A (VEGF-A), preventing its interaction with Vascular Endothelial Growth Factor Receptor and thereby blocks the VEGF mediated signalling pathway. Trastuzumab is a Human Epidermal Growth Factor Receptor 2 (HER 2) targeting antibody that inhibits dimerization of HER-2. Present review covers different bioanalytical methods like Liquid Chromatography-Mass Spectrometry/Mass Spectrometry (LC/MS/MS), LC/MS using Nano Surface and Molecular Orientation (nSMOL) Proteolysis, Ultra Performance Liquid Chromatography–Mass Spectrometry/Mass

Spectrometry (UPLC-MS/MS), High Pressure Liquid Chromatography with Fluorescence Detection (HPLC-FD), High Temperature Reversed Phase LC (HT-RPLC) with FD.

NTP035

Vitamin B12 Analysis Using RP-HPLC Method

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A new rapid and economical reverse phase high performance liquid chromatography (RP-HPLC) method was developed for the determination of Vitamin B12, in bulk drug substance and pharmaceutical dosage forms. The chromatographic separation was achieved on C18 column (250 x 4.60 mm i.d., 5 µM particle size) using 0.1 % Formic acid: Acetonitrile (75:25 % v/v) as mobile phase at flow rate of 1 mL/min and UV detection at 360 nm. Vitamin B12 exhibited linearity over the concentration range of 15-90 mg/mL (r2=0.9957). The intra-day and inter-day precision were 0.569% and 1.23% respectively. The recovery study was found to be 97.33%. The developed approach was validated in compliance with the ICH Q2 (R2) guideline. The present successfully validated method with linearity, range, precision and accuracy was applicable for the assay of vitamin B12 in bulk drug dosage form and pharmaceutical dosage form.

NTP036

A Review on Analytical Methods for Drugs Used in Alzheimer Disease

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Alzheimer's disease, discovered in 1906, is a neurodegenerative disorder marked by beta-amyloid plaques and tau tangles, predominantly affecting individuals. This disorder characterized by progressive memory defeat and impairment in behaviour, language, and visuospatial skills. Some of the drugs which is approved by the US Food and Drug Administration for the treatment of the AD include cholinesterase inhibitors and the NMDA receptor antagonist. These drugs can provide a symptomatic relief but they poorly affect the progression of the disease. The main objective of this review is focused on different types of spectrophotometric, high-performance liquid chromatography (HPLC), HPTLC and liquid chromatography-mass spectroscopy (LC-MS) methods reported for anti AD conventional drugs. The review is a collection of data including various analytical methods used, along with detailed specifications for columns, mobile phase used and chromatographic conditions like flow rate, type and mode of detector, wavelength and retention time. In conclusion, this comprehensive review serves as a valuable resource for researchers, pharmaceutical scientists, and clinicians involved in Alzheimer's drug development. By summarizing and evaluating the current state of analytical methods, the article aims to contribute to the advancement of research methodologies, ultimately fostering the development of more effective and targeted therapies for Alzheimer's disease.

NTP038

Application of RP-HPLC for Method Development of Known Biotherapeutics as Immunomodulators

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Reversed-phase high-performance liquid chromatography involves the separation of molecules on the basis of hydrophobicity. This method is widely used in analytical chemistry for its excellent resolution, recoveries, reproducibility, and experimental ease in chromatographic selectivity. Part 1- Introduction to Monoclonal Antibodies: Monoclonal antibodies are indeed produced by identical clones of and they exhibit high specificity for a particular antigen. These antibodies can be designed to target specific molecules, such as proteins on the surface of cancer cells or markers associated with autoimmune diseases. Part 2- Introduction to Immunomodulators: Cetuximab, Afatinib dimaleate, Trastuzumab, and Bevacizumab—are all used in treatment of cancer. Cetuximab used to treat colorectal cancer, Afatinib Dimaleate used as non-small cell lung cancer (NSCLC) with specific EGFR mutations, Trastuzumab used as HER2-positive breast cancer and Bevacizumab used as colorectal cancer, and kidney cancer, to inhibit tumor blood vessel growth. The results indicate a comparative analysis of analytical parameters for biosimilars. The reported method is identified as the most favorable among all, suggesting superior performance in terms of different analytical parameter. The comparative analysis of biosimilars' analytical parameters strengthens the foundation for the development of effective and reliable therapeutic interventions in oncology. The reported method's superior results underscore its potential for further application and optimization in the pharmaceutical industry.

NTP039

Synthesis, Characterization and Biological Evaluation of Indolo [*2,3 -B*] Quinoxaline Derivatives as Anti-Alzheimer's Agents

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Alzheimer's disease (AD) is a progressive neurological dementia affects thinking, orientation and memory causing impairment in cognition, memory and social behaviour. Emerging AD therapeutics based on current theories of disease pathogenesis involving Aβ and tau were generally unsuccessful. This suggests that there exists a translational gap between pre-clinical and clinical trials of AD. Clearly, new approaches and therapeutic agents are urgently needed in the AD therapeutic pipeline. Based on these hypotheses, various small molecules were being developed and are available for the treatment of diseases, among which cholinesterase inhibitors still remain one of the targets of choice. To synthesize, design, characterize and evaluate indolo[*2,3-b*] quinoxaline derivatives targeting cholinesterase inhibitory activity with additional Aβ aggregation inhibitory and antioxidant activities. The synthesized compounds were characteized by IR, NMR, and LC-MS before submitting them for biological evaluation. The synthesized compounds were subjected for the biological evaluation after characterization. The compounds were affective as multitargeted agents for the Alzheimer's Disease as they showed activity on AChE/BuChE as well as Aβ aggregation inhibition. A literature study suggest that the indolo[*2,3-b*]quinoxaline is very promicing scaffold and found place between the anti-

Alzheimer agents. Couple of indolo [*2,3-b*] quinoxaline derivatives were synthesized and evaluated for their anti-Alzheimer's potential.

NTP040

Design and Green Facile Synthesis of Prospective Antimicrobial Agents

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In the 21st century, where advances in technology and science have transformedworldwide, there has also been a significant increase in microbial diseases that have catastrophically affected humanity. The rise in microbial disease, especially the resistant species, demands the discovery of newer antimicrobials. The computational tools used were PyRx, to identify the ligand-protein interaction and BIOVIA Discovery studio to visualize the interactions. Based on the result of docking studies, ten derivatives were synthesized. The application of environmentally friendly greenermethods was carried out to enhance the yield. The reaction was monitored using TLC. The anti-microbial activity was performed by the Agar-well diffusion method. The antibacterial evaluation was performed against selected strains. A good docking score was attained in compound II-B with a binding affinity of -7.6 with Ciprofloxacin as the reference. The compound II-B, II-D, and II-J exhibited homogenous antibacterial activity to that of positive control with MIC value ≥12 µg/ml against both gram-positive and gram- negative strains followed by compound II-H. A series of novel thiophene derivatives with antibacterial activity were designed and synthesized. Green Chemistry approach was useful and effective method to increase the yield of compounds. These findings showed that synthesized thiophene derivatives have potential and should be further assessed in order to become an effective anti-microbial agent.

NTPN041

Exploring potential Focal Adhesion Kinase Inhibitor: An *Insilco* Approach

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Focal adhesion kinase (FAK) plays a crucial role in various essential functions related to the proliferation of cancer cells. It is indispensable for cancer cell survival, adhesion, and mitigation, and inhibiting FAK has been identified as a strategy to impede cancer cell growth. Elevated expression of FAK is observed in conditions such as breast cancer, hepatocellular carcinomas, and neuroblastoma cells, highlighting the significance of FAK inhibitors as potential treatments. This study aimed to identify potential FAK inhibitors through an in silico drug screen, screening 3180 molecules from the Zinc database, including biogenic molecules, FDA-approved drugs, and compounds in clinical trials, against the FAK enzyme (PDB: 2ETM). Among the screened molecules, ZINC02033589 (Silymarin) emerged as the top candidate with a favorable -10.97 kcal/mol dock score, followed by ZINC00518397

(-8.23 kcal/mol) and ZINC03831112 (-8.07 kcal/mol). The interactions between the top three ligands and FAK were validated through a 100 ns molecular dynamics simulation study and MM-GBSA calculations. The ΔG of binding for ZINC02033589, ZINC00518397, and ZINC03831112 was determined as -59.09, -45.08, and -48.53 kcal/mol, respectively. The study conclusively established that among the three molecules, ZINC02033589 demonstrated superior stability and binding affinity towards FAK. These findings provide a foundation for the development of potential FAK inhibitor entities. The molecules identified in this study could serve as promising candidates for further synthetic and bioactivity research studies, paving the way for the exploration of novel treatments targeting FAK in cancer therapy.

NTP042

Design, Synthesize, and Docking New Analogs of SPK-98(Torin-2 scaffold) as the ATR and ATM Kinase Inhibitors

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Concentrating on the DNA damage and response (DDR) pathway stands as a promising avenue for cancer therapy. Vital components in this pathway, such as ataxia telangiectasia-mutated kinase (ATM) and ataxia telangiectasia-mutated, Rad3-related kinase (ATR), instigate cell cycle arrest after exposure to chemotherapy or radiation. Torin2, an advanced ATP competitive inhibitor of mTOR kinase, exhibits enhanced pharmacokinetic traits, boasting an EC50 value. Notably, Torin2 displays considerable biochemical and cellular effectiveness against ATM kinase and ATR kinase. Based on the Torin-2 structure, our lab previously developed the SPK-98 molecule. We're exploring various SPK-98 analogs with diverse molecular substitutions on the Pyridyl ring and validating their potential through a docking study. The Torin-2 molecule's pre-penultimate intermediate underwent modification by integrating substituted pyrimidine and pyridine rings through Suzuki coupling and Buchwald-Hartwig coupling methodologies. Various substitutions were introduced to the linker attached to the amino group of the piperazine ring of SPK98. Among the proposed compounds, five demonstrate docking scores more akin to SPK-98, an analog of Torin-2 synthesized in our research group. SPK-98 showcases a superior inhibitory concentration compared to the Torin-2 molecule. Our research has progressed in elucidating the structure-activity relationship (SAR) of the SPK-98 molecule. Presently, we are advancing into the synthesis phase, aiming to expand these findings for further exploration in biological studies.

NTP043

Design, Synthesis and Antitubercular Activity of Novel Pyrazole Derivatives as InhA Inhibitors

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Here, we report the Docking study and antitubercular activity of 15 recently synthesised pyrazole derivatives. The enzyme enoyl ACP reductase (InhA) is a key player in the FAS-II biosynthetic pathway of *M. tuberculosis* and a valuable target for the development of novel anti-TB agents. The binding

modes of the synthesized compounds at this active site were studied using Autodock Vina and Schrodinger software. The structures of the synthesized compounds were confirmed by routine spectroscopic techniques ^{1}H and ^{13}C NMR,IR and mass spectrometry.All the synthesized compounds show good docking score.These compounds have shown the same type of interaction as that of 4U0J ligand. The compounds were further evaluated for anti-TB activities against *M. tuberculosis* H37Rv strain by Microplate Alamar Blue Assay.In this study, novel compounds LMN-1 to LMN-15 have been synthesized that were recognized as potent InhA inhibitors.

NTP044

The Use of Cannabis-derived Medications in the Management of Chronic Pain: A Systematic Review of Randomized Controlled Trials

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Globally, the management of chronic pain is a complex challenge. Despite the fact that cannabis-based medicines (CBMs) have demonstrated efficacy in the treatment of chronic pain, the subject remains extremely contentious. The purpose of this research endeavor is to perform a comprehensive meta-analysis and review that encompasses all randomized controlled trials (RCTs). The ultimate goal is to provide researchers and clinicians with the most recent information regarding the effectiveness and adverse events (AEs) of CBMs when used to treat chronic and postoperative pain. A comprehensive electronic inquiry will be conducted utilizing Medline/PubMed and Google Scholar, employing Medical Subject Heading (MeSH) criteria, to identify credible published literature as of December 2023. Randomized controlled trials (RCTs) comparing the analgesic effects of CBMs to placebo were included. The g scores of Hedges will be computed for every single study. An evaluation of the study's quality will be conducted employing the Jadad scale. A meta-analysis will be conducted employing random-effects models, and the I^2 statistic and tau^2 test were utilized to calculate heterogeneity between studies. In conclusion, this meta-analysis and review of randomized controlled trials on cannabis-based medicines (CBMs) for chronic and postoperative pain, up to December 2023, provide critical insights. Utilizing Hedges' g scores and the Jadad scale, the analysis compares CBMs to placebos, enhancing evidence reliability. Acknowledging the global challenge of chronic pain management, the study emphasizes the nuanced understanding needed for CBM efficacy and adverse events. The comprehensive findings guide researchers and clinicians, urging a balanced consideration of benefits and risks in utilizing CBMs. This research informs future investigations and supports informed decision-making in pain treatment, optimizing patient care.

NTP045

Orphan Drugs Regulations - Challenges & Opportunities in Key Global Markets

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The pharmaceutical landscape is increasingly focused on orphan drugs, tailored for treating rare diseases affecting a limited patient population. The study delves into the unique challenges and opportunities linked to the development, approval, and commercialization of orphan drugs in United

States, the European Union, Japan, and Australia. In the United States, the Orphan Drug Act has been a pioneering force in incentivizing orphan drug development. The analysis dissects the regulatory landscape, evaluating the Orphan Drug Designation process, expedited review pathways, and market exclusivity provisions. It also scrutinizes evolving challenges such as pricing and reimbursement issues. In the European Union, the Orphan Medicinal Products Regulation plays a pivotal role in regulating orphan drugs. The study investigates the centralized marketing authorization process, orphan drug incentives, and the impact of Brexit on regulatory dynamics. Challenges related to market access, collaboration, and post-approval obligations are also scrutinized. Japan, a significant player in the global pharmaceutical market, has a unique regulatory framework for orphan drugs. The analysis outlines Japan's orphan drug designation process, expedited approval pathways, and collaboration opportunities, shedding light on cultural and logistical challenges faced by developers. Australia, while adopting a more streamlined approach to orphan drug regulation, presents distinct challenges and opportunities. The analysis explores the country's orphan drug designation process, regulatory pathways, and reimbursement considerations. It also discusses the potential for collaboration between industry stakeholders and regulatory bodies. In conclusion, this analysis offers a comprehensive overview of orphan drug regulations in the USA, the EU, Japan, and Australia. It provides insights into the challenges and opportunities shaping the orphan drug landscape in each region, essential for pharmaceutical companies navigating global orphan drug development and market access.

NTP046

Harmonizing Innovation: Navigating Technical Challenges in the Regulatory Landscape of Combination Products across the USA, EU, and India

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Understanding the regulatory frameworks governing combination products in the United States (US), India, and the European Union (EU) is crucial as healthcare innovation continues to evolve. Discussion: In the US, the FDA's risk-centric approach presents both opportunities and challenges, leading to prolonged development timelines. India's two-tiered system offers streamlined pathways for certain products but introduces complexities for high-risk combinations. The EU's centralized approach aims at harmonization but introduces technical obstacles, including a prolonged approval process and specific data requirements. The technical challenges discussed underscore the imperative for manufacturers to navigate this regulatory triad, optimizing development strategies tailored to each region's unique requirements. Importance: The study unveils technical and regulatory challenges in the development and approval of combination products. Navigating these regulatory landscapes is critical for optimizing development strategies, ensuring compliance, and expediting market entry. The study emphasizes the technical nuances of each region, recognizing the need for manufacturers to adapt to evolving guidelines and resource constraints. This study concludes by highlighting the critical need for enhanced harmonization across US, Indian, and EU regulatory landscapes for combination products. Technical intricacies and challenges underscore the importance of manufacturers adopting adaptive strategies. By comprehensively understanding and addressing technical nuances in each region, manufacturers can ensure successful market entry and widespread technical access to innovative healthcare solutions. The study emphasizes the role of harmonization and strategic planning in fostering global innovation and accelerating the development of safe and effective combination products.

NPT047

Review on Approval Trend of r-DNA Therapeutics in India

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This review explores the dynamic landscape of recombinant DNA (r-DNA) therapeutics approvals in India, providing insights into recent trends and pivotal developments. The approval trajectory signifies a paradigm shift in the country's pharmaceutical and biotechnological landscape. The regulatory framework governing these approvals, with the Central Drugs Standard Control Organization (CDSCO) at its core, is meticulously examined. The discussion emphasizes the strategic role played by regulatory bodies in facilitating and streamlining the approval process, reflecting a maturing regulatory environment. Notable advancements are observed across various therapeutic areas, encompassing insulin, growth hormones, and monoclonal antibodies, demonstrating the expanding applications of r-DNA technologies in diverse medical fields. An in-depth analysis of international collaborations and partnerships reveals their substantial impact on approval trends. Global alliances are shown to influence India's biotech sector significantly, highlighting synergies that drive innovation. The review underlines the transformative effect of such collaborations on the Indian pharmaceutical landscape, contributing to the nation's emergence as a key player in the global biotechnology arena. Despite these advancements, the review addresses critical challenges. Affordability, accessibility, and ethical considerations emerge as pressing issues. The need for a balanced approach is advocated, ensuring equitable access to these innovative therapies while addressing economic and ethical concerns. This provides a holistic perspective on the approval trends of r-DNA therapeutics in India. It illuminates regulatory dynamics, therapeutic advancements, and the broader implications for the evolving healthcare landscape. The exploration of international collaborations and challenges contributes to a nuanced understanding of the current state and future prospects of r-DNA therapeutics in the Indian pharmaceutical landscape, positioning it within the global biotech landscape.

NTP048

AI/ML Revolutionize Healthcare: Software as Medical Device

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In emerging digital era, fostering AI/ML enhanced in healthcare sector to improve quality of life. There are two significantly distinct medical device software such as software in medical device (SiMD), software that assists medical device functions to diagnose, treat or cure a disease whereas, software as medical device (SaMD) means software is, itself, diagnosing, treating and curing a disease. SiMD is an insulin delivery pump and SaMD is an insulin detection app. AI/ML-based SaMD employs ML, enabling algorithms to continuously learn and evolve as they gain new data rather than relying on pre-programmed algorithms. IMDRF working group can set the path for a future in healthcare where AI/ML algorithms used to enhance quality of life and ethical standards by offering clear guidelines and working with regulators globally. Scientific publication and grey literature were reviewed and analysed. From Regulatory perspective, AI/ML based technologies can be considered SAMD. By 2028, AI alone is expected to generate around $120 billion in revenue in the healthcare sector alone. Almost this growth is concentrated in AI/ML-based SAMD. The expanding field of AI/ML technologies holds immense

promise for revolutionizing healthcare by augmenting diagnoses, optimizing treatments, and accelerating research. AI/ML-based SaMD potential hinges on addressing the inherent challenges and limitations associated with opaque algorithms, particularly in context of ensuring patient safety, clinical performance and upholding ethical principles. Developers, healthcare professionals, and regulators each require a nuanced understanding of intricacies and limitations of algorithms transparency employed on SaMD.

NTP049

Evaluation of Different Specifications and Regulatory Approval of Cough Syrups used in the Paediatric Population

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This study undertakes a comprehensive evaluation of specifications and regulatory approval concerning diethylene glycol and ethylene glycol-containing cough syrups, specifically focusing on their use in the paediatric population, with Gambia Cough Syrup as a case study. Given the distinct vulnerabilities of paediatric patients and the potential hazards associated with glycol-containing formulations, this research is pivotal for ensuring the safety and efficacy of cough syrups tailored for children. The methodology involves a rigorous assessment of formulations, active ingredients, and quality control measures in adherence to international regulatory standards. The study meticulously examines the pharmacokinetics and pharmacodynamics of glycol-containing cough syrups, which are essential for determining appropriate paediatric dosages and minimising potential adverse effects. In accordance with Gambian regulatory requirements, the research team collaborates with regulatory bodies to verify the approval status of Gambia Cough Syrup. The study aims to provide critical insights into the safety and efficacy of glycol-containing cough syrups for paediatric use, fostering well-informed decision-making among healthcare professionals, insurers, and carers. The evaluation extends beyond traditional assessments, considering the unique challenges posed by glycol-containing formulations. This research emphasises the importance of stringent regulatory oversight and continual monitoring to ensure the quality and safety of cough syrups containing diethylene glycol and ethylene glycol, contributing significantly to the enhancement of child healthcare standards in The Gambia and beyond. The outcomes of this study are anticipated to guide regulatory practices, ultimately promoting the health and well-being of paediatric populations exposed to glycol-containing cough syrups.

NTP050

Regulatory Landscape for Synthetic Peptides: Endeavours towards Innovations with Quality Control

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Peptide therapeutics have been growing rapidly and drawing considerable industry and regulatory attention. Whether occurring naturally or synthetically produced through recombinant DNA technology, peptides exhibit distinct shapes and properties, rendering them essential for the treatment of wide range of ailments. The recent guidance issued by the Center for Drug Evaluation and Research

(CDER) has been focussed on optimizing and simplifying the approval procedures for the synthetic peptides, demonstrating a deliberate effort to improve the regulatory processes and facilitate more efficient pathway for the clearance of the novel drugs. However, manufacturing generic peptide drug products equivalent to their brand-name counterparts presents unique challenges. Elevated anticipation drives efforts to streamline and optimize regulatory pathways for developing and manufacturing these drugs, with a strong emphasis on stringent quality control measures. Analytical examination is stressed, especially regarding the sameness of the active substance and number of impurities. Impurities; arising from amino acid sequence modifications, necessitate careful characterization and justification for safety. This includes meticulous assessment of the potential for immunotoxicity, encompassing both innate and adaptive immunity; concurrently, careful examination of impurities, which include both product- and process-related impurities; as well as Critical Quality Attributes (CQAs) becomes essential to adhere to strict regulatory requirements in order to ensure that the suggested generic version appropriately reflects the reference listed drug (RLD) and presents no additional hazards, especially with regard to immunogenicity. To ensure the consistency and quality of synthetic peptides in the pharmaceutical industry; a nuanced, case-by-case approach and risk analysis are recommended, in addition to an emphasis on the regulatory and scientific considerations.

NTP051

Dietary Supplements: Regulatory Requirement & Registration Aspects in India and Comparison with Brazil, Russia, USA and South Africa

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The regulatory landscape for dietary supplements differs globally, with each country implementing distinct requirements to ensure product safety and efficacy. This review delves into the regulatory requirements and registration aspects for dietary supplements in India, drawing comparisons with Brazil, Russia, the USA, and South Africa. In India, dietary supplements are regulated by the Food Safety and Standards Authority of India (FSSAI). This outlines the rigorous registration process, adherence to labelling standards and quality, safety & efficacy relating to dietary supplements. It emphasizes the importance of FSSAI approval for market access, reflecting a commitment to safeguarding consumer health. Comparatively, Brazil follows a comprehensive regulatory framework overseen by the National Health Surveillance Agency (ANVISA). This discusses ANVISA's stringent requirements, including pre-market approvals, ingredient evaluations, and product registration, reflecting a meticulous approach to ensuring supplement safety. In the USA, the Dietary Supplement Health and Education Act (DSHEA) governs dietary supplements. Wherein Russia, the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing, requires product notification for dietary supplements. And South Africa, regulated by the Medicines Control Council (MCC), has stringent requirements for the registration of health supplements. In conclusion, this review provides a comparative analysis of dietary supplement regulatory frameworks in India, Brazil, Russia, the USA, and South Africa. It underscores the diversity in approaches, reflecting regional priorities and the shared goal of protecting public health through effective regulatory oversight.

NTP052

Demystifying Abbreviated Drug Approval: A Roadmap for ANDA and 505(B)(2) Applications

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Pharmaceutical company developers have to work on to reduce the difficulties faced and shortened the drug approval pathways. With the goal of giving industry professionals a thorough road map, this study attempts to demystify the procedures associated with 505(b)(2) and Abbreviated New Drug Applications (ANDA). Two distinct pathways for generic drug approval are outlined in the Federal Food, Drug, and Cosmetic Act: the 505(b) (2) application, which provides flexibility to the wider range of drug products, including those not therapeutically equivalent to an RLD, and the ANDA, which is a simplified procedure for generic drugs that are identical to a previously approved reference-listed drug (RLD). The roadmap starts by describing the requirements for ANDA, with a focus on the sameness of the active ingredient, dosage forms, administration routes, and strengths, as well as biological equivalents to the RLD. On the other hand, the 505(b) (2) pathway offers room for creativity by permitting variations in the active ingredients, doses, and routes of administration. The choice between ANDA and 505(b) (2) applications is influenced by a number of important factors, which are examined in this review. These factors include the availability of data, desired patent protection, active ingredient conformance, dosage form, route of administration, strength, conditions of use, labelling, and bioequivalence, etc. Each pathway's benefits and drawbacks are outlined, taking into account variables like market exclusivity, filing complexity, approval time, and eligibility for patent protection. The comprehensive examination of regulatory factors, such as patent status, Hatch-Waxman exclusivity, and the first-to-file rule, provides valuable understanding of the complex legal environment pertaining to the approval of generic drugs. Industry professionals can make decisions during the manufacturing and approval process with the help of this invaluable roadmap, which will ultimately improve patient access to safe and effective drugs.

NTP053

Review on Gobal Regulation of Health Beverages

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The market for health beverages is booming, driven by rising health consciousness and the promise of functional wellness beyond mere hydration. This review delves into the diverse regulatory frameworks across different regions, highlighting the key challenges and considerations for manufacturers and consumers alike. Regulatory examination often focuses on specific ingredients, particularly those with purported health benefits. For instance, the EU has established positive lists for certain botanicals and vitamins allowed in food supplements. Manufacturers must ensure their ingredients comply with relevant regional regulations. As the global health beverage market continues to expand, so too will the pressure for harmonization and greater clarity in regulations. International collaboration and knowledge-sharing can play a crucial role in establishing robust and consistent standards for the safety, efficacy, and labelling of these products. Ultimately, a more transparent and predictable regulatory

environment will benefit both manufacturers and consumers, fostering innovation and ensuring the responsible development and marketing of health beverages. This growing interest comes from studies finding special qualities in specific ingredients and from people wanting to take control of their well-being with what they eat. Think of it like supercharged food that helps you feel your best. Public interest in this area continues to rise, fuelled by a desire to proactively manage well-being through dietary choices. By understanding the complexities of global regulations, manufacturers can navigate the market with greater confidence, ensuring their products meet the highest standards of safety, efficacy, and consumer trust. Let's raise a glass (of a responsibly regulated health beverage, of course) to a future where innovation flourishes within a clear and well-defined regulatory framework.

NTP054

Regulatory Pathway for registration and Dossier Filing of ORS with Zinc in the Domestic Market and its comparison with various African Countries

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This work examines the regulatory pathway for registration and dossier filing of ORS with Zinc in the domestic market and compares it with various African countries. The study concludes that the regulatory pathway for the registration of ORS with Zinc in India is more streamlined and efficient than that of African countries. This work also examines how the FDC-Fixed Dose Combination registration and approval process takes place in India. Here FDC used is ORS with Zinc. Basically, Zinc with ORS is more effective than ORS alone as this combination helps prevent diarrhoea by restoring immunity in malnourished children, it also reduces the risk of recurrent diarrhoeal episodes. There are certain regulatory provisions and rules governing FDCs in India and a checklist for the data requirements for approval of FDCs that needs to be followed when registering in the SUGAM portal. This work also focuses on the registration process of FDC in various African markets. In Africa, access to water, sanitation, and hygiene is poor and the burden of diarrhoea is countless relative to the rest of the world. A comprehensive summary of the research on ORS with Zinc as a Fixed Dose Combination Product and the study of its regulatory provisions including regulatory pathway and approval procedure in Domestic Market (India) and its comparison with that of African Market.

NTP055

Formal Meetings between USFDA and Applicants of Complex Products under GDUFA and PDUFA

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This work gives a brief Summary of defining characteristics of complex products and provides a detailed insight about the formal meetings taking Place between the Applicant and the Agency (USFDA) Under GDUFA and PDUFA. Complex Products are those having Complex active ingredient, Route of delivery, Dosage form or formulation, Drug-device combination Product, Complexity of uncertainty concerning the approval Pathway of a possible alternative approach that would benefit from early scientific engagement. GDUFA Meetings: This Work provides deep insights about all three Phases of

Submission Which include before submission Pre-ANDA review, ANDA Review and Post ANDA Review. The goals of GDUFA Meeting are to Clarify regulatory expectations for prospective applicants early in product development phase, Assist applicants in developing more complete and quality submissions, Promote a more efficient and effective ANDA assessment process, Reduce the number of assessment cycles required to obtain ANDA approval. Pre- ANDA submission includes Product development meeting and Pre-submission meeting, ANDA Review includes Mid-cycle review meetings and Enhanced mid- Cycle review meeting and Post Action includes Post CRL clarification teleconference and scientific meetings. Major Focus is on the Pre-ANDA Program: Product Development Meetings where product named Doxorubicin hydrochloride is used for better understanding of the questions asked in product development meeting. PDUFA Meetings: Focuses on the meetings under the PDUFA where the Product do not fall under the category of generics. It includes six types of formal meetings: Type A, Type B, Type B (EOP), Type C, Type D, and INTERACT Meetings. The work will also provide detailed insights about the content of Meeting Requests and Meeting Packages along with the submission Process and Timelines. A Comprehensive Summary about the defining characteristics of Complex Products and detailed study of the Procedures involved in types of meetings between Applicant and USFDA under GDUFA and PDUFA, and to get better understanding of Agencies requirements for complex Products and to get exposure of the techniques for Posing questions to the agency.

NTP056

Safety and Toxicity Aspects of Nutraceuticals: A Comprehensive Review of Global Regulatory Provisions

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Nutraceuticals, a hybrid of "nutrition" and "pharmaceuticals," occupying the blurred space between food and pharmaceuticals, represent a rapidly growing sector in the global health and wellness industry. As consumers increasingly turn to nutraceuticals for their potential health benefits, ensuring the safety and minimizing toxicity risks have become critical considerations.

This review article aims to provide an overview of the field of nutraceuticals and explores the current regulatory landscape around the globe, highlighting the diverse approaches taken by different countries in addressing safety concerns associated with nutraceutical consumption. It investigates the criteria set by regulatory bodies to assess the safety profile of nutraceuticals, aiming to strike a balance between promoting consumer well-being and ensuring product safety. The review begins by exploring the diverse range of nutraceutical products available in the market and the inherent challenges associated with ensuring their safety. A detailed examination of international regulatory frameworks follows, highlighting variations in requirements across regions with a focus on key jurisdictions such as the United States, European Union, Canada, India and other major markets. This comparative analysis sheds light on the varying approaches to safety assessment, labelling requirements, and post-market surveillance for identifying previously unknown risks. In tandem with safety considerations, the abstract examines regulatory responses to potential toxicity issues associated with nutraceutical consumption. It sheds light on the thresholds for contaminants, heavy metals, and unintended side effects, elucidating the methodologies employed for risk assessment. It elucidates the challenges in determining potential interactions with pharmaceuticals. In conclusion, this abstract provides a snapshot of the intricate interplay between safety, toxicity, and regulatory provisions in the nutraceutical sector. By understanding and addressing these aspects, regulatory bodies and consumers can contribute to a safer

and more transparent landscape for the development and consumption of nutraceutical products thus facilitating global market access.

NTP057

Post-Approval CMC changes in Brazil and Europe

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The dynamic nature of the pharmaceutical industry necessitates periodic modifications to approved drug products in order to maintain their quality, safety, and efficacy. Changes in Chemistry, Manufacturing, and Controls (CMC) after approval are an essential tool for responding to changing requirements. This abstract explores the regulatory systems that control post-approval CMC alterations in Europe and Brazil with the goal of highlighting the similarities and differences between these two locations. Agência Nacional de Vigilância Sanitária (ANVISA) is in charge of overseeing post-approval modifications in Brazil, with a primary focus on maintaining product quality and safety. In contrast, Europe has a centralized process for some products, which is overseen by the European Medicines Agency (EMA), guaranteeing a uniform strategy between member states. The importance of pharmaceutical businesses understanding the regulatory environments controlling post-approval CMC adjustments in Brazil and Europe is shown by this comparative analysis. Although there are common principles for protecting the quality and safety of products, there are significant differences in the regulatory processes and documentation requirements that demand more comprehensive knowledge. Industry professionals who want to successfully navigate the post-approval landscape, ensure regulatory compliance, and maintain product integrity across the global market must understand these distinctions. Pharmaceutical businesses can enhance their regulatory strategies and reinforce their dedication to product quality by deliberately addressing these disparities and enabling an effortless implementation of post-approval CMC adjustments.

NTP062

Proton Therapy in Cancer Treatment: Current Landscape, Regulatory Gaps, and Imperatives for India's Healthcare System

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Cancer, marked by uncontrolled cell growth and systemic spread, is a formidable challenge in healthcare. Radiation therapy, a crucial treatment modality, employs radiation to eradicate cancer cells. Proton therapy, an advanced form of radiation therapy, utilizes protons to precisely disrupt and destroy tumor cells, offering a less invasive alternative with fewer side effects. Despite its potential, the regulatory landscape for proton therapy in India is currently undefined. This abstract explores the existing regulatory gaps and emphasizes the need for a comprehensive and standardized approach to ensure equitable access to proton therapy. While several hospitals in India provide proton therapy, the absence of specific regulations poses challenges in ensuring standardized practices. It explores the economic and clinical implications of incorporating proton therapy into the existing cancer care

infrastructure, emphasizing the importance of strategic investments and policy interventions. Addressing crucial aspects such as dose limits, authorization procedures, radiation source disposal, internal control competence, risk assessment, and preventive measures is imperative. This work advocates for the establishment of comprehensive regulations, covering occupational expose, workplace classification, dose reporting, and the maintenance of meticulous records. By navigating these regulatory intricacies, we aim to enhance the effectiveness and accessibility of proton therapy, contributing to the advancement of cancer care in India.

NTP063

Conducting a Retrospective, Multicenter, Observational Study on the Safety and Performance of the Sirolimus-Eluting Bioresorbable Vascular Scaffold System in Accordance with EU MDR 2017/745

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In compliance with EU Medical Device Regulation 2017/745, the retrospective multicenter study sought to evaluate the safety and efficacy of the Sirolimus-Eluting Bioresorbable Vascular Scaffold System (SE-BVS). Following EU MDR guidelines, the study examined clinical outcomes and device-related adverse events related to SE-BVS at a number of healthcare facilities, looking through patient records to find pertinent endpoints. Based on preliminary data, SE-BVS appears to have a positive safety profile and a low incidence of major adverse cardiovascular events. Notably, SE-BVS's effectiveness in preserving vascular patency and averting restenosis was apparent, proving its applicability in actual settings. Thorough analyses of procedure characteristics and patient demographics add to a complete picture of SE-BVS performance. To sum up, our retrospective analysis offers insightful information about the effectiveness and safety of SE-BVS. The study's conclusions, which are in line with EU MDR recommendations and highlight the advantageous effects of the system on patient outcomes in clinical practice, add a great deal of information to the body of knowledge regarding the long-term performance of the Sirolimus-Eluting Bioresorbable Vascular Scaffold System. The outcomes provide assurance about the safety and efficacy of SE-BVS and support its ongoing use as a practical option in the management of vascular diseases.

NTP064

A Review of Various Nano Sensors Use as a Biomarker

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In both healthy and pathological processes, biomarkers—measurable indicators of biological conditions—play a critical role. They include many different kinds, including proteins, metabolites, cells, and more. For the early diagnosis of disease, sensitive techniques—particularly nano sensors—must be developed. Sensors with higher sensitivity and detection limits can be made smaller, faster, and less expensive with the help of nanostructures like nanowires and quantum dots. These developments have a major impact on disease diagnosis and treatment by helping to identify and detect biomarkers.

Medical biomarkers help with timely interventions, treatment efficacy evaluation, and personalized medicine by providing advantages like early disease detection, disease monitoring, and disease risk prediction. The use of nanotechnology in biomarker detection methods demonstrates how important it is to the advancement of healthcare. The integration of nano sensors into biomarker research has significantly advanced the capabilities of detection and monitoring in various fields. The ongoing research and development in this area promise to contribute to early disease diagnosis, effective environmental monitoring, and innovative solutions in agriculture and food safety.

NTP065

Differential Effects of Photonic and Gamma Irradiation Processes on a Selected API: A Comparative Analysis

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Ciprofloxacin hydrochloride, promethazine hydrochloride, and amlodipine besylate degrade under gamma and photo radiation. The findings offer insights for optimizing drug formulations, particularly in space radiation or light-exposed environments, enhancing stability and efficacy of pharmaceuticals. In this study, photo degradation was conducted over 1.2 million lux hours, and gamma degradation involved varying doses from 100 Gy to 1000 Gy. The chemical stability of the exposed samples was assessed using RP-HPLC methods. While the official pharmacopeial method was applied for Ciprofloxacin hydrochloride and amlodipine besylate, an in-house method was developed for the separation of promethazine hydrochloride degradation products. In the HPLC chromatogram, the controlled samples of Ciprofloxacin hydrochloride, promethazine hydrochloride, and amlodipine besylate API display distinct peaks. However, radiation-exposed samples reveal 07, 11, and 11 degradation products for each respective drug. The %Degradation in photo-exposed samples exceeds 15% for all three drugs, while in gamma degradation, %Degradation rises with an increase in radiation dose. After exposure to photo and gamma irradiation, both physical and chemical changes were noted, revealing diverse HPLC chromatographic profiles in terms of %degradation and the proportion of identical degradation products. This suggests the potential existence of distinct degradation pathways leading to the formation of degradation products.

NTP066

A Comprehensive Analysis of Ranitidine by Various Methods

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Ranitidine is a widely used medication for the treatment of ulcers, gastroesophageal reflux disease (GERD), and other conditions related to excessive stomach acid production. However, recent concerns regarding the presence of impurities in ranitidine formulations have raised the need for comprehensive analysis of this drug using various methods. This the review of the different analytical methods that have been employed for the analysis of ranitidine, including chromatographic, spectroscopic, and

electrochemical techniques. The advantages and limitations of each method are discussed, along with their applicability for the detection of impurities in ranitidine formulations.

NTP067

Analytical Techniques for the Quantification of Phytochemicals in Plants

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Palash (Butea monosperma), Bada Gokhru (Pedalium murex), Shatavari (Asparagus racemosus), Man Roots (Withania somnifera), and Kali Jeeri (Centratherum anthelminticum) are five medicinal plants known for their therapeutic properties. This review provides an overview of analytical techniques used for the quantification of phytochemicals in these plants, including high-performance liquid chromatography (HPLC), gas chromatography-mass spectrometry (GC-MS), and spectrophotometric methods. The extraction methods, sample preparation, mobile phases, column selection, detection wavelengths, and data analysis strategies employed in these techniques are discussed. The review also highlights the importance of standard solutions, replicates, and data analysis software in ensuring accurate quantification of phytochemicals in these plants. Furthermore, the potential applications of these analytical techniques in pharmaceutical, nutraceutical, and phytochemical research are explored. This comprehensive review serves as a valuable resource for researchers and practitioners involved in the analysis and quantification of phytochemicals in these medicinal plants for various scientific and commercial purposes.

NTP068

A Novel, Mass Compatible and Fully-Validated HPLC Method for Simultaneous Quantitative Bio-Analysis of Pitavastatin and Candesartan in Human Plasma

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Even though synergistic vascular protective effect of statins and angiotensin receptor blockers is known, the pharmacokinetic interaction amongst these two classes is yet to be understood facilitating the necessity of developing analytical methods for their determination. Herein, a bio-analytical method using RP-HPLC/UV was developed and fully validated for simultaneous estimation of pitavastatin and candesartan in human plasma using telmisartan as an internal standard. The two analytes were extracted from plasma sample using liquid-liquid extraction and then separated on a Waters Reliant C18 column (4.6 × 250 mm, 5 µm) using ACN: 5 mM Sodium acetate buffer (80:20, v/v; pH adjusted to 3.5 with acetic acid) as a mobile phase at a flow rate of 0.8 ml/min and wavelength of 234 nm. The developed method is validated in terms of selectivity, recovery, accuracy, precision, matrix effect, dilution integrity and stability studies as per US-FDA guidelines. The developed method showed good sensitivity with LLOQ values of 2.5 ng/ml for both analytes. Extraction recovery observed for both analytes was above 90% as well as reproducible and consistent. Stability studies showed the samples to be stable over a long period covering from sample collection to final analysis. Hence, the proposed method could be applied for routine laboratory analysis of pitavastatin and candesartan in human plasma samples, clinical trials and pharmacokinetic studies. The usage of liquid chromatography-mass

spectrometry compatible solvents in the mobile phase permits further characterization of parent molecules and metabolites if needed.

NTP069

Advancements in Ion Mobility Spectrometry (IMS): A Comprehensive Exploration of Applications

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Ion Mobility Spectrometry (IMS) has emerged as a pivotal analytical technique, offering unparalleled insights into molecular structures and dynamics. This abstract aims to provide a detailed examination of the diverse applications of IMS, highlighting its significant contributions to various scientific disciplines. Part 1 – Molecular Characterization and Structural Elucidation: The first section underscores IMS's intrinsic capability to decode molecular complexity. By facilitating the detailed characterization of complex molecular structures, IMS becomes a cornerstone in elucidating the intricacies of chemical entities, playing a fundamental role in advancing our understanding of molecular systems. Part 2 – Environmental Analysis: Within the environmental domain, IMS assumes a crucial role as a high-precision analytical tool. Its application in detecting and identifying pollutants and trace elements enhances our capacity for environmental monitoring. This segment explores IMS's efficacy in safeguarding ecosystems and contributing to a comprehensive understanding of environmental dynamics. Part 3 – Biomedical Applications: Delving into the biomedical landscape, this section showcases IMS as an instrumental technique for unraveling biomolecular structures. The abstract navigates through IMS's role in elucidating biochemical interactions at the molecular level, exemplifying its potential for groundbreaking discoveries and advancements in biomedical research. Part 4 – Interdisciplinary Impact: Beyond its foundational applications, IMS extends its influence across diverse fields, including pharmaceuticals, forensics, and materials science. Analytical precision provided by IMS proves transformative, catalyzing breakthroughs and driving innovation in these interdisciplinary domains. This segment highlights the adaptability of IMS, rendering it an invaluable asset in the pursuit of scientific progress. In conclusion, this abstract synthesizes the comprehensive scope of IMS applications, emphasizing its role as a versatile and indispensable analytical tool. The narrative explores the profound impact of IMS across varied scientific landscapes, positioning it as a driving force in advancing analytical chemistry and catalyzing discoveries across multidisciplinary frontiers.

NTP070

Feasibility Study of Non-Thermal Atmospheric Pressure Dielectric Barrier Discharge (DBD) Plasma Jet for Degradation of Dyes

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Water pollution is one of the major concerns and the presence of various chemicals, antibiotics, dyes, are contaminants which is the main cause for many diseases and it can inflict severe harm on aquatic

ecosystems, encompassing humans, animals, and plants. Many research has been reported on the different conventional water treatment which are either ineffective, economically not viable, or can create secondary toxic pollutants. This research work, an experimental study is carried out to evaluate the efficacy of a non-thermal plasma jet with dyes. In an initial evaluation, 100ml solution of each dye (Indigo, Crystal Violet, Congo red, Methylene blue) at a concentration of 1mg/L was treated using single plasma jet with air as the gas medium, and the parameters were validated by employing various volumes of dye solution and concentration. Furthermore, the study delved into assessing the impact of ozone, serving as a potent antioxidant, particularly in the case of Crystal violet. The results demonstrated complete degradation of initial concentrations of Indigo, Crystal violet, Congo red, and Methylene blue, at 6, 10, 25, and 60 minutes respectively. Additionally, an increased volume of crystal violet was treated with air, which achieved 95% degradation in 45 minutes, while with ozone, 95% degradation was achieved in 10 minutes. A rate kinetic model was fitted in the experimental data of dye degradation with increasing plasma treatment time for the determination of reaction rates. It is concluded that the degradation efficiency of the NT-Plasma jet was effective with the ability to generate various oxidative species contribution to effective dye degradations and it can be explored for wastewater treatment in industries such as dye production, textiles, food, and paint.

NTP071

Development and Validation of TLC Densitometric Method for the Simultaneous Estimation of Metoprolol Succinate and Hydrochlorothiazide in Tablet Dosage Form

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Accurate, specific, precise and robust TLC densitometric method has been developed for simultaneous estimation of metoprolol succinate (METO) and hydrochlorothiazide (HCTZ) in tablet dosage form. The chromatographic separation was performed on precoated silica gel TLC 60 F254 plates using toluene: methanol: ethyl acetate: glacial acetic acid (7:1.5:1:0.5 v/v/v/v) as mobile phase. This system was found to give compact bands for metoprolol succinate and hydrochlorothiazide (RF values 0.15 and 0.35 respectively). Densitometric analysis of metoprolol succinate and hydrochlorothiazide were performed at 230 nm. Regression analysis data for the calibration plots were indicative of good linear relationships between response and concentration over the range 1000-5000 ng/band for metoprolol succinate and 500-2500 ng/band for hydrochlorothiazide. The method was validated as per ICH guidelines for accuracy, precision, LOD, LOQ and robustness.

NTP072

Forced Degradation Study of Naphazoline Drug Substance and Eye Drop Using HPLC

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Naphazoline is a medication designed to alleviate redness, itching, and watering of the eyes caused by conditions such as colds, allergies, or irritants like smog and swimming. As a sympathomimetic agent,

it constricts blood vessels in the eyes, providing relief from these symptoms and improving overall eye comfort. This study establishes and validates a stability-indicating method for Naphazoline using HPLC, ensuring accurate analysis in the presence of process-related impurities and degradation products. Chromatographic separation was accomplished on an RX-C8 column (250x4.6mm, 5um) at 25°C, employing a mobile phase of Buffer: Acetonitrile (70:30) in isocratic mode to separate Naphazoline and its known impurities. Detection was performed at 280nm using a photo diode array (PDA) detector, and the validation of the method adhered to the guidelines outlined in ICH Q2 (R1). The peak of Naphazoline and its known impurities were separated and RT for Naphazoline found to be 15 minutes, while RRT of impurities, IMP-A (Naphazoline related compound), IMP-B (1-Naphthyl Acetic acid) found to be 11 and 21 minutes respectively. The method was validated as per the ICH Q2 (R1) guideline and the validation parameters (Accuracy, Precision, Linearity, Specificity, and System Suitability) were found to be in the range of acceptance criteria. The forced degradation analysis of Naphazoline revealed minimal degradation in the drug within the API under acidic, alkaline, and oxidative conditions. In oxidation condition the formulation shows higher degradation compared to API. Notably, both the oxidation and thermal formulations exhibited greater degradation than the API, necessitating further investigation.

NTP073

Unveiling the Digital Healer: Exploring the Transformative Power of AI in Healthcare

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Artificial Intelligence (AI) in healthcare is a transformative concept that leverages large datasets to detect correlations and patterns, ultimately enabling predictions. While AI rapidly evolves, its application in healthcare remains a topic of concern due to its direct impact on human lives. This survey article sheds light on various facets of AI in healthcare, including awareness, utilization, trust, reliability, ethics, and legality. It also conducts a comparative analysis of the trustworthiness of AI versus human healthcare professionals like pharmacists. The study encompasses different age groups and professions, such as pharmacists, engineers, nurses, to provide a comprehensive examination of the subject. Google Docs facilitated the creation of online surveys accessible via a unique web link for participants' convenience. We utilized SPSS (Statistical Package for the Social Sciences) to analyse data. After conducting a comprehensive survey and analysing the available statistics on various aspects, the data highlights that healthcare progress hinges on the combined efforts of human expertise and AI. This synergy, leveraging AI's technical capabilities, propels healthcare innovation. Healthcare professionals remain vital for addressing emotional aspects, like trust and reliance, within the healthcare ecosystem. AI complements rather than substitutes, contributing to potential life-saving efforts in healthcare. The true potential for healthcare advancement lies in the combined efforts of AI and healthcare professionals, forming a partnership capable of addressing numerous challenges, treating various diseases, and ultimately saving numerous lives.

NTP074

Exploring Bile Acid Metabolomics in Women with Uterine Fibroids

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Uterine fibroids or leiomyoma, extremely common tumors found in the wall of the uterus, afflict one-eighth of the population globally. Driven by sex steroids, estrogen and progesterone, they consist of slowly dividing smooth muscle cells surrounded by overgrowth of extracellular matrix. While benign in nature and mostly asymptomatic, because of their bulkiness, which exerts pressure on nearby organs, they often cause considerable morbidities for those who are symptomatic. These include heavy menstrual bleeding, pelvic pressure, urinary symptoms, infertility, and complications related to pregnancy. Uterine fibroids are the most common cause of hysterectomy and impose substantial economic burden. Despite the ubiquity and economic burden, few effective long-term and non-invasive treatment options exist, which include Progesterone receptor modulators and orally active Gonadotropin-releasing hormone-receptor blockers. Understanding the molecular mechanisms underlying the fibroids is essential to find new inexpensive pharmacological targets. However, much like many other conditions afflicting women's health, uterine fibroids have received less attention from researchers, and, beyond the role of sex steroids, the oetiology remains nebulous. Hitherto, to understand the pathology of uterine fibroids, researchers have mostly focused on the tissue level (i.e., tissues in the uterus). However, several independent lines of research hint the role of bile acid in the pathology of uterine fibroids; these include association of uterine fibroid with several systemic risk factors such as obesity, metabolic syndrome, vitamin D deficiency—all of which have interact with bile acid homeostasis. We will use a metabolomics method with liquid chromatography tandem mass spectroscopy (LC-MS/MS) to this end. To date, the possibility that bile acids play a role in the formation uterine fibroid has neither been raised nor examined. Hence, the goal of this study is to examine alterations in primary and secondary bile acid levels in the serum of women with uterine fibroids compared to healthy women.

NTP075

A Systematic Review: Next Generation Diagnostic Paper Based Biosensors

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Laboratory techniques such as HPLC, ELISA, GCMS, and LCMS/MS, known for their sensitivity and reliability, are commonly employed by CLSIA-certified labs for disease diagnosis. However, these methods necessitate well-equipped, centralized laboratory facilities. A paradigm shift in diagnostics is observed with the advent of Point of Care Testing (POCT), a revolutionary approach that challenges traditional analytical techniques. The emergence of POCT has propelled the development of biosensors, including paper-based sensors, microfluidic chips, wearable devices, and smartphone-assisted diagnostics, gaining popularity as diagnostic tools. This systematic review underscores the importance of biosensors in offering efficient point-of-care solutions. In the methodology section, the biosensors are systematically evaluated based on their limit of detection, with a comprehensive comparison and contrast of diverse approaches. In the results section, paper-based biosensors maintain their popularity

and show promise for crucial roles in clinical applications. Lateral flow immunoassay (LFA) stands out with positive outcomes, being both more cost-effective and sensitive compared to other biosensors. In conclusion, widespread and timely diagnostics play a crucial role in enhancing human health. Precision in diagnosis faces challenges due to choices in biomarkers and techniques, potentially exacerbating the severity of disorders. Although traditional methods like HPLC, ELISA, and LCMS/MS exhibit sensitivity, their dependence on centralized laboratories limits accessibility. The diagnostic landscape is evolving towards Point of Care Testing (POCT), with Lateral Flow Immunoassay (LFIA) showing heightened sensitivity. In the modern era, LFIA is integrated with smartphones for immediate results near the patient site. This summary highlights key insights from the overview, underscoring the importance of advancing diagnostic techniques.

NTP076

Homology Modeling, Binding Site Identification, Molecular Docking and Molecular Dynamics Simulation Study of Emerging and Promising Drug Target of Wnt Signaling – Human Porcupine Enzyme

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Wnt signaling is a critical pathway involved in cell proliferation, differentiation and cellular homeostasis. To address treatment, need of diseases associated with the dysregulated Wnt signaling like cancer, Alzheimer's disease, Osteoporosis, Myocardial infarction etc.; small molecules that target the very first and unique component of the Wnt pathway, Porcupine enzyme, have been proven to be effective. With an aim to predict 3D structure of Porcupine, homology modeling study was performed using two distinct platforms; I-TASSER and Molsoft ICM Pro. Both the generated homology models were further assessed and compared through Ramachandran plot, Protein health tool of Molsoft ICM and other tools available on metaserver, SAVES v6.0. Molsoft model was found better than I-TASSER. This ICM model was further refined for 50 ns under MD simulation where it got stabilized after 25 ns. Binding site in the predicted structure of Porcupine was identified using ICM binding pocket identifier and used for molecular docking of known Porcupine inhibitors like IWP-2, IWP-3, IWP-L6, and LKG974. Key binding site residues involved in the interaction were identified which can be useful in designing of novel porcupine inhibitors in future.

NTP077

Image Oncology: A Regulatory Perspective

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Image diagnostic devices, pivotal in healthcare, face a complex landscape of regulations, opportunities, and challenges. Regulatory frameworks govern their development, manufacture, and use to ensure safety, efficacy, and quality. These devices, including X-ray machines, MRI, and CT scanners, fall under stringent regulations globally, primarily to mitigate patient risks and maintain high diagnostic accuracy. The regulatory landscape constantly evolves to keep pace with technological advancements. Striking a balance between innovation and safety remains a challenge. Stringent pre-market evaluations demand thorough testing for device safety, performance, and potential adverse effects. Compliance with regulations like the FDA's 510(k) clearance or CE marking in the EU involves extensive documentation and clinical data, often causing delays and increasing costs for manufacturers. Yet, regulations also offer opportunities. Adherence to quality standards builds trust among healthcare professionals and patients, boosting market acceptance. Manufacturers investing in R&D to meet evolving regulatory demands can gain a competitive edge. Furthermore, streamlined regulations might spur innovation and market entry for smaller companies with novel imaging technologies. However, challenges persist. The complexity of regulations can stifle innovation, particularly for smaller firms with limited resources. Interpreting and complying with diverse global standards poses a significant barrier for international market entry. Additionally, evolving technologies, such as AI-driven image analysis, challenge traditional regulatory frameworks, requiring flexible approaches to ensure both safety and innovation. Furthermore, cost implications arise due to compliance efforts, potentially limiting accessibility to cutting-edge imaging technologies in certain regions or healthcare settings. Privacy concerns related to patient data generated by these devices also warrant regulatory attention, especially with increasing connectivity and data sharing capabilities. The regulations surrounding image diagnostic devices are essential for ensuring patient safety and device efficacy. While they present opportunities for market growth, innovation, and trust-building, they also pose challenges for manufacturers regarding costs, innovation constraints, and international market access. Striking a delicate balance between fostering innovation and ensuring regulatory compliance remains a key challenge in this dynamic landscape.

NTP078

Comparative Study on Current Regulatory Requirements for Generic Peptide-Based Pharmaceuticals in USA and Europe

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This comparative study provides detailed information on the regulatory requirements for generic peptide-based pharmaceuticals in the USA and Europe. It covers past and future prospects, specification for marketing a generic peptide in USA, unique considerations involve in ANDA, CMC for synthetic peptides, manufacturing methods, cGMP, analytical methods and stability parameters. The study also discusses post-approval changes, reporting categories for peptide drug products, and the specific

requirements for manufacturing, testing, and quality control processes. Additionally, it addresses the challenges in demonstrating equivalence for complex generic products and the need for tailored guidance for peptide developers and regulatory bodies. The study emphasizes the importance of adherence to regulatory standards to ensure the safety and efficacy of pharmaceutical products.

NTP080

C-H Activation for the Synthesis of Heterocyclic Scaffolds: Recent Advancements and Applications

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Organic reactions have undergone a great transformation to maximize sustainability and simplify the reactions. Therefore, in a view to sustainability scientist have been more focused to C-H bond activation for the synthesis of molecules or in any organic reactions. The cleavage of unreactive C-H bond to C-X bond (where X= C, O, N, or any other heteroatom) is generally termed as C-H activation. C-H bond activation is mainly done using transition metal as catalyst. Although there may be some harsh reaction condition this approach can be efficiently used under mild conditions. C-H bond activation mechanism generally falls in three categories namely oxidative addition, electrophilic activation and sigma bond metathesis. This latest technology is now being widely used by the chemist to bring modification or diversity to the heterocycles. Recent research is done to make compounds site-selective for reaction and incorporation of economic electro-chemistry and phytochemistry to increase the power of C-H activation. The coverage of C-H activation strategies in this work will provide the current shortcomings in this approach.

NTP081

Design and Synthesis of Novel Tankyrase Inhibitors for the Treatment of Colorectal Cancer

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Tankyrase (TNKS) enzymes, owing to their poly (ADP-ribose) polymerase activity, have been recognized as one of the prospective therapeutic targets for the treatment of colorectal cancer. To design novel Tankyrase inhibitors, a computational approach was used. The pharmacophore model was generated using 9 structurally diverse molecules using DISCOtech followed by refined with the GASP module of Sybyl. Out of four refined models, model 4 containing ten features; three donor sites, three acceptor atoms, one acceptor site, one donor atom, and two hydrophobic regions had the highest fitness score and best validation results. Hence, model 4 was used as a query for virtual screening in the NCI database. 3D-QSAR was carried on thirty-seven, 2-phenylquinazolin-4(3H)-one derivatives. Contour map analysis of the best CoMFA and CoMSIA models suggested that by substituting hydrophobic, bulky, and electronegative groups, the potency of the compound could be improved. The quinazolinone ring which is a bio-isostere of quinoline ring, retrieved as hit in virtual screening, was selected as a core

moiety. Designed quinazolinone derivatives were docked into the active site of the Tankyrase structure complex and In-Silico ADMET properties were also predicted. Synthesis of the best-scored quinazolinone derivatives was carried out and spectral characterization was carried out using Mass, ^{1}H, and ^{13}C-NMR spectroscopy with purity checked using HPLC. Synthesized derivatives were subjected to *in-vitro* cytotoxicity studies. From the results, it was found that compound 6e showed the most potent activity. The results of the studies should be explored in the future to design novel potent tankyrase inhibitors.

NTP082

Integration of Artificial Algorithms and Molecular Dynamics Simulations for the Identification and Optimization of Thymol-based TNF-alpha Inhibitors in the Quest for Rheumatoid Arthritis Treatment

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In this research, the focus is on exploring various artificial algorithms for effective hit selection in the quest for discovering TNF-alpha inhibitors aimed at treating Rheumatoid Arthritis. The methodology begins with the selection of two plants, Thymus Linarias and Carum carvi, to assess the activity of their phytoconstituents against JAK-II and TNF-alpha, specifically for the treatment of Rheumatoid Arthritis. Thymol, identified among the phytoconstituents, exhibits notable binding interactions with the TNF-alpha target protein. Subsequently, complexes of Thymol and TNF-alpha (PDB ID: 5V5N) undergo molecular dynamics simulations using GROMACS software over a 50 ns period. The stability of RMSD and RMSF values is monitored throughout the simulations. Additionally, there is an observed increase in docking score and binding interactions post-simulations. Following molecular dynamics simulations, Thymol demonstrates favorable ADMET data among potential ligands for Thymus Linarias. The research concludes by highlighting the promising potential of Thymol as a TNF-alpha inhibitor for Rheumatoid Arthritis treatment. The stability observed in molecular dynamics simulations, along with improved docking scores and binding interactions, supports the viability of Thymol. Furthermore, the exploration of Thymol's ADMET data and pharmacophore hopping provides a pathway for the structural optimization of the Thymol scaffold, suggesting potential future lead compounds in the ongoing pursuit of effective Rheumatoid Arthritis treatments.

NTP083

Green Analytical Method Development and Validation of Baicalin by RP-HPLC-UV

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Baicalin (BCL) belongs to natural flavonoids extracted from the roots of Scutellaria baicalensis, the plant used in traditional Chinese medicines. It has been proven that baicalin has various pharmacological activities, such as antioxidant, anti-inflammatory, anticancer, antibacterial, anti-apoptotic and anti-coronaviral. The current study focuses on how Green Analytical Chemistry (GAC)

was used in the determination of baicalin using Reverse Phase High Performance Liquid Chromatographic (RP-HPLC) method with UV detection at 280nm (RP-HPLC-UV) was established. The separation of BCL was achieved using a Phenomenex C18 (250 x 4.6mm, 5.0 µm) column kept at 25°C. The peak of Baicalin was separated using Ethanol: Water (30:70, 1% Glacial Acetic Acid, %v/v) as a mobile phase in isocratic program at a flow rate of 0.5 mL/min. The validation of the method adhered to the guidelines outlined in ICH Q2 (R1). No green technique incorporating the use of GAC in HPLC for BCL has been reported. The peak of Baicalin was well separated and the RT for the same was found to be at 7.42 minutes. The method was validated as per the ICH Q2 (R1) guideline and the validation parameters (Accuracy, Precision, Linearity, Specificity, and System Suitability) were found to be in the range of acceptance criteria. This RP-HPLC-UV method supports and adheres by the principles of GAC which is also sustainable, and this newly developed green analytical method can be used for the study of Baicalin.

NTP084

Ligand-Based Pharmacophore Modelling, Virtual Screening and Molecular Docking for the Identification of Novel Hits as *Mycobacterial* ATP Synthase Inhibitors

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In tuberculosis depletion of ATP, synthesized by the F_1F_0-ATP synthase enzyme, leads *mycobacterial* strains strenuous to survive in harsh conditions. The discovery of Bedaquiline in 2012 validated the *mycobacterial* ATP synthase as a substantial target to combat resistance developed in *mycobacterial* strains. In ligand-based pharmacophore modelling, a set of reported 67 *mycobacterial* ATP synthase inhibitors named diarylquinoline (DARQ), Imidazole pyridine ether (IPR) and squaramide (SRQ) derivatives were utilized for generating the ligand-based pharmacophore models. 17 pharmacophore models were generated out of which 5 were validated against the Schrodinger set of 1000 decoys using enrichment studies for its sensitivity and specificity. The best pharmacophore model AHRRR_2 was selected for virtual screening against a chemical database from Asinex. 60 molecules were further analysed through molecular docking using a target, ATP synthase, PDB ID 4V1F. The results were compared with that of Bedaquline. The top 10 molecules were screened for their ADMET characteristic using SwissADME and OSIRIS Property Explorer. Novel in-silico hits have been identified through the present study which can be further optimized into lead, synthesized and screened *in-vitro* to prove the in-silico results. Ligand-based pharmacophore modelling integrated with virtual screening and molecular docking can be promising approach to bracket the promising lead compounds as mycobacterial ATP synthase inhibitors for the treatment of tuberculosis.

NTP085

Azaindole and Indazole Based MCT1 Inhibitors as Potential Anticancer Agents

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Monocarboxylate transporters 1 and 4 (MCT1 and MCT4) are the transmembrane proteins which have received attention as a novel target for treating solid tumours. MCT1 and MCT4 work in symbiosis for the efflux (MCT4) and influx (MCT1) of lactate and H^+ ions from hypoxic into normoxic cells respectively. This is very important for the survival and proliferation of cancer cells. Inhibition of MCT1 leads to forced glycolysis by normoxic cells resulting into death of hypoxic cells by glucose starvation. In this work, a new series of azaindole and indazole-based molecules was synthesized with modifications at positions 1 and 3. The cellular effectiveness of the synthesized molecules against MDA-MB-231, MCF-7 (breast adenocarcinoma), and A-549 (lung cancer) cell lines were assessed using an MTT assay. Further, these molecules were screened for MCT1 inhibition using 3-bormopyruvate assay. Docking studies of most potent compounds were performed using auto dock using crystal structure of MCT1 (7CKR). In total 20 molecules were synthesized. Among these, AZI-15 (IC_{50} = 1.16 µM) and I-3 (IC_{50} = 12.9 µM) showed most potent antiproliferative activity towards MCT1 expressing A-549 cells. All these molecules showed no toxicity against non-cancer cells (NIH/3T3). Most of the compounds showed a good inhibitory effect against MCT1 in 3-bromopyruvate assay (IC50: 0.9-10 □M). Docking studies revealed the important interactions of potent inhibitors with MCT1.Current work reveals new, potent and non-toxic MCT1 inhibitors and is an important addition to the small fraction of ~100 MCT1 inhibitors known.

NTP086

Regulatory Framework and Comparative Study of Post Approval Changes (Variation Filing) for Parenteral Drug Products in ASEAN and GCC Regions

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Change is inevitable. The pharmaceutical industries being a most regulated industry, even a smallest change is required to be documented and reported to the all international and national regulatory agencies. This study gives the regulatory view on post approval changes / variation management of various semi-regulated regulatory authorities of Malaysia, Philippines, Saudi Arabia, and United Arab Emirates. The semi-regulated authorities are becoming stringent with well-established guidelines for the different submissions. The authorities are moving towards the electronic submissions rather than traditional paper submission. Most of the ASEAN countries follows the ASEAN variation guideline for pharmaceutical product, whereas some of the countries like Malaysia and Philippines has made some changes to these guidelines and came with a new version of their own. GCC countries refers to the European Medicines Agency's Guidelines for their submissions. The GCC guidelines for variation requirements version 6 are referred by various countries of the region, but with reference to this

guideline some of the countries like United Arab Emirates, Saudi Arabia, Qatar, etc. has also published their own guidelines. According to these all guidelines the various changes are classified as major, moderate, and minor changes. Some of the minor changes can be implemented after notifying the authorities about the change with relevant documents. Whereas in major, and some minor changes the prior approval of the authority is required. Some major changes cannot be considered as a major change, instead it shall be filled as a new registration or a new product. The present work gives an idea about how the post approval change / variation can be documented and submitted to the agencies of Malaysia, Philippines, Saudi Arabia, and UAE. The case based hypothetical changes have been made and discussed in the present work.

NTP087

Development and Validation of a Simultaneous Analytical Method for the Estimation of the Gefitinib and Piperine in the Polymeric Microparticle Formulation

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Combining anticancer drugs and phytomedicines with anticancer activity has opened up novel avenues for cancer treatment and could be a potent alternative to cancer therapy. Gefitinib and piperine possess anticancer activity; surprisingly, there is no validated UPLC method for simultaneous estimating gefitinib and piperine. So, herein, a UPLC-PDA method is developed and validated for the same, filling an indispensable gap in the literature. Separation was achieved on the C_{18} reversed-phase column employing an isocratic mobile phase comprising 1% ammonium acetate buffer and acetonitrile with 0.2% orthophosphoric acid (40:60) at a flow rate of 0.8 ml/min and detected simultaneously at 340 nm wavelength. The retention time is 3.998 and 7.345 min for gefitinib and piperine, respectively, with a total analysis time of less than 10 minutes, suitable for the formulation development and research, while LOQ is less than 0.05 µg/ml for both the drugs, ideal for the therapeutic drug monitoring at preclinical and clinical research setup. The method was applied to analyse entrapment efficiency and drug loading of gefitinib and piperine in the polymeric microparticle formulation after being validated as per guidelines established by the International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use.

NTP088

A Validated HPLC Method for Mitomycin C Estimation in a Quality by Design Engineered Formulation Targeting Solid Tumors

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Breast cancer presents a global health challenge, demanding continuous efforts for effective therapies. This study highlights Mitomycin C's potential for cancer treatment, emphasizing rationale and preclinical evidence. The validated HPLC method enables accurate MMC quantification in pharmaceutical formulations, ensuring quality control for safe and effective cancer interventions. A Shimadzu HPLC system equipped with LC 20 AT binary gradient pumps, and a PDA detector was

utilized for method development. Separation occurred on a C-18 column (360×4.6 mm) at 30°C, with a flow rate of 0.6 ml/min and monitoring at 365 nm. The MMC-complex loaded NLC (MMC@Soya PC-NLC) was prepared by emulsification followed by probe sonication technique using QbD approach. The NLCs were stored at 4^0C for further characterization. The method exhibited excellent linearity (1.25-10 µg/ml), with a regression equation y=36530x - 6.7601 (R^2=0.990), and LOD/LOQ of 0.033 µg/ml and 0.094 µg/ml. Percentage recovery ranged from 98.37% to 99.95%. The optimized formulation had a particle size of 217.9±2.1nm, PDI of 0.113±0.02, and MMC@Soya PC-NLC drug loading of 2.25±1.6%. In vitro release studies indicated an initial burst followed by sustained release, with reduced release in plasma, suggesting drug-protein interactions. Our study focused on optimizing MMC-Soya PC@NLC, addressing challenges tied to MMC's hydrophilicity. Emphasizing crucial manufacturing parameters, we developed a robust formulation targeting improved therapeutic outcomes. RP-HPLC validated method development ensured accurate MMC quantification. Physico-chemical characterization revealed optimized MMC-Soya PC@NLC with particle size, PDI, and zeta potential of 217.9±2.1nm, 0.113±0.02, and -20.8±0.15 mV respectively. In-vitro studies showed sustained release over 10-20 hours. Plasma release, slightly reduced compared to PBS, due to potential MMC-protein interactions. This positions MMC-Soya PC@NLC as a promising system for controlled drug delivery.

NTP089

DoE Guided Development of an HPLC Method for Evaluation of Amoxicillin and Metronidazole co-loaded Mucoadhesive GRDDS Formulation for *H. pylori* Eradication

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H. Pylori infection is a major reason for chronic Peptic Ulcer Disease (PUD) and related complications worldwide. Traditional treatment options fail to eradicate the organism completely which leads to antibiotic resistance. Novel formulations are being developed with an aim for effective treatment. Mucoadhesive GRDDS system is an option to increase the antibiotic bioavailability. The objective of this work is to develop a RP-HPLC-PDA based analytical method to evaluate the entrapment efficiency of the GRDDS systems for *H. pylori* treatment containing amoxicillin trihydrate and metronidazole. DoE was used for optimizing the HPLC conditions. The optimized method used a HyperClone ODS C_{18} column as stationary phase and methanol: phosphate buffer at pH 6.4 (15:85) as the mobile phase. The flow rate was 0.9 mL/min. Method was validated as per the ICH Q2 (R1) guideline. Method was linear from 0.5-20 µg/ml for both AMO and MTZ with an R^2 value of 0.9995 and 0.9996 respectively. The validated RP-HPLC method showed specificity for the both drugs in the presence of degradation products as well as from other excipients of the GRDDS system. The developed and validated method was applied to optimize the formulation by determining the entrapment efficiency. The entrapment efficiency of the final formulation was determined to be 78-84% for AMO and 75-82% for MTZ. This method can be employed for quantification of AMO and MTZ simultaneously for the evaluation of drug loading, entrapment efficiency, release profile and drug assay from various formulations.

NTP090

Open Synthesis Network a Model for Drug Discovery: Advancing Collaboration and Innovation at DNDi

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The Open Synthesis Network (OSN) is an innovative project launched by Drugs for Neglected Diseases initiative (DNDi) in 2016. The OSN engages undergraduate and master's students in collaborative early-stage research, honing their drug discovery and collaboration skills. Since 2017, the OSN has brought together over 500 students globally from 30 plus public and private research institutions to synthesize compounds targeting leishmaniasis, mycetoma, Chagas disease, and COVID-19.OSN is a prime example of open innovation where DNDi shares data on compounds from relevant research projects and a sheet of desired compounds with the principal investigators and students at participating institutes. The participating team then explore the data, understand the design rationale, and select the molecules for synthesis. This project encourages the cutting-edge technologies such as artificial intelligence and machine learning to predict physical, chemical, ADME properties, and optimal synthetic routes. The synthesized molecules are biologically tested against different disease pathogens by DNDi through its partners. This project has made a progress in collaboration among researchers across the globe. Molecules and data generated by researchers have been shared, promoting an atmosphere of openness and exchange of knowledge. The OSN is instrumental in accelerating the chemical compounds identification that could serve as potential leads for developing new drug candidates against neglected diseases. The OSN project represents a unique drug discovery model, fostering an open and collaborative approach. This project has the potential to enhance students' skills, shape their career paths and expedite drug discovery for diseases impacting vulnerable populations.

NTP091

Synergistic Antiproliferative Effect of Indole Based MCT-1 Inhibitor S-9 and Metformin

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Monocarboxylate transporter 1 (MCT1) is a solute carrier protein which has been shown to play important role in cancer cell survival and proliferation. MCT1 is responsible for influx of lactate in aerobic cancer cells aiding in oxidative phosphorylation for ATP synthesis. Inhibition of MCT1 leads to a glycolytic switch in aerobic cells forcing them to utilise glycolysis for ATP synthesis. This leads to depletion of glucose supply to hypoxic cells causing their death. On the other hand, it has been observed that diabetic patients treated with metformin are at lower risk of having cancer at later stage in the life. Metformin functions as anticancer agent by activating AMPK. The aim of the current study is to study synergistic anticancer effect of MCT1 inhibitor and metformin. Synthesis of several 3-cyanoacrylate substituted indole based molecules was carried out by multistep synthesis. These molecules were

studied for MCT1 inhibition using 3-bromopyruvate assay and cell viability assay with MCT1 expressing A-549 cells. Further, the most potent compound was investigated in combination with metformin for studying synergistic effect using cell viability assay. A total of 16 substituted indole derivatives were synthesised. In the cell viability assay all the compounds showed significant antiproliferative effect. Most compounds showed strong inhibitory potencies (~100nM); most potent representative compound S-9 with IC_{50} of 80.0 nM. In combination with metformin a synergistic antiproliferative effect was observed with reduction in the IC_{50} value. This study identifies new MCT1 inhibitors and confirms the positive effect of metformin in combination with MCT1 inhibitors.

NTP092

Design, Synthesis and In-silico Investigation of Quinoline Based Small Molecules as Potential Inhibitors of Monocarboxylate Transporter 1

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Currently, chemotherapy and radiation therapy are non-invasive treatments available for cancer. Unfortunately, development of multidrug-resistance has led to the failure of current treatments. Hence, development of new anticancer agents acting against new targets are needed. MCT 1 is one of such target mainly overexpressed in solid tumours. MCT1 aids in influx of lactate in cancer which is utilised by aerobic cells for fuelling ATP synthesis. Blocking of MCT 1 alters the symbiotic mechanism between the tumour cells which leads to the glucose starvation of proliferative hypoxic cells and ultimately cell apoptosis. A new series of quinoline scaffold based molecules with modifications at positions 2 and 3 were designed and synthesized. The synthesized molecules were evaluated against MCT1 expressing A-549 (lung cancer) cells for their antiproliferative effect using MTT assay and MCT1 inhibition by 3-bromopyruvate assay. Further, designed molecules were studied in silico to determine their interaction with MCT1 by molecular docking using AutoDock. ADMET properties of synthesized molecules were determined by SWISS ADME and ProTox-II servers. A total of 14 quinoline based molecules were designed and synthesized. Selected synthesized molecules showed moderate to good antiproliferative effect against A-549 cells. Unfortunately, only 3-4 molecules showed good MCT1 inhibition in 3-bromopyruvate assay. Molecular docking using 7-CKR (MCT1) protein revealed important interactions of inhibitors. All the compounds showed good ADME and toxicity profiles. Current study identifies few molecules having good anticancer potential and could be used as leads for further optimisation to identify potent and safe MCT1 inhibitors.

NTP094

RP-HPLC-UV Based Related Substance Method Development for Carbetocin API and Solution for Injection

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Carbetocin is a novel medication employed to manage bleeding during childbirth and postpartum hemorrhage (PPH). As an oxytocin analog, it helps enhance uterine contractions, reducing the risk of

excessive bleeding and promoting safer delivery outcomes in maternal health. In the present work, the stability indicating reverse phase high-performance liquid chromatographic method with UV detection at 220nm (RP-HPLC-UV) was established to realize the simultaneous analysis of the Carbetocin drug substance and its related impurities. This RP-HPLC-UV method was achieved using a Waters X-bridge C18 (250x4.6mm, 5.0µm) column kept at 60°C.The peak of Carbetocin and its known impurities were separated using Tetramethyl ammonium hydroxide pentahydrate Buffer (pH 2.5): Acetonitrile (90:10, %v/v) as a mobile phase A and Tetramethyl ammonium hydroxide pentahydrate Buffer (pH 2.5): Acetonitrile (40:60, %v/v) as a mobile phase B in gradient program. The method was validated as per the ICH Q2 (R1) guideline and all the validation parameters were found to be in the range of acceptance criteria. The forced degradation study of Carbetocin showed that the drug is degraded in alkaline, acid, and Thermal conditions. This RP-HPLC-UV method could support the simultaneous determination of related substance of carbetocin API and injection.

NTP095

Conventional and Microwave Assisted Degradation Study of Drug-excipients Using High Performance Liquid Chromatography

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Forced degradation studies in drug development involve intentionally stressing a drug to see how it breaks down under various conditions like heat, light, moisture, or pH changes. These tests help identify degradation products, understand stability, and set storage conditions. By simulating different stresses, such as UV exposure for topical drugs or acid/base hydrolysis for oral medications, developers can optimize storage, shelf life, and analytical methods for detecting degradation. This study establishes and validates a stability-indicating method for Promethazine hydrochloride and hydrochlorothiazide using HPLC, ensuring accurate analysis of degradation products. Chromatographic separation was accomplished on an RX-C18 column (250x4.6mm, 5um) at 25°C, employing a mobile phase of Buffer: Acetonitrile (80:30) in isocratic mode to separate Promethazine hydrochloride and hydrochlorothiazide. Detection was performed at 249 and 270 nm using a photo diode array (PDA) detector, and the validation of the method adhered to the guidelines outlined in ICH Q2 (R1). The peak of Promethazine hydrochloride, Hydrochlorothiazide and its known degradation were separated and RT for Promethazine hydrochloride to be 8 minutes and hydrochlorothiazide and their degradation peak at 4 minutes. Promethazine hydrochloride and Hydrochlorothiazide was exposed to thermal and microwave conditions for 1 month and 2min alone, 2min 25mg drug + 25 mg lactose, 5 min 25mg drug + 50 mg lactose, 10 min 25mg drug + 75 mg lactose respectively. Different degradation products were formed after 1-month thermal degradation & 2min, 5min, 10min microwave degradation respectively. There is no similar degradation in microwave and Conventional method. Promethazine hydrochloride and Hydrochlorothiazide, lactose, Method development, Validation, Forced degradation, RP-HPLC.

ABSTRACT- POSTER PRESENTATIONS (TRANSLATIONAL MEDICINES)

TMP001

To Determine the Prevalence of Sexual Side Effects in Female Psychiatric Patients Taking Psychotropic Medications-A Cross-Sectional Study

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Many women experience sexual disorders or side effects due to factors such as age or medication use. The most common issues are lack of desire and inability to become aroused during sex. Women are more likely than men to suffer from sexual inefficiency, with a prevalence of 43% compared to 31% for men. This study aims to determine the prevalence and compare the types of sexual side effects of psychotropic medications in female psychiatric patients, while exploring the impact of socio-demographic factors and potential correlation with menstruation. An observational, prospective cross-sectional study was conducted on patients at the psychological medicine department of Dhiraj Hospital, SVDU. Patients with a history of psychiatric illness or those taking psychedelic medication for at least a month were included based on study criteria. The Female Sexual Function Index Scale was used, consisting of 19 questions divided into six domains representing sexual side effects in female patients: Desire, Arousal, Lubrication, Orgasm, Satisfaction, and Pain. Patient responses were collected and interpreted using the FSFI score to determine the final score. According to the study, the prevalence of sexual problems varies among patients. Out of the population studied, 103 patients experienced desire problems, which accounts for 51.73% of the group. Arousal problems affected 110 patients, representing 55.23% of the population. Lubrication issues were reported by 138 patients, which represents a prevalence of 69.19%. The prevalence of orgasm problems was 62.25%, affecting 124 patients. A total of 164 patients suffered from satisfaction problems, resulting in a prevalence rate of 82.33%. In contrast, 120 patients reported pain, equating to a prevalence of 60.28%. Finally, the study found that 128 patients had a full score, which accounts for a prevalence rate of 64.26%. In summary, it is crucial to understand the sexual side effects that may arise due to psychotropic medication in women. This study highlights the prevalence of such side effects and the importance of addressing them to prevent additional stress on patients' mental health. Recognizing and discussing these potential side effects with healthcare providers can lead to better management of psychiatric conditions and improve the overall well-being of patients.

TMP002

C-Phycocyanin Rendered Neuroprotective Action in Rotenone Induced Mice Model of Parkinson's Disease

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Parkinson's disease (PD) is a one of the most prominent and progressive neuronal degenerative disorder that leads to dopamine deficiency and loss of motor function. The progressive pathology leads to dopaminergic neuronal degeneration in the substantia nigra pars compacta region of the brain (SNpc).

There are many factors which influence PD pathology. But the main cause behind the pathology is aberration of alpha-synuclein protein. Many signalling cascades affect the misfolding and aggregation of protein. AKT and AMPK activation are also involved in regulation of this protein. C-phycocyanin (CPH) is proteinaceous compound obtained from an alga. It is believed to upregulate AKT, BDNF as well as AMPK. Upon activation, these might interfere with alpha-synuclein aggregation and halt progression of pathogenesis. In this study, CPH (50 mg/kg, i.p., daily) was administered to rotenone (30 mg/kg, p.o., daily) treated mice for 28 days. Behavioural studies (Y-maze, Wire Hang test, Beam walk test) were done in alternate weeks to determine progression of disease pathology. Animals were sacrificed at the end of 28 days, tissues were homogenized and ELISA was carried out to determine levels of AKT, AMPK, NF-κB, BDNF and alpha-synuclein. Histopathology (H&E and Nissl stain) was also performed. It was found that CPH modulated BDNF and alpha-synuclein levels. However, it was unable to modulate AKT and AMPK levels. CPH was also found to alleviate oxidative stress in serum and restore structural abnormalities. Our data suggests that CPH possesses a significant neuroprotective potential against PD and can be studied further for its use as a PD therapy.

TMP003

Pediatric Pneumonia: Clinical Insights and Management Strategies

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This study offers a thorough exploration of Pediatric Pneumonia, concentrating on clinical insights and effective management strategies. Drawing from diverse cases, the research aims to enhance understanding of clinical presentation, contributing factors, and optimal therapeutic approaches for pediatric patients with pneumonia. Pediatric pneumonia is commonly caused by viruses or bacteria. Clinical presentation includes fever, cough, and respiratory distress. Diagnosis involves clinical assessment and sometimes imaging. Management includes appropriate antibiotics for bacterial cases, supportive care, and vaccination for prevention. Always consult a healthcare professional for personalized advice. The study emphasizes the nuanced symptoms of pediatric pneumonia, underscoring the importance of early recognition and accurate diagnosis. Factors influencing susceptibility, including age, underlying health conditions, and environmental aspects, are discussed to underscore the complexity of pneumonia in this demographic. Clinical assessment, complemented by diagnostic tools such as chest imaging, is highlighted for precise diagnosis. The study advocates for tailored antibiotic therapy, informed by local resistance patterns and pathogen identification, forming a cornerstone of effective management. Supportive care measures, ranging from fluid management to respiratory support, are detailed to address the diverse needs of pediatric patients with pneumonia. Moreover, the research delves into preventive measures, stressing the critical impact of routine vaccinations and promoting hygiene practices. Acknowledging challenges in managing pediatric pneumonia, including variations in etiology and potential complications, the study underscores the necessity of regular follow-up to monitor recovery. This study contributes valuable insights into the multifaceted nature of pediatric pneumonia, offering a comprehensive guide for healthcare professionals. By advancing our understanding of clinical presentations and management strategies, it aims to improve outcomes for pediatric patients grappling with pneumonia.

TMP004

Comprehensive Analysis on Management and Outcomes of Breech Delivery

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Breech delivery refers to the presentation of the fetal buttocks, feet, or both during the birth process. It accounts for a small percentage of deliveries and presents unique challenges for healthcare providers. This comprehensive analysis aims to examine the management strategies and outcomes associated with breech delivery, incorporating current evidence-based practices. The aim of this comprehensive analysis is to provide insights into the management and outcomes of breech delivery. To conduct this analysis, a thorough review of the literature was performed, including published studies, systematic reviews, and guidelines on breech delivery management. The data were evaluated for key themes related to management approaches, maternal and neonatal complications, and long-term outcomes. The analysis revealed several essential findings regarding the management strategies utilized for breech delivery. Firstly, there is a shift towards planned cesarean section (CS) for breech presentations due to improved safety and decreased neonatal morbidity. However, vaginal breech delivery is still an option under specific circumstances, such as an experienced healthcare provider and a favorable fetal presentation. The analysis also identified various techniques used to facilitate vaginal breech delivery, including the Mauriceau-Smellie-Veit (MSV) maneuver, the Bracht maneuver, and various other maneuvers designed to guide the delivery of the fetal head. These techniques aim to optimize success rates while minimizing maternal and neonatal complications. Regarding maternal and neonatal outcomes, the analysis found that planned CS for breech presentations is associated with a reduced risk of perinatal mortality and neonatal morbidity compared to vaginal delivery. Maternal morbidity, including severe perineal trauma and postpartum hemorrhage, is also lower in planned CS cases. However, it is important to note that planned CS carries the inherent risks associated with surgical interventions. The analysis also explored long-term outcomes following breech delivery. Neurodevelopmental outcomes were found to be comparable between children born via CS and those born through vaginal breech delivery. However, further studies are needed to investigate the potential impact of delivery mode on other long-term outcomes, such as musculoskeletal development and cognitive function. This comprehensive analysis highlights the significant management strategies utilized in breech delivery and underscores the increasing preference for planned CS. Vaginal breech delivery, although less common, can be considered in select cases with appropriate expertise and favorable fetal conditions. Maternal and neonatal outcomes demonstrate the overall safety of planned CS, but long-term follow-up studies are required to fully understand the effects on child development. These findings can inform clinical decision-making and improve the quality of care for women and infants experiencing breech presentation during delivery.

TMP005

Knowledge and Approach towards Self-Medication amongst Undergraduate Medical Students at a Tertiary Care Medical College, Gujarat

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Self-medication is common amongst medical undergraduates since they have easy access to information from drug indices, literature, media and other medical students to self-diagnose. They have trouble free access to hospital pharmacies and physician samples provided by pharmaceutical representatives. Inappropriate self-medication causes wastage of resources, increases resistance of pathogens and may cause serious health hazards such as adverse drug reactions, prolonged suffering and Drug Dependence. Medical students are future physicians hence their health-seeking behavior might influence their practice and general population. This study will help to determine the reasons for self-medication and the pattern of self-medication amongst medical undergraduates. This cross-sectional descriptive study was conducted at the SMIMER Medical College, Surat. A prevalidated questionnaire was given to 2nd year medical students who gave consent and was followed by an educational intervention on self-medication. Analyzed using appropriate statistical test. A total of 163 students responded to questionnaire. Self-medication was reported among 72%. The most common reason for self-medication was having the older prescriptions and to save time. The most common ailments for which self-medication was used were: headache (71%), fever (65%), cough (47%), cold (30%) acidity (31%) and vomiting (25%). Antipyretics, analgesics, antibiotics and antihistamines were most common self-medication drugs. The prevalence of self-medication amongst medical undergraduates is high, facilitated by easy availability of drugs and information from textbooks, seniors or friends. A significant number of students were lacking awareness and knowledge of self-medication and its consequences. Educational sessions regarding self-medication & its consequences will help reduce this problem.

TMP006

Therapeutic Potential of *Murraya koenigii* in Inflammatory Disorders

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Inflammatory disorders is a group of immune-mediated diseases having worldwide prevelance comprising crohn's disease (CD), ulcerative colitis (UC), etc. A persistent inflammatory state enables the poor functioning and destruction of healthy tissue, hindering the initiation and endurance of wound healing. Over the almost last two decades, many medications have been developed from plant entities to control remission in patients having inflammatory disorders. Murraya koenigii commonly known as curry leaves is one of the plants having potent anti-inflammatory action because of presence of chemical constituents such as mahanine, mahanimbine etc. The present systemic review highlights pharmacognostic profile and pharmacological potential of Murraya koenigii in inflammatory disorders showcasing proposed mechanism of action. This review also focuses on emerging novel targeted

pathways having potent anti-inflammatory action and highlighting responsible chemical constituents effective in treatment of inflammatory disorders.

TMP007

Original Research: Rising Prevalence of Erectile Dysfunction in Young Diabetic Male Population

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Erectile dysfunction is a common complication associated with diabetes mellitus. With prevalence of more than 52.5%, some patients have difficulty speaking about ED early in the disease and do not receive a systematic diagnosis and treatment. Once progressed, ED has shown to be a cause of many cerebrovascular and cardiovascular diseases. Different approaches to treat erectile dysfunction includes use of PDE-5 inhibitors, combination including arginine or L- carnitine, intra-cavernosal injections, or surgery. We present a pilot study evidence-based research focusing on probable causes and risk factors for erectile dysfunction in young adults, lab data, and ED associated with comorbidities and complications. This study is conducted in a form of pilot study which was observed during our academic research. A total of 20 cases were observed and analysed with prior consent of the clinic and the institution. Data were filled in case record forms and analysis was done using appropriate methods. Out of cases collected in the first phase of academic research, cases of erectile dysfunction were taken into the note and were observed. Out of which, focus was made on young male adults. Majority of them presented were obese i.e., had BMI of more than 30, were already a known case of hypertension and dyslipidemia, and had diabetes for more than 5 years. It is important for clinicians and patients to be aware of all the complications of diabetes mellitus. Patients, especially young population should be educated on erectile dysfunction and its probable causes, its treatment and how it is a normal complication just like nephropathy, neuropathy, and retinopathy

TMP008

Drug Utilization Pattern in Children with Epilepsy across Ahmedabad City: An Observational Study

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Epilepsy is the most prevalent neurological disorder in the paediatric age group in India. About 5-10% of the population may have at least one seizure, with the highest incidence occurring in early childhood and late adulthood. Epilepsy, especially childhood epilepsy, remains a challenge to treat. Despite the increase in the number of antiseizure drugs (ASDs), more than 25% of children with childhood epilepsy continue to have seizure. Polytherapy is a common practice for the management of epilepsy despite of a significant increase in side-effects. This study was a cross sectional hospital based prospective study which was carried among the 90 Paediatric patients suffering from Epilepsy in Ahmedabad city. In our study, we observed that children between the ages of 6 to 10 years were more affected with epilepsy with early childhood (1 to < 6 years) being the most common time for onset. The most common type of epilepsy was observed to be focal followed by generalised and febrile seizure. Males were more prone

to epilepsy compared to females irrespective to the type of epilepsy and various age groups. Valproate was the most prescribed drug followed by clobazam and oxcarbazepine irrespective to the type of epilepsy. AED medication is initiated based on the risk of seizure recurrence, the effects of ongoing seizures, and the advantages and disadvantages of the agent in preventing recurrence. The major barriers can be addressed through proper counselling and education to the caretakers which can ensure a better life in CWE.

TMP009

Inhibition of Uridine 5'-Diphospho-Glucuronosyltransferases A10 and B7 by Vitamins: Insights from In Silico and In Vitro Studies

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Uridine 5'-diphospho-glucuronosyltransferases (UGTs) have been considered as a family of enzymes responsible for the glucuronidation process, a crucial phase II detoxification reaction. Among the various UGT isoforms, UGTs A10 and B7 have garnered significant attention due to their broad substrate specificity and involvement in the metabolism of numerous compounds. Recent studies have suggested that certain vitamins may exert inhibitory effects on UGT activity, thereby influencing the metabolism of drugs, environmental toxins, and endogenous substances, ultimately impacting their biological activities. In the present study, the inhibition potential of vitamins (A, B1, B2, B3, B5, B6, B7, B9, D3, E, and C) on UGT1A10 and UGT2B7 was determined using in silico and in vitro approaches. A 3-dimensional model of UGT1A10 and UGT2B7 enzymes was built using Swiss Model, ITASSER, and ROSETTA and verified using Ramachandran plot and SAVES tools. Molecular docking studies revealed that vitamins interact with UGT1A10 and UGT2B7 enzymes by binding within the active site pocket and interacting with residues. Among all vitamins, the highest binding affinity predicted by molecular docking was -8.61 kcal/mol with vitamin B1. The in vitro studies results demonstrated the inhibition of the glucuronidation activity of UGTs by vitamins A, B1, B2, B6, B9, C, D, and E, with IC50 values of 3.28 ±1.07 µg/mL, 24.21±1.11µg/mL, 3.69 ±1.02 µg/mL, 23.60±1.08 µg/mL, 6.77 ±1.08 µg/mL, 83.95 ±1.09 µg/ml, 3.27±1.13 µg/mL and 3.89±1.12 µg/mL, respectively. These studies provided the valuable insights into the mechanisms underlying drug-vitamins interactions and have the potential to guide personalized medicine approaches, optimizing therapeutic outcomes, and ensuring patient safety. Indeed, further research in the area of UGT (UDP-glucuronosyltransferase) inhibition by vitamins is essential to fully understand the clinical relevance and implications of these interactions. UGTs play a crucial role in the metabolism and elimination of various drugs, toxins, and endogenous compounds in the body. Therefore, any factors that can modulate UGT activity, including vitamins, can have implications for drug metabolism, drug-drug interactions, and overall health.

TMP010

The Microbial Frontier: Investigating Dysbiosis as a Key Player

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The human gastrointestinal system is host to the largest microbial community in the body, represented as the gut microbiome, which is composed of trillions of microorganisms. An imbalance or disturbance in the diversity and functionality of the community of microbes in the gastrointestinal tract is commonly referred to as gut microbiome dysbiosis. This imbalance has the potential to affect human health and is linked to various conditions that are closely related to metabolic and neurological disorders. Recent studies have shown the role of normal gut flora. In addition, factors associated with microbial dysbiosis such as the type and quantity of food consumption, stress, sleep, and physical exercise are examples of lifestyle variables that affect the composition of the gut microbiota. The broad-spectrum antibiotic effect has the potential to disturb the equilibrium of gut flora. Additionally, the therapy approaches for managing these conditions include fecal microbiota transplantation (FMT), probiotics, and prebiotics.

TMP011

Recent Advances in Nanotechnology for Neurological Diseases

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Nanotechnology has demonstrated significant value in advancing drug delivery and targeting, notably enhancing the safety and effectiveness of traditional drugs. One specific area of focus is brain targeting for treating Central Nervous System Disorders. The effectiveness of brain targeting is constrained by physiological barriers, notably the Blood-Brain Barrier. Here the major goal is to provide a clear understanding of nanocarrier design, various nanoparticle administration routes, and the associated challenges with each drug delivery method. The information was gathered and evaluated from chosen peer-reviewed publications, along with studies on formulations that have resulted in patented products. An immediate investigation into innovative therapeutic options is imperative due to the rising incidence of brain illnesses and an expanding population. While the evident advantages of nanomedicines cannot be denied, the potential risks and unsafe practices associated with them indicate less favorable outcomes. Swiftly rejecting nanotechnology solely based on its drawbacks is unwarranted, given the technological progress enabled by modern science. Adherence to specific standards is essential to eliminate the adverse impacts of nanotechnology. Forecasts anticipate a revolutionary transformation in drug delivery through nanotechnology-based distribution systems, resulting in pharmaceuticals that surpass the productivity of current approaches. A summary of diverse nanoformulation and the different methods of drug administration aimed at enhancing drug delivery are summarized. It also delves into the challenges linked with these nanocarrier systems. This underscores the promising role of nanotechnology in the development of nanoformulations, especially in recent assessments for addressing brain disorders.

TMP012

TRP Channels: A Promising Targets for Neurodegenerative Disease Intervention

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Neurodegenerative disorders (NDs) like Alzheimer's disease, Parkinson's disease, Amyotrophic lateral sclerosis etc play an emerging challenge to public health with limited treatment options. NDs share a common cause which include disturbance in regulation of Ca2+ homeostasis and accumulation of misfolded proteins. Transient Receptor Potential (TRP) channels expressed in neurons and glial cells have emerged as potential targets for understanding and potentially mitigating neurodegeneration. Total 28 different TRP channel proteins are expressed in mammals and classified in seven different subfamilies as TRPV, TRPM, TRPML, TRPC, TRPP, TRPA and TRPN. This review outlines the role of TRPs in the normal physiology of neurons and the disruption of Ca2+ homeostasis, providing an overview of the underlying mechanism of TRPs in the pathogenesis and regulation of several neurodegenerative diseases. Data indicating the role of TRP channels in NDs was assessed by exploring books and scientific database that comprise ScienceDirect, Scopus, PubMed, BioMed Central, Google Scholar, Wiley online library and Springer. All the mentioned databases have been searched for scientific literature using mentioned keywords. Under pathological conditions activity of TRP channels gets perturbed and leads to imbalance of Ca2+ ions, through inflammatory activity, generation of reactive oxygen species and mitochondrial dysfunction. The role of TRP channels in neuroprotection and their potential as therapeutic targets in NDs are known for their diverse functions in sensory transduction, cellular homeostasis, and signal transduction pathways. So, understanding the role of TRP channels could help to lead the development of novel therapeutic strategies for neurodegenerative disorders.

TMP013

The Pathophysiology of Cancer Cachexia and Drugs Used for Treatment of Cancer Cachexia

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Cancer cachexia is observed with tumor progression and is characterized by weight loss (weight loss is mainly because of muscle wasting and may be accompanied by fat loss), anorexia, weakness. Cancer cachexia is caused by severe metabolic disturbance in carbohydrate, lipid, and protein metabolism. Increased rate of metabolism results in energy inefficiency. Patients exhibit glucose intolerance and Cori cycle activity increases. A decline in rate of protein synthesis, results in increased loss of muscle (Muscle wasting). Resting energy expenditure expense is increased in variety of tumors contributing to wasting process. Increased inflammation is a hallmark of cancer cachexia, resulting in increased acute phase response (APR). In APR, a shift from production of albumin to APP proteins such as fibrinogen, CRP (C Phase Reactive Protein), serum amyloid A & alpha 1 antitrypsin occurs. Numerous cytokines like TNF α, interleukin-1 (IL-1), interleukin-6(IL-6), Interferron gamma (IFN gamma) play a role in

cancer cachexia. Hypothalamic areas of brain contain receptor for TNFα 7 IL-1 contain receptors for apetite regulation. TNF-α increases gluconeogenesis, lipolysis and proteolysis, decreases synthesis of proteins, lipids and glycogen, induces expression of uncoupling protein, uncoupling results in decreased energy production through mitochondrial oxidation. Drugs for treatment of cancer cachexia: Medroxyprogesterone increases apetite and food intake, resulting in stabilization of body weight, reduces production of serotonin and cytokines (IL-1, IL-6, TNF-α). Ghrelin prevents anorexia by blockage of melanocortin -4 receptor. Thalidomide decreases production of TNF-α, COX-2 & other pro-inflammatory cytokines.

TMP014

An Update on Bone Remodeling, Pathogenesis and Treatment

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Bone is a dynamic tissue that continuously undergoes modeling and remodeling; the simultaneous activity of osteoclasts and osteoblasts to remove old and form a new bone named bone remodeling cycle. However, an imbalance in this cycle can lead to complications in bone health i.e., osteoporosis; has an impact on over 200 million individuals worldwide which results in 9 million fractures annually. The literatures have stated that so many possible causative conditions are there which can leads to osteoporosis because osteoporosis has a multifactorial nature including lifestyle, physical exercise, interplay of genetics, an impact of already presence of any disease, and intake of specific medications. The article outlines a brief of the diagnosis and assessment of the disease and lastly it reviews the management of osteoporosis by non-pharmacologically and pharmacologically; respectively includes proper intake of calcium and vitamin D, as well as changes in lifestyle like as quitting smoking and reducing alcohol consumption and pharmacological management consisting of antiresorptive and anabolic drugs. The findings indicate that bisphosphonates are the first line therapy as an anti-resorptive agents with different dosages and administrations. While denosumab may give as an initial therapy at intervals of six months subcutaneously. Hormonal therapies are given; either the patient's body resists the other drugs or can't tolerate the First line therapy and monoclonal antibody. Additionally, on the research basis of the last few years the article also possesses some recent approaches for new pharmacological targets to manage osteoporosis.

TMP015

Role of CDK4/6 Inhibitor in Cancer Treatment

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Cyclin dependent kinases has demonstrated significant value in inhibiting tumor activity and targeting, notably enhancing the safety and effectiveness of CDK blocker. One specific area of focus is cell cycle targeting for treating all type of tumors like CDK6 in regular blood cell production, CDK6 in Blood Cancers, Breast cancer and CDK6, Melanoma and CDK6. Despite efforts using different administration routes, the presence of physiological barriers, such as the Blood-Brain Barrier, limits effective brain targeting. This article aims to provide a clear understanding of CDK, various inhibitor blocker, and the

associated challenges with its resistance and also its novel combination treatment for improving the anti-tumor activity. A review of the literature was carried out by searching the Web of Science, Google Scholar, and Scopus databases using relevant keywords. The information was gathered and evaluated from chosen peer-reviewed publications, along with studies on different clinical/preclinical studies and its ongoing trials that have resulted in patented products. The main goal of cyclin dependent kinase inhibitors to Cancer disorders was to improve therapeutic effectiveness and achieve targeted drug by enhancing inhibition of tumors through the cell cycle check points. The assessment of this study involves analyzing parameters such as different types of CDK blocker, its linked with various disorder, and in-vitro/in-vivo studies. Additionally, the safety and efficacy of these inhibitor were evaluated through in vitro cell line studies and animal models. This examination offers a summary of cyclin dependent kinases and the varied doses and combination of drug administration aimed at enhancing the Anti-tumor effect. It also delves into the challenges linked with its resistance of drug in the inhibition of tumor activity. The review underscores the promising role of cyclin dependent kinases and its subunits in cancer treatment, especially in recent assessments for addressing various types of tumors.

TMP016

Drug-Dexloxiglumide: Novel Role for Pancreatitis

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The swelling and redness of the pancreas lying behind the lower part of the stomach. It may occur suddenly and start and last for days and sometimes for years. Occurs due to heavy alcohol use including gallstones. More than 1 million cases per year (India). It is divided into Chronic and Acute pancreatitis. Acute pancreatitis is a pancreatic inflammatory process affecting distant organs and peripancreatic tissues. An inflammatory condition known as chronic pancreatitis results in fibrosis which means thickening of the pancreas and the infiltration of chronic inflammatory cells, among other anatomical abnormalities. If the condition is severe, they may also need to go to an intensive care unit and they will not be allowed to eat or drink, and they will receive intravenous fluids, painkillers, and occasionally antibiotics such as Ciprofloxacin and Ofloxacin. CCK is a peptide hormone of gastrointestinal system consisting of varying number of amino acids which is responsible for stimulating the digestion of fat and proteins. CCK is a neurotransmitter that is distributed throughout the nervous system and a regulatory peptide hormone that is primarily found in the gastrointestinal tract. The D-isomer of loxiglumide, dexloxiglumide is a more potent antagonist selective CCKA receptor that is going phase III testing. It inhibits GIT motility and reduces gastric secretion and other antagonist. D-isomer of Dexloxiglumide may play a novel role for the treatment of pancreatitis. To date there is no treatment for this disease as there are only painkiller and other supplement. So, thus drug may play a potent role by antagonizing CCKA receptor.

TMP017

A Systemic Review and Meta-Analysis of Aflibercept plus FOLFIRI Regimen as a Second-line Treatment for Metastatic Colorectal Cancer: A PRISMA Compliant Pooled Analysis of Randomized Controlled Trials and Single Arm Studies to Assess Efficacy and Safety

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Aflibercept; a decoy receptor for vascular endothelial growth factors (VEGFs) and placental growth factor (PLGF), in combination with FOLFIRI (leucovorin calcium, fluorouracil, and irinotecan hydrochloride) chemotherapy regime, was FDA approved in 2012 as second-line salvage chemotherapy for metastatic colorectal cancer (mCRC). This is the first systematic review, and meta-analysis-based evidence to determine the efficacy and safety of Aflibercept plus FOLFIRI regimen pooling randomized controlled trials and single-arm studies. PubMed, Cochrane library, Embase, and Clinical trial.gov were systematically searched for published randomized controlled trials, single-arm studies, and national patient programs on aflibercept plus FOLFIRI chemotherapy for the treatment of mCRC till 11/10/2022. Ten studies met the inclusion criteria comprising 1075 patients for efficacy studies and 2027 patients for safety studies. The pooled prevalences were 18 % (95% CI, 5%-37%, p = 0.00) for 12m PFS and 61 % (95 % CI, 53 % - 68 %, p = 0.00) for 12m OS. The pooled prevalences were 69 % (95 % CI, 55 % - 82 %, p = 0.00) for any grade 3-4 toxicities, 10 % (95 % CI, 5 % - 16 %, p = 0.00) for grade 3-4 diarrhea, 13 % (95 % CI, 5 % - 24 %, p = 0.00) for grade 3-4 hypertension, 31 % (95 % CI, 22 % - 40 %, p = 0.00) for grade 3-4 neutropenia and 5 % (95 % CI, 2 % - 7 %, p = 0.00) for grade 3-4 venous thromboembolic event. Our meta-analysis shows that the aflibercept plus FOLFIRI combination shows better survival efficacies however; it is also associated with more high-grade adverse events.

TMP018

Repurposing of Drugs for Neurological Disorders

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Drug Repurposing is process of finding new uses for FDA-approved pharmaceuticals—old, existing, unsuccessful, experimental, previously sold prodrugs and using those newly created drugs to cure ailments other than the ones for which they were intended. It's a cost-effective and time-efficient strategy for identifying therapies, especially in challenging areas like neurological diseases (NDs). Drug repurposing studies have sought to identify existing drugs that could be repositioned to treat NDs; however, the effectiveness of drug repurposing for these ailments remains unclear. This review systematically analyses the progress made in drug repurposing for NDs and changes in the repurposing strategies used over time. Drugs can be repurposed in numerous ways viz combination, reformulation, and repositioning. Various approaches for drug repurposing are common approaches and experimental approaches. Repurposed drugs have shown potential for treating diseases, with companies leveraging

AI, docking softwares and machine learning for drug discovery. The literature for these mentioned methods has been searched using scientific database and books. The challenges in precise analysis of pre-clinical and clinical evidence exist, posing regulatory and scientific threats. Emphasizing the importance of robust post-authorization studies, repurposing saves time in research and development by expediting approvals for existing medications. While there's no cure for NDs, drug repurposing offers promise beyond original indications, enhancing profitability and productivity in the pharmaceutical sector. The future of drug repurposing for NDs entails a multidimensional approach, integrating precision medicine, data science, patient engagement, and global collaboration for efficient development of safer and more effective treatments.

TMP019

Dress Syndrome- Overview

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DRESS (Drug Reaction with Eosinophilia and Systemic Symptoms) which is also known as hypersensitivity reaction is clinically defined by fever, facial swelling, lymph node enlargement, a rash similar to measles, and organ involvement. There are three main factors involved in the pathophysiology of this condition. Firstly, different versions of the human leukocyte antigen (HLA) gene which make a person genetically susceptible to this condition. Secondly, an amendment in the metabolic pathways of drugs, especially aromatic antiepileptics. Lastly, a T cell-mediated inflammatory response caused by reactivation of Human herpesvirus-6 leads to tissue damage. DRESS syndrome can result from certain drug exposure at a rate of >1 case per 10000 exposures. Antiepileptics, antibiotics, antituberculosis, and non-steroidal anti-inflammatory agents (NSAIDs) are frequently cited concerning Dress syndrome. The syndrome usually begins with prodromal symptoms such as fever, malaise and generalised itching. Skin rashes are commonly seen, beginning from a few days after the onset, and lasting up to several weeks. The diagnosis of DRESS is tricky owing to a variety of clinical manifestations. Skin biopsies are usually used to establish the diagnosis, and patch testing may be used to identify the suspect drug. DRESS poses a high risk of morbidity and mortality in both the short and long term, with mortality rates around 10%. Prevention of DRESS through cautious prescribing, and early treatment through careful monitoring, are crucial in optimising patient outcomes. This article examines the known literature on DRESS, including its epidemiology, pathophysiology and management.

TMP020

Exploring the Neuroprotective Role of GLP-1 Secretagogues in Rotenone Induced Mouse Model of Parkinson's Disease

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Parkinson's disease (PD) is the second most prevalent neurodegenerative disorder. People beyond the age 50 - 60 are affected by this age-related disorder. Progressive and considerable loss of dopaminergic (DA) neurons in substantia nigra pars compacta (SNpc) contributes primarily to initiation and

advancement of PD pathology. Cinnamaldehyde, a natural occurring flavonoid, may increase the GLP1 release, acting on GLP1R. This may lead to GSK-3β inhibition and subsequently halt alpha-synuclein aggregation. Thus, it may hinder PD progression and render neuroprotective effect. C57/BL6 mice were subjected to rotenone (30 mg/kg, p.o.) and cinnamaldehyde (50 mg/kg, p.o.) for 28 days. Neurobehavioral analyses were done in alternate weeks, and animals were euthanised after 28 days. Furthermore, molecular estimations and histopathological studies were carried out. After 4 weeks of disease induction, it was found that there was significant difference between control and rotenone groups in behavioural studies. This indicates progression of the disease. Also, there is significant difference between disease and treatment groups in Y-maze test, pole test and round beam walk (time taken). Thus, restoration of behavioural deficits was observed. Our data suggests that cinnamaldehyde treatment shows neuroprotective action against rotenone induced toxicity.

TMP021

Thyroid Dysfunction and Diabetes Mellitus: Interplay

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Insulin and thyroid hormones play important role in our body. Insulin helps in regulating the glucose level while thyroid affects various cells and tissues, metabolizing protein, lipid and glucose. Thereby elevating the glucose level in body. Untreated thyroid disorders such as hyperthyroidism and thyrotoxicosis are potential hazards for subclinical diabetes and type 2 diabetes mellitus. There is high prevalence of thyroid disorder and diabetes mellitus coexistence in the patients as thyroid disorder is observed more in diabetic patient compared to normal population. Type 2 diabetes mellitus can downsize the regulation of thyroid stimulating hormone and impairs the conversion of thyroxine to triiodothyronine in peripheral tissues. Furthermore, poorly managed type 2 diabetes mellitus may result in insulin resistance and hyperinsulinemia, contributing to proliferation of thyroid tissue and increase in nodule formation and goiter size. Although metformin proves advantageous for both type 2 diabetes mellitus and thyroid disorder patients, other antidiabetics like sulfonylureas, pioglitazone, and thiazolidinediones may have adverse effects on thyroid disorder. While antithyroid drugs such as methimazole can weaken glycemic control in individuals with diabetes. Thus, an interplay between both the endocrinopathies is observed and individualized care and management of disorder needs to facilitate.

TMP022

Prostate Cancer: Signalling Pathway and Treatment Strategies

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Prostate cancer is most common cancer occur in men. The disease is heterogenous in both morphology and clinical behaviour. Clinically prostate cancer development appears to produce due to many genetic alterations. Prostate cancer, which is now a day the third-leading cause of cancer death in males, might pose a threat to long-term health. Around the world, an estimated 1,414,259 men were diagnosed with this cancer in 2020. An estimated 375,304 men died across the world in 2020 from this disease. It is the

4th major common diagnosed cancer across the world. Around 60% of cases of prostate cancer is diagnosed in men of 65 years or older age. There are many treatment strategies available which act on different pathways to inhibit the proliferation of prostate cancer. Therapies that target androgen signalling includes GnRH inhibitors, AR inhibitors, CYP17 inhibitors which supress the androgen signalling pathway. Targeting DNA repair pathway includes the inhibiting abnormal function PARP enzyme by PARP inhibitors, inhibition of CDK4\6 targeting cell cycle regulation, prostate-specific membrane antigen released by cancer cell is inhibited by antibody complexes by emitting beta and gamma radiations and radio ligand binding therapy, and inhibiting RANKL function in bone metastatic microenvironment in prostate cancer. In spite of many treatment options or strategies are available the treatment have many limitations like sexual dysfunction, weight gain are widely reported. This review summarises newer targes and treatment strategies for the treatment of prostate cancer.

TMP023

Direct-to-Consumer Pharmaceutical Advertising (DTCPA)

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Direct-to-consumer pharmaceutical advertising (DTCPA) for prescription drugs can be defined as prescription drugs advertising targeted directly at consumers, through public media, such as television, radio, newspaper and internet. Advertising of prescription drugs can be both beneficial and harmful to healthcare consumers. DTCPA has grown rapidly during the past several decades and is now prominent type of health communication that the public prefer most. The aim of the present study is to evaluate various aspects of people perceptions of over-the-counter drug advertising. A survey was conducted with a self-designed questionnaire for one month and the participants were selected based on their age and willingness to participate. Data was analyzed using MS Excel 2016.The most common source for advertisements for medications was internet which is (n=116, 68.9%), followed by television (n=111, 46.1%). Most of them had great trust on information shown in advertisements. 41.1% people agreed on that advertised drugs are better than non-advertised drugs and 24.9% disagreed to it. Advertising can encourage patients to follow treatment instructions or advice from their doctors were agreed by 68% and disagreed by 12% while 19.9% were neutral. As per the opinions of the surveyed peoples, the appropriateness and effectiveness of currently seen over-the-counter drugs advertisement are optimal. Although people stated that they use advertisements as a means of information about over-the-counter drugs, they believe that several areas of the over-the-counter drug advertising need improvement.

TMP024

Neuroinflammation and Cadmium: A Systemic Review

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Cadmium is a highly toxic heavy metal classified as a non-essential transition element. It is notorious for its adverse effects on both human and animal health. Cadmium having a high occurrence in the air, soil, and water, these environmental sources give rise to a diversification of health risks.

Epidemiological studies carried out earlier suggest the high cumulation of cadmium in the human body, posing a serious risk to various diseases including neurological and nondegenerative diseases. Various studies related to ADMET analysis shows the High blood brain permeability of cadmium and thus high influx of cadmium to the brain as of output. Of various mechanisms suggested for identifying cadmium-induced neurotoxicity, Neuroinflammation appears to be the most promising one. Various Neuroinflammatory pathways have been activated by cadmium exposure leading to the generation of reactive oxygen species, oxidative stress, and cellular damage. Cadmium can activate microglia and inflammatory signaling pathways such as NF-kb and MAPKs, and promote and release proinflammatory cytokines and chemokines. In this review, we will briefly discuss the various neuroinflammatory pathways which been activated by cadmium exposure and are responsible for cadmium-induced neurotoxicity.

TMP025

Gut Brain Axis: Communication between Gut and Brain

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Gut brain axis (GBA) is a bidirectional communication between gut and brain. Gut is a key player in development of neuronal disorders. This connection is not only anatomical but it is also connected through immune, chemical as well as endocrine. It is seen that during dysbiosis, pathways that are associated with GBA dysregulated and also altered permeability of the blood-brain barrier (BBB) and neuro-inflammation is observed. All connection allows the brain to interfere in gut activity and also gut can affect the neuronal activity and contribute to various diseases such as mood, cognition, mental health, Anxiety and depression as well as neurodegenerative disease such as Alzheimer and Parkinsonism. However, the overall research is poorly understood. In this review we summarize that how gut and brain are associated with diseases as well as possible pathway for Gut Brain Connection.

TMP026

Probiotic Intervention: Unravelling the Gut Brain Axis Interplay

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Emerging evidence indicates that the gut microbiota plays a crucial role in the bidirectional communication between the gut and the brain suggesting that the gut microbes may shape neural development, modulate neurotransmission and affect behaviour, and thereby contribute to the pathogenesis and/or progression of many neurodevelopmental, neuropsychiatric, and neurological conditions. Gut brain axis has a bidirectional communication between gut and brain. It is seen that during dysbiosis, pathways that are associated with GBA dysregulated and also altered permeability of the blood-brain barrier and neuro-inflammation is observed. All connection allows the brain to interfere in gut activity and also gut can affect the neuronal activity and contribute to various diseases such as mood, cognition, mental health, Anxiety and depression as well as neurodegenerative disease such as Alzheimer and Parkinsonism. However, the overall research is poorly understood. Probiotics has beneficial effect on the gut. Some research concluded that probiotics has potential effect on gut brain

axis. Probiotics have indicated to modulate the gut brain axis, which have supportive impact on central nervous system and decrease or control the incidence of some mental disorders such as depression, anxiety, autism, schizophrenia. In this review we summarize the impacts and possible mechanism of probiotics on neuronal disorders.

TMP027

Future Perspectives of Use of AI in the Treatment of Cancer

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In the last decade, artificial intelligence (AI) and machine learning (ML) has made a huge impact on humanity and has applications in multiple fields like engineering, communications, manufacturing and healthcare. The demand for healthcare services is ever increasing and many countries are experiencing a shortage of healthcare practitioners, especially physicians. Healthcare institutions are also fighting to keep up with all the new technological developments. It is generally believed that AI tools will facilitate and enhance human work and not replace the work of physicians and other healthcare staff as such. Artificial intelligence and machine learning techniques are breaking into biomedical research and health care, which importantly includes cancer research and oncology, where the potential applications are vast. These include detection and diagnosis of cancer, subtype classification, optimization of cancer treatment. AI can also be used to accurately predict the mechanism of action of anticancer molecules, thus enabling precise preclinical and clinical positioning and increasing the likelihood of clinical success.

TMP028

Perception of General Public towards Generic Medicines: A Survey Based Study

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India is the largest provider of generic medications globally. Despite this, many generics remain inaccessible to majority of the general population due to lack of awareness, distrust about the quality of medicines, poor policy implementation and inadequate recommendation by doctors. The objective of the study was to explore the perception of general population regarding generic drugs of Ahmedabad city. A community based prospective cross sectional interventional study was performed among 409 people in the population of Ahmedabad city. Data was collected through questionnaire-based survey and data analysis was done by MS Excel. The findings of the present study suggested that out of 409 people, 20% were preferring generic medicines, 26% were preferring only brand medicine while 54% were preferring both. The factors responsible for influencing the public opinion were, i) Low Cost, ii) Easy availability iii) Physician preference and iv) Quality of medicines. This study concluded that perception towards generic medicine as well as usage can be promptly enhanced by disseminating right information. The attitude towards 'Jan Aushadhi Yojna' propagated by the government can be changed by making general public aware towards it.

TMP029

Agmatinergic Pathway Attenuates Ethanol Withdrawal Induced Seizures in Rats

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Ethanol use is related to seizures in several ways. Ethanol usually acts in the brain like a depressant drug, consequently increasing the seizure threshold. With repeated detoxifications, the risk of alcohol withdrawal seizures increases, and the severity of alcohol withdrawal symptoms gradually worsens over years of alcohol dependence. The present study investigated the role of the agmatinergic system in ethanol withdrawal-induced audio-genic seizures in rats. Ethanol was given to the rats by oral gavage for 7 days and its abrupt withdrawal (10-12 hour of last ethanol exposure) produced Seizure, as evidenced by increased seizure score, compared to the control Animals. In the present study, ethanol withdrawal-induced seizure was significantly attenuated by agmatine (40-80 mg/kg, i.p.), L-arginine (100 Mg/kg, i.p.), aminoguanidine (50 mg/kg, i.p.), arcaine (30 mg/ kg, i.p.). Since Ethanol withdrawal seizures is known to produce oxidative stress and inflammation as well as alterations in neurotransmitters level, we have also monitored the lipid peroxidation, nitrite, reduced glutathione and catalase, as well as GABA and glutamate levels in ethanol withdrawal induced seizure rats and its modulation by agmatine and agmatinergic agents. An elevated oxidative stress parameters were also significantly reduced by agmatine and agmatinergic agents. It was also found that it decreases the elevated glutamate level and increases GABA level in ethanol withdrawal seizure animals. These data suggest that agmatine is a potential therapeutic target for alcohol withdrawal-induced seizures.

TMP030

Unravelling the Role of Sirtuins in Parkinson's Disease Pathology

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One of the emerging neurodegenerative disorders is Parkinson’s Disease which is mainly characterised by motor symptoms like bradykinesia and non-motor symptoms such as sensory disorders and psychotic symptoms. Aggregation of misfolded alpha-synuclein is the main pathology in PD, which results in the loss of dopaminergic neurons in the substantia nigra pars compacta of the brain. Although there is significant progress in identifying the genetic and environmental determinants that contribute to PD, however it has not resulted in the discovery of a definitive cure. Various mechanisms at the molecular level are involved in the progression of PD which are alpha-synuclein aggregation, mitochondrial dysfunction, increased levels of oxidative stress and ROS, neurodegeneration and neuroinflammation. According to the Braak staging hypothesis, the increased spread of aggregated alpha-synuclein through interconnected brain regions is an important contributor to the progression of PD. This review focuses on the Sirtuin protein, a family of NAD+-dependent deacetylase proteins and their role in PD pathology. Up till now, seven members of this protein family have been discovered to be present in diverse cellular locations and exhibit different functions. Among them SIRT1, SIRT6 and SIRT7 are found in the nucleus, SIRT3, SIRT4 and SIRT5 are situated in mitochondria and SIRT2 is preferably found in cytoplasm but may get transported to the nucleus in specific conditions. They participate in and

influence various actions like modulation of oxidative stress, aggregation of alpha-synuclein, mitochondrial dysfunction, neurodegeneration and neuroinflammation which contribute to the pathology of PD. Thus, stimulation of SIRT1, SIRT3, SIRT5, SIRT6 and SIRT7 and inhibition of SIR2 and SIRT4 can be promising therapeutic targets for disease-modifying therapies of PD. Further research is essential to identify mechanisms and develop targeted interventions for neuroprotective effects and effective PD management.

TMP031

Agmatine Attenuates Neurobehavioural and Biochemical Alterations Induced by Maternal Stress in Rats Offspring

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Prenatal stress during pregnancy is a common debilitating condition affecting mother-fetus/-infant interactions, which can be a risk factor for cognitive and affective disorders in mothers and their children. The present study aimed to investigate the effects of prenatal stress alone or in combination with agmatine on hypothalamic-pituitary-adrenal axis (HPA) activity, anxiety-/depression-like behaviors in dams and in offspring. Agmatine, a putative neurotransmitter has been reported to be released in response to various stressful stimuli. It exhibits anxiolytic, neuroprotective, memory-enhancing, antidepressant, and endogenous stress modulator. Gestationally-stressed and non-stressed rat dams were restrained in plastic chamber with daily 3 stress sessions for 30 mins between 3 hours interval from gestational day 5-19. Gestationally-stressed and non- stressed rat dams were intra-peritoneally (i.p.) treated with Agmatine (20, 40 and 80 mg/kg) and its modulators L-Arginine (30 mg/kg), Arcaine (60 mg/kg), and Aminoguanidine (50 mg/kg) from gestational day 5-19. The behavioral outcomes of prenatal stress and agmatine treatment and its modulators in dams were assessed using the open field test, elevated plus maze apparatus, sucrose preference test, novel object recognition test and forced swim test. Agmatine 40 and 80 mg/kg significantly normalized the altered parameter related to cognitive impairment and depression like symptoms in offspring. In addition to this, agmatinergic modulators were also shown the potential effect. These data suggests that agmatine as a novel therapeutic target in the maternal stress induced complications in offspring.

TMP032

Myeloperoxidase Enzyme: A Promising Target for the Neuroinflammation in Traumatic Brain Injury

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Traumatic brain injury (TBI) is defined as an impact, penetration and fast movement of the brain within the skull which is responsible for the mental state alteration. Inflammation, Apoptosis, Oxidative stress, and Ischemia are some of the important pathophysiological mechanisms which causes the neuronal loss after traumatic brain injury. There are two types of Traumatic brain injury: Primary brain injury and

Secondary brain injury. The primary brain injury is characterized by the initial impact, leading to the displacement of the brain within the skull. Secondary injury occurs because of the cellular events which cause further damage after the primary brain injury. Approx 5.48 million people are examined to suffer from severe Traumatic brain injury per year. In the USA, the estimated economic Collison of brain injury was estimated at $ 75 billion and cost $ 396,000. Traumatic brain injury leads to marked alterations in the phenotype, function and life-span of circulating neutrophils. As the first line of host defence, neutrophils are transient, distributing cells that quickly mobilise to areas of damage. One of the principal enzymes released upon PMN activation is Myeloperoxidase (MPO), a heme protein. Many cytokines and amino acid adhere the brain membrane alter the BBB permeability, inflammation, cell death and ion alteration. Therefore, during Traumatic brain injury, MPO activation by neutrophils increases swelling and the degree of brain injury. The activation of MPO is essential for oxidative damage in TBI.

TMP033

Future Prespective for Treatment of Post Ischemic Neurodegeneration

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Neurodegeneration of the brain after ischemia is a major cause of severe, long-term disability, dementia, and mortality, which is a global problem. These phenomena are attributed to excitotoxicity, changes in the blood–brain barrier, neuroinflammation, oxidative stress, vasoconstriction, cerebral amyloid angiopathy, amyloid plaques, neurofibrillary tangles, and ultimately neuronal death. In addition, genetic factors such as post-ischemic changes in genetic programming in the expression of amyloid protein precursor, β-secretase, presenilin-1 and -2, and tau protein play an important role in the irreversible progression of post-ischemic neurodegeneration. Some treatment is aimed at preventing symptoms such as dementia and disability, the search for causative therapy like nanotechnology and monoclonal antibody would be helpful in preventing and treating post-ischemic neurodegeneration of Alzheimer's disease is outgoing. Medical devices such as Cardiac implantable electronic devices, including pacemakers, implantable cardioverter defibrillator (ICD), biventricular pacemakers, and cardiac loop recorders, are designed to help control or monitor irregular heartbeats in people with certain heart rhythm disorders. Many animal studies found that some medicinal agent, Phenolic acids, flavonoids, curcumin, vitamin E, honey vitamin C, glutathione, and β-carotene, containing compound that reduces infarct volume, brain edema, blood-brain barrier permeability, apoptosis, neuroinflammation, glutamate neurotoxicity, inhibits autophagy and oxidative stress, and improves neurological behavioural that's called apitherapy.

TMP034

AI Enhanced Pharmacovigilance in Traditional Medicine

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This review examines how AI is transforming pharmacovigilance in traditional medicine by enabling swift detection of adverse effects, prediction of potential risks, and real-time monitoring of traditional

remedies. The aim is to bridge the gap between ancient remedies and modern healthcare by leveraging AI technologies, traditional medicine can be integrated into modern healthcare systems, leading to a proactive approach that improves safety standards. Traditional medicine (TM) is effective in treating a wide range of illnesses. However, due to its complex prescriptions and lack of objective evaluation standards, it's still somewhat mysterious and underutilized. Experts are exploring AI technology to link chemical composition, herbal medicine, medications, targets, symptoms, and diseases. AI also facilitates the identification of key ingredients, mode of action, and the accurate application of traditional medicine. AI is used to build QSAR models, 1. QSAR models of Anti-Inflammatory Drugs, CoMFA (Comparative Molecular Field Analysis), CoMSIA (Comparative Molecular Similarity Indices Analysis), 2. Natural Language Processing (NLP). AI and pharmacovigilance in traditional medicine identify safer combinations, optimal dosages, and potential interactions. AI strengthens quality control measures, ensuring consistency and standardization of traditional remedies. This empowers researchers to create models for pharmacology research and increase amount of data acquired from experimental datasets. AI can improve healthcare safety in diagnosis, decompensation, and adverse drug events. Integrating AI into medicine enhances credibility and safety. However, to make AI effective, companies need data-driven analytics to enhance patient safety continually.

TMP035

Nattokinase Attenuates LPS Induced Parkinson's like Symptoms in Rats

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Parkinson's disease stands as a formidable challenge in neurodegenerative disorders, affecting millions worldwide. The exact cause of Parkinson's disease is not yet fully understood however, PD patients have increases mean platelets volume thereby rendering toxic accumulation of alpha synuclein as one of the chief etiological aspects. Nattokinase, obtained from fermented soyabean in Japanese food, and also as one of the potential antiplatelet compounds, may be able to attenuate this process. We investigated the potential therapeutic impact of nattokinase in a dose-dependent study on Parkinson-like symptoms induced by lipopolysaccharide (LPS) in rats. Rats were subjected to site-specific administration of LPS in right substantia nigra to induce Parkinson-like symptoms, and nattokinase was subsequently administered in different doses (180, 360 and 720 FU). Behavioral tests, including cylinder test, catalepsy bar test, balance beam, and stepping test, were undertaken to assess motor function. Biochemical assessment for Dopamine, nitrite, reduced glutathione, superoxide dismutase, lipid peroxidation level content, body weight changes and mean platelet volume were measured to evaluate the effects of nattokinase. Nattokinase administration at both 360 FU and 720 FU demonstrated significant improvements in Parkinson's-like symptoms. Nattokinase also attenuated excessive nitrite levels, mitigated body weight reduction in the PD group, and showed a promising effect in reducing mean platelet volume. These finding suggested that nattokinase may have potential to improve symptoms associated with PD. Further research is needed to understand the receptorial mechanism of nattokinase in neurodegenerative disorders.

TMP036

Agmatine Attenuates Attention Deficit Hyperactivity Disorder Using Exposure of 6-OHDA in Mice

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Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder, affecting both children and adults, involves persistent inattention, hyperactivity, and impulsivity due to underdeveloped prefrontal cortex connections. Injecting 6-hydroxydopamine (6-OHDA) causes dopaminergic neuron damage, mirroring ADHD symptoms. This study aims to explore how agmatine impacts 6-OHDA-induced ADHD-like behaviour in mice. Animals received 6-OHDA hydrobromide on PND 5, displaying major ADHD-like symptoms: hyperactivity, attention deficits, and impulsivity. Coexisting symptoms included memory deficits in plus maze, anxiety like behaviour in marble burying test, depressive-like behaviour in sucrose preference test, and anti-social behaviour in three chamber Social Interaction task. Agmatine (20, 40, and 80 mg/kg, i.p.), L-Arginine (60 mg/kg, i.p.), Aminoguanidine (50 mg/kg, i.p.) significantly mitigated 6-OHDA-induced ADHD-like behaviour. Monitoring encompassed oxidative stress markers, neurotransmitter levels (nitrite, lipid peroxidation, glutathione, superoxide dismutase, Dopamine, GABA), associated with ADHD alterations. Agmatine and its neuroprotective modulators effectively mitigated behavioural hyperactivity by reducing ambulation and impulsive behaviour, while enhancing sucrose consumption, indicating antidepressant potential, also ameliorated impulsivity, attention deficits, increased social interaction, and reduced anxiety in 6-OHDA lesioned mice. These agents elevated dopamine, decreased lipid peroxidation and nitrite levels, and increased SOD and GSH levels, reducing oxidative stress. Agmatine significantly attenuated ADHD symptoms and mitigated oxidative stress in mice, as well as the drugs known to elevate its endogenous levels, such as L-arginine and aminoguanidine. These findings imply agmatine potential therapeutic agent for ADHD treatment and suggest preventive role in ADHD through agmatinergic modulators.

TMP037

Role of Agmatine in 3-Nitropropionic Acid Induced Neurodegeneration and Brain Damage in Rats

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Huntington's disease (HD) is an autosomal dominant inherited progressive neurodegenerative disorder. It is characterised by involuntary choreatic movement, motor impairment, cognitive decline and neuropsychiatric complications. Despite the knowledge of the exact cause and pathophysiology of Huntington's disease, there is no cure for this disease. Agmatine is a polyamine and exerts neuroprotective action by antagonising the NMDA receptor. The present study was designed to determine role of agmatine in 3-Nitropropionic acid induced neurodegeneration and brain damage in

rats. 3-NP is a mitochondrial toxin obtained from various fungal species like Aspergillus flavus, Astragalus, Arthrinium, and leguminous plants. 3-NP was administered from day 1 to day 9 at a dose of 10 mg/kg via the IP route on alternate days to mimic the symptoms of HD. Agmatine in dose ranges of 5, 10, and 20 mg/kg was administered for the treatment from day 10 to day 33 by the IP route. On day 33, several behavioural assessments and histopathological studies were performed. The findings of present study Demonstrated that 3-NP produced spontaneous choreiform and dystonic movements, frontal-type cognitive deficits, and progressive striatal neuronal degeneration. Chronic treatment with Agmatine reverses the histological morphology in 3-NP-induced HD rats. Furthermore, agmatine 20 mg/kg has shown promise in mitigating motor impairments, cognitive deficits, psychiatric symptoms, and neurodegeneration associated with HD in animal models. The findings of present study suggest the neuroprotective potential of agmatine in the management of HD and its associated neuropsychiatric complications.

TMP038

Role of Agmatine in Autism Spectrum Disorder in Rats

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Autism Spectrum Disorder (ASD) is a heterogeneous neurodevelopmental disorder characterized by core behavioral symptoms, including impaired social communication, repetitive behaviors, and various neuropsychiatric symptoms. Unfortunately, due to less-known pathophysiology and molecular targets, the effective treatment for ASD is still vague. Agmatine is an endogenous polyamine, neuroprotective agent, and NMDA receptor antagonist. It exhibits a wide spectrum of biological actions and has demonstrated great potential as a novel therapeutic candidate in various neuropsychiatric disorders. The study aimed to investigate the therapeutic impact of agmatine on propionic acid (PPA)-induced (ASD) in rats using a PPA dose of 250 mg/kg orally. We investigated the influence of intra-peritoneal agmatine injections (20, 40, and 80 mg/kg) on behavioral dysregulation induced by PPA in rats. Behavioral parameters (body weight, social interaction, anxiety test, motor coordination) were checked then animal was sacrificed for Neurochemical (Estimation of glutamate level) and Biochemical (estimation nitrite, reduced glutathione, lipid peroxidation level) Furthermore, we have also investigated the effects of i.p injections of agmatinergic modulators L-arginine (50 mg/kg) and aminoguanidine (60 mg/kg) in PPA-induced autistic rats. Rats treated with PPA displayed altered behaviors associated with ASD, including social impairment, reduced exploration, anxiety, and repetitive actions. PPA also induced changes in neurochemical and biochemical levels. Chronic administration of agmatine and agmatinergic modulators alleviated PPA-induced ASD symptoms, improving social behavior, reducing anxiety, and positively impacting neurochemical and biochemical parameters. Our data, in particular, project agmatine-based therapies as a novel treatment strategy in the management of ASD and its associated complications. The study aimed to investigate the therapeutic impact of agmatine on propionic acid (PPA)-induced Autism Spectrum Disorder (ASD) in rats using a PPA dose of 250 mg/kg orally.

TMP039

Agmatine Mitigates Behavioral Abnormalities and Biochemical Dysregulation Associated with Quinolinic Acid-Induced Huntington's Disease in Rats

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Huntington's disease (HD) is an autosomal dominant progressive neurodegenerative disorder characterized by motor impairment, cognitive decline, and neuropsychiatric complications. Despite the knowledge of the exact cause and relentless efforts of the scientific community, to date, there is no cure for this devastating disorder. Agmatine is a naturally occurring polyamine and reported to possess neuroprotective properties. The present study was designed to elucidate the therapeutic potential of agmatine against Quinolinic Acid (QA)-induced striatal toxicity and to explore its possible mechanism. QA (300 nmol/4µl) was administered intrastriatally to induce HD-like symptoms in rats. Agmatine (5, 10 and 20 mg/kg, i.p.) was administered from day 1 to day 21 of the treatment protocol. Body weight and behavioral observations were recorded weekly after agmatine treatment. On the 22nd day, the rat striatum was isolated for the biochemical estimation (lipid peroxidation, superoxide dismutase, and nitrite) and neurochemical analysis (gamma-aminobutyric acid, glutamate, and dopamine). The findings of the present study demonstrated that a single intra-striatal injection of QA showed a marked reduction in body weight and also resulted in behavioral alterations, oxidative damage, and neurochemical dysregulation in experimental rats. Chronic treatment with agmatine (5, 10 and 20 mg/kg, i.p.) not only improved the behavioral dysregulation but also normalized the oxidative stress parameters and neurotransmitter levels in QA-induced HD rats. The present study proposed agmatine-based therapies as a novel treatment approach for the management of HD and associated psychiatric complications.

TMP040

Meloxicam and Its Neuroprotective Action in Alzheimer's Disease

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Alzheimer's disease (AD) is a progressive neurodegenerative disease that affects the central nervous system and progressively impacting the elderly population worldwide, at a concerning pace. AD remain a significant unresolved societal burden afflicting millions of people worldwide. The reported pathogenesis for AD are oxidative stress, Amyloid-β plaque formation, Tau protein hyperphosphorylation leads to neurofibrillary tangles, decreased level of acetylcholine and other. There exist multiple causes that affect a variety of neurological disorders either directly or indirectly through multiple pathways, that must be researched and studied. Till now no cure exists for this disorder and current approved treatment includes Acetylcholinesterase inhibitors and NMDA antagonists. The inflammatory response plays an important role in neuroprotection and regeneration. The use of non-steroidal anti-inflammatory drugs have beneficial effects. In this context, the effects of the anti-inflammatory agent meloxicam had been scarcely documented, but its ability to inhibit both cyclooxygenase isoforms (1 and 2) could be a promising strategy to modulate inflammation.

TMP041

Fisetin Augmentation Amplifies Antidepressant Responses: Evaluating Enhanced Efficacy with Venlafaxine and Escitalopram in a Chronic Unpredictable Mild Stress Model

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The current study used a chronic unpredictable mild stress mouse model of depression to evaluate the antidepressant effects of fisetin in combination with venlafaxine or escitalopram. The widely recognized flavonoid fisetin has demonstrated neuroprotective and antidepressant characteristics. It is primarily present in a variety of fruits and vegetables. Escitalopram, classified as a selective serotonin reuptake inhibitor and Venlafaxine, categorized as a serotonin-norepinephrine reuptake inhibitor, exhibit notable effectiveness as antidepressants. Male Swiss Albino mice were subjected to various treatments, including Vehicle group (saline), 'fisetin alone,' 'venlafaxine alone,' fisetin+venlafaxine, 'escitalopram alone,' fisetin+escitalopram, and venlafaxine+escitalopram for a duration of 21 days, following a three-week exposure to Chronic Unpredictable Mild Stress. Thirty minutes following the treatment, the immobility period was examined in forced swim and tail suspension experiments. Levels of norepinephrine, dopamine, and serotonin in the cerebral cortex, hippocampus, and the entire brain were examined through High-Performance Liquid Chromatography (HPLC) combined with a fluorescence detector. In comparison to their respective groups treated with monotherapy, the group receiving both fisetin and venlafaxine exhibited superior outcomes, showing a reduction in the immobility time and an elevation in norepinephrine and serotonin levels in brain. The combination of Fisetin with Venlafaxine exhibits an additive or synergistic effect, which could potentially treat depression with minimal side effects and a quicker onset of action.

TMP042

Pharmacological Investigation on Agmatine in Type 2 Diabetes Mellitus with Co-Morbid Alcoholism

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Diabetes mellitus is a chronic metabolic disorder characterized by abnormally high blood glucose levels known as hyperglycemia. Type 2 diabetes mellitus (T2DM) is characterized by a progressive loss of insulin action (insulin resistance), followed by pancreatic beta cell dysfunction. The present study establishes animal model for diabetic with co-morbid alcoholism and investigates pharmacological effect of agmatine in T2DM with co-morbid alcoholism through biochemical evaluation. The alcohol-induced type 2 diabetes mellitus group rats were fed with Liquid Modified Diet (LMD) + ethanol (EtOH) over 3 weeks with HFD with a low dose of streptozotocin (35 mg/kg) on day 14. Other groups are fed with respective HFD or LMD or normal diet. All the groups were then evaluated for blood glucose, glucose tolerance, insulin tolerance, lipid profile, amylase, SGOT, SGPT and alkaline phosphatase. Histopathologically liver and pancreatic morphology comparison was also performed.

Antidiabetic action of agmatine (40, 80 mg/kg, i.p.) was indicated by lowering in elevated blood glucose, cholesterol and triglyceride level in diabetic rats and also in alcohol induced diabetic rat. Also shows the beneficial effect on the liver enzyme profile and normalized SGOT, SGPT, ALP, amylase level. This study thus establishes the animal model of T2DM with co-existing alcoholism and also highlights evidentially the potential of agmatine in the management of diabetes in alcoholic subjects.

TMP043

Recent Advancement in Parkinson's Disease

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Parkinson's disease is a chronic Neurodegenerative disease where the loss of dopaminergic neurons occur in SNPC area in the brain with motor and non -motor symptoms. It is a movement disorder consisting of bradykinesia, rest tremor, rigidity, and postural instability. Treatment options for Parkinson's disease are limited, with most of the recent treatment based on restore the dopamine in striatum. A levodopa is a treatment for Parkinson's disease. A future treatment like stem cell therapies, Gene therapy, biomarker treating Parkinson's disease. A new FDA approved drug rytatry and duopa is a new approach to the delivery of levodopa and carbidopa for the treatmemt for Parkinson's disease. A 3-D printed immunosensor and dopamine transporter scan are detecting gene who responsible for Parkinson's disease.

TMP044

Effect of Withania Somnifera on Ethanol & Nicotine Cross Tolerance

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Adaptogens are herbal medications that can be used as a potential therapeutic target for drug addiction. Withania somnifera (Ashwagandha) is one of the adaptogens having great medicinal value and is used in many clinically proven neuronal conditions. In the present study, we investigate the effects of Withania somnifera extract and its phytoconstituents on alcohol and nicotine cross-tolerance effects in the Swiss albino mice model. Exposure of mice to 4-day daily treatment with ethanol or nicotine and on 5th day, assessment of tolerance with same dose of alcohol or nicotine followed by withdrawal period assessment of cross-tolerance with single dose of nicotine to ethanol treated mice and ethanol to nicotine treated mice. Behavioural paradigms were assessed. We observed that group of animals receiving 4 days of daily alcohol and assessment of tolerance to the same dose on 5th day showed development of tolerance to anxiety- like behaviour, but locomotor parameters were not affected significantly. The development of cross-tolerance in group of mice receiving single anxiogenic dose of nicotine followed by ethanol consumption and withdrawal in EPM. The pre-treatment of WSE and its phytoconstituents before the nicotine challenge attenuates the anxiogenic effect of nicotine as revealed by an increase in OA entries in EPM. Also, a significant decrease in ACTH level was observed. These results suggest that WSE may serve as an effective adaptogen in arresting ethanol and nicotine mediated tolerance to cross-tolerance effects, attenuating anxiety and stress levels.

TMP046

Artificial Intelligence as Novel Detection Tool for Alzheimer's Disease

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Alzheimer's disease (AD) is one of the most prevalent dementia types affecting the elderly population. Alzheimer's disease (AD) is now classified as a silent pandemic due to concerning current statistics and future predictions. Despite this, no effective treatment or accurate diagnosis currently exists. On-time detection of the AD is valuable to find new approaches for the AD treatment. Artificial intelligence (AI) is an effective technique for AD detection as these methods are employed as a computer-aided diagnosis (CAD) system in clinical practices and play a crucial role in identifying variations in the brain images to detect AD. The negative impacts of invasive techniques and the failure of clinical trials have prompted a shift in research towards non-invasive treatments. In light of this, there is a growing need for early detection of AD through non-invasive approaches. The abundance of data generated by non-invasive techniques such as blood component monitoring, imaging, wearable sensors, and bio-sensors not only offers a platform for more accurate and reliable bio-marker developments but also significantly reduces patient pain, psychological impact, risk of complications, and cost. Nevertheless, there are challenges concerning the computational analysis of the large quantities of data generated, which can provide crucial information for the early diagnosis of AD. Hence, the integration of artificial intelligence and deep learning is critical to addressing these challenges.

TMP047

Sargramostim for Treatment of Alzheimer Disease: Hype or Hope

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It is a modified form of recombinant granulocyte macrophage colony-stimulating factor, which is a glycoprotein made up of 127 amino acid and molecular weight is approximately 18000 dalton and it act as an immunostimulatant. It is used to increase immune cell production after bone marrow transplant. Its chemical formula is C639H1006N168O196S8 and molecular weight is 14434 dalton. It is basically used for recovery of patient receiving bone marrow transplantation and cancer therapy. Sargramostim bind to GM-CSF receptor which stimulates a jak/stat pathway and this leads to production of hemopoietic cells and neutrophils. Therapeutic effect of sargramostim can be increased with corticosteroids interaction and toxic effect can be increased with cyclophosphamide interaction. A phase 2 trial that was a randomized, double-blind, placebo-controlled phase-2 has been reported where the safety and effectiveness of sargramostim therapy in patients have been evaluated. This finding that short-term sargramostim treatment activates the innate immune system without causing any major drug-related side effects. It also improves cognition and memory and partially normalizes blood measures of tau and amyloid beta pathology, as well as neuronal damage in individuals with Alzheimer's disease. In order to treat neuro-inflammatory diseases, it can be administered in conjunction with vaccinations against antimicrobial resistant infections. People who have low blood monocyte counts will develop Alzheimer's disease. It improves anti-cancer responses.

TMP048

Evaluation of Oxytocin-Agmatine Interaction in LPS-induced Parkinsonism Symptoms in Rats

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Agmatine, a biogenic amine and putative neurotransmitter, exhibits neuroprotective properties against excitotoxicity, oxidative damage, and corticosteroid-induced neurotoxicity. Oxytocin functions as a neuroprotective agent by averting neuro-apoptosis, neuro-inflammation, oxidative stress and restoring mitochondrial function. Agmatine is believed to be a neuromodulator co-localized with oxytocin and vasopressin in hypothalamic paraventricular and supraoptic nuclei. The study investigates their physiological interaction, based on their anatomical co-localization in lipopolysaccharide (LPS)-induced Parkinson disease (PD) like symptoms in rats. Parkinson like symptoms was induced by intranigral administration of LPS. Rats administered with agmatine (40-80-160 mg/kg) and oxytocin (1.5-3-4.5 IU) underwent behavioral paradigms such as catalepsy test for rigidity, cylinder test for akinesia, string test for grip strength and stepping test (bradykinesia) balance beam for motor coordination. Furthermore, histopathological investigations by Golgi cox staining and biochemical assessment for dopamine was done. The study showed that combining oxytocin and agmatine positively impacted body weight regulation and showed significant improvement in all symptoms assessed for the LPS PD models. Analysis of neurotransmitter levels revealed significant effects on dopamine, suggesting modulation of the dopaminergic system. Additionally, nitrite levels indicated reduced oxidative stress in treated PD groups versus controls. Results showed that subeffective dose of agmatine andoxytocin significantly attenuated parkinsonism-like symptoms there by providing evidence of interaction. These treatments demonstrated effectiveness in mitigating the core symptoms associated with PD and may be investigated further as small molecules used for intra-nasal delivery.

TMP049

Effect of Agmatine on Sleep Deprivation Induced Nociception in Mice

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Adequate sleep is essential for optimal human functioning. Sleep deprivation caused by experimental changes or external factors, involves complete sleep loss, including REM sleep. Absence of sleep heightens pain sensitivity. Agmatine is derived from arginine by ADC agmatine is help with sleep deprivation, which is a condition where a person does not get enough quality or quantity of sleep. Mice, were split into 5 groups: Control, Sleep deprived and treated with agmatine 20,40,80 mg/kg group and animal were sleep deprived for 72 hours. Following the treatment period behevioural and biochemical parameter were carried out, including antioxidant parameters, biochemical marker (Oxidative stress marker). After the treatment of agmatine at different dose it showed significant improvement in SD

induced altered nociception. following behavioural paradigm were performed (FST, TST, OFT). The result demonstrates that sleep deprivation leads to increased hyperanalgesia and a lower pain threshold Agmatine counteracted the elevated TBAR levels and also increase catalase and GSH level in SD mice, resulting in lower TBAR and higher GSH/Catalase levels. Agmatine's antioxidant mechanism also supports these advantages, suggesting that it may have therapeutic potential to mitigate the negative consequences of sleep loss. The study affirms Agmatine effectiveness in exhibiting, anti-nociceptive, antioxidant, and anti-inflammatory activities in SD mice the exact mechanism of agmatine and its theurapeutic potential in SD induced alter nociception warrant for the investigation particularly in SD groups. Agmatine neuroprotective roles and therapeutic potential against SD induced neuroinflammation warrant further investigation.

TMP050

Gene Polymorphism in Breast Cancer: New Insights and Targets for Therapeutic Intervention

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Breast cancer is one of the common female cancers worldwide around 25% of the all cases are diagnosed with breast cancer. Risk factors responsible for the occurrence of breast cancer reproductive factors, Age, family history of breast disease, genetic variations. Single nucleotide polymorphism of genes is the most common risk factor responsible. A polymorphic gene may lead to the abnormal expression or to the production of an abnormal form of the gene; this may cause or be associated with disease. Genome-wise association studies identified 94 common genetic variants associated with risk of developing breast cancer. Women who had one, or more close relatives suffered have higher risk of breast cancer. Genes like BRCA 1 or 2, P53, ADIPONECTIN, ERCC, GSTM1, S1RT, HER2, are the cancer suppressor gene that induces the genetic polymorphism in women which leads to breast cancer. Cytochrome P-4501A1 plays a key role in phase I metabolism of polycyclic aromatic hydrocarbons and in estrogenic metabolism. At least some of this variation is associated with the presence of common genetic polymorphisms. This review has analysed database of gene polymorphism in various studies which will be helpful for management and prognosis of patient of breast cancer.

TMP051

Addressing Central Pathology: Antidiabetic Polypill in Alzheimer's and Diabetes Combo Model

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Type 2 Diabetes Mellitus (T2DM) is one of the important risk factors to suffer from dementia, Alzheimer's Disease (AD) being the most common form. Since AD and T2DM, both are closely related to ageing and elder population are also growing, finding new therapeutic approach which will slow down or prevent the central complications associated with metabolic disorder will be relevant. This

review poster is of a study which investigates the potential therapeutic impact of an Anti-Diabetic Polypill (ADPP) on central pathology and cognitive impairment in a mixed model of AD & T2DM. ADPP which consists of metformin, aspirin, simvastatin and Angiotensin Converting Enzyme inhibitor (ACE inhibitor) was given to long term treated, new mixed model of AD-T2DM APP/PSIxdb/db mouse subjects. The study incorporated thorough assessment of central pathology and cognitive function. Established biomarkers and behavioural tests were applied to comprehensively evaluate the impact on subjects of ADPP. Improvement was seen in central pathology, marked by reduction in beta-amyloid accumulation and tau hyperphosphorylation pathophysiology of AD. Cognitive assessment revealed enhanced memory. Polypill (PP) might be an interesting approach that is inexpensive, safe and has approved components in PP. It shows reduction in both the pathophysiology of AD, spontaneous bleeding and cognitive impairment also shows reduction. This animal study proves PP to be alternative or adjuvant therapy to delay the central pathology associated with T2DM and AD.

TMP052

Evaluating Hepatoprotective Activity of Designed Regimen in Alcohol Induced Hepatic Injury in Wistar Rats

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Chronic alcohol consumption leads to liver dysfunction. There is lack of effective drugs to treat these diseases. In this study, we evaluated the combination of herbal drugs to treat liver damage and also to find out the possible mechanism related to its hepatoprotectivity. The study was carried out in two phases. Induction phase, animals were grouped into Normal control (NC), and Disease control (DC). For induction of hepatic injury ethanol (40%, 5gm/kg, and p.o. for 6 weeks) was used. After 6 weeks animals were evaluated for different parameters. After confirmation treatment phase, was initiated for 6 weeks with Shilajit (500mg/kg, p.o. with cow's milk), and Triphala (400mg/kg, p.o. with cow's milk) in seven groups: - NC, DC, DC + Milk (DC+M), DC + Shilajit +Milk (DC+SM), DC + Shilajit + Triphala (DC+ST), DC + Shilajit + Triphala + Milk (DC+STM), DC + Standard (DC+Std) and different parameters were assessed. Treatment has significantly reduced the sleeping time of phenobarbitone in DC+STM group as compare to DC group ($p<0.01$). Strong blue color in occult blood stool test was identified in DC, and DC+M group when compared with no blue color in DC+STM group. Serum SGPT, SGOT levels were decreased in DC+STM when compared with DC ($p<0.01$) and DC+M group. Serum total and direct bilirubin levels were significantly decreased in DC+SM, and DC+STM when compare to DC group ($p<0.01$). Significant decreased in serum ALP level in DC+STM ($p<0.01$), and DC+STD ($p<0.05$) when compared to DC group. Level of Serum total protein was significantly increased DC+STM group as compare to both DC, and DC+M group ($p<0.05$). Significantly increase in serum albumin levels in DC+STM when compare with DC group ($p<0.01$). Levels of Serum CRP was significantly decreased in DC+STM as compared to DC group ($p<0.05$). MDA and Nitrite levels was significantly reduced DC+STM when compared to DC, and DC+M group ($p<0.01$). Levels of GSH was increased in DC+STM compare with DC group ($p<0.01$). SOD levels were increased in DC+STM group as compared to DC, and DC+M group ($p<0.05$). Catalase levels were significantly increase in DC+STM compared to DC ($p<0.05$), and DC+M group ($p<0.05$); DC+STD compared to DC+M group ($p<0.05$). IL-6 levels in liver tissue significant decrease in DC+STM when compared with DC, and DC+M groups ($p<0.05$). In Histopathology evaluation DC+STM showed regaining shape of central vein and improved cell structure. These findings indicate that combination of shilajit and triphala with

cow's milk has improved the toxic signs of alcohol induced liver injury which was reflected in various parameters. However, further studies are required to establish a treatment.

TMP053

Sticking to Recovery: A Review on Adhesion Molecules as Potential Target for Neurological Treatments

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Neural Cell Adhesion Molecule (NCAM) and Polysialylated NCAM (PSA-NCAM) are two crucial molecules involved in the development and regeneration of the nervous system. The complexity of neural regeneration, particularly concerning degenerated neurons and glial cells, presents significant challenges in neurological therapeutics. This review emphasizes the potential of NCAM and PSA-NCAM in addressing these challenges, focusing on their implications in treating neurological disorders. NCAM plays a pivotal role in cellular adhesion, establishing membranous contacts between cells in the CNS. Its influence is also significant in modulating synaptic connectivity and plasticity, which are critical for recovering neural functions following injury or in neurodegenerative diseases. PSA-NCAM, known for its role in neurogenesis, is especially prominent in the developing brain. The polysialylation of NCAM prevents cellular attachment, thereby promoting migration and growth, suggesting its potential in enhancing neural plasticity and regeneration. This review explores the mechanisms by which NCAM and PSA-NCAM contribute to the recovery of neuronal and glial cells. Recent key studies are highlighted, showing the effectiveness of NCAM and PSA-NCAM manipulation in enhancing neural stem cell proliferation, migration, and differentiation – essential processes in neural tissue recovery. Furthermore, the review discusses the potential of these molecules in remyelination processes, crucial for the restoration of glial cell function and overall neural health. The synthesis of current research findings draws attention to the therapeutic possibilities of NCAM and PSA-NCAM in neurodegenerative diseases and neural injuries. This review proposes these molecules as promising targets for future research and clinical applications in regenerative neurology, opening new avenues for therapeutic strategies.

TMP054

Pulmonary Fibrosis: An Overview

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Abstract Pulmonary fibrosis basically a persistent type of illness which affects the whole respiratory pattern and its functioning. Generally Pulmonary Fibrosis and its subtype has no specific cure but it can be preventive by using certain treatments. O_2 therapy, Lung transplant, Living a healthy lifestyle. The basic mechanism of pathophysiology involved is thickening of lung tissues and also lungs become stiffs also some of natural components such as dust. Now if we talk about IPF then it is still under researches to find out it's main cause If we talk about it's results then basically it got limits to the balance and also decreases the capability of Carbon monoxide spreadability to got bind with haemoglobin. This review

gives overview of Treatment for Pulmonary Fibrosis newer treatment strategies and targets. Also, main cause of it is lung thickening and and in some of its type include unknown cause.

TMP055

Antipsoriatic Activity of Novel Herbal Gel Formulation Containing Curcumin and Sapponin

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Poor aqueous solubility and permeability of curcumin limits its transdermal absorption. So this project may increase aqueous solubility and permeability of curcumin so it may give better antipsoriatic activity topically. To formulate a novel herbal combination to overcome the poor dermal penetration of curcumin. The saponins extracted from reetha may be used as solubilizer for the curcumin. Curcumin is a capable compound for management of skin disorders. However, poor aqueous solubility and permeability of curcumin restrictions its transdermal absorption. A number of different approaches have been used for improving solubility and bioavailability of curcumin such as formation of prodrug, liposomes, and polymeric micelles. Saponins are well known natural surfactants. Considering critical role of saponin and curcumin gel formulated and evaluated anti-inflammatory and antipsoriatic activity. Saponin and Curcumin were procured from the supplier. Formulations of curcumin will be prepared using varying concentrations of saponins. Permeation study was carried out by using Franz Diffusion cell apparatus, Stability study were carried out by using TLC method found significant antinflammatory activity by using carageenan induced paw edema model and antipsoriatic activity by using Perry's scientific tail model. ANOVA applied to analyze data and expressed as Mean ± SEM (N =6) which was followed by Dunnett's test and differences between means were regarded significant at * ($P< 0.05$), ** ($P< 0.01$) level. The gel formulation was prepared by using 2% Curcumin, saponin, propylene glycol, carbapol 934 and distilled water. The Results obtained for Anti-inflammatory activity carried out by using carrageenan induced paw edema method was found Percentage decrease in Cucumin plus saponin gel had shown 9.17 % decrease in paw volume while only curcumin gel shown 7.74% decrease in paw volume. Histopathology of rat tail skin after antipsoriatic treatment psoriatic rat tail was treated with curcumin gel, curcumin and saponin gel, Tretinoin 0.025% we found that increase in orthokeratosis with reference and test formulations. Physical appearance, pH, Homogenecity, Spreadability, U. V. spectroscopic analysis, permeation enhancement study by using franz diffusion cell apparatus. Curcumin and saponnin gel formulation might play an important role in anti-inflammatory and antipsoriatic activity.

TMP056

Assessment of Quality of Life in Epileptic Patients in Pediatric Population across the Ahmedabad City: An Observational Study

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Epilepsy is the most common neurological condition in the paediatric age group in India. Epilepsy has an impact on one's physical, mental, emotional, and social health as well as one's overall quality of life.

Studies have revealed that a number of variables, such as the age at which seizures start, their type, frequency, the harmful effects of medications, the family's socioeconomic situation, parental anxiety, etc., have a role in seizure development and even have an impact that how the quality of life (QOL) of people with Children with epilepsy (CWE) are been affected. This study was a cross sectional hospital based prospective study which was carried among the 116 Paediatric patients suffering from Epilepsy in Ahmedabad city. Self-designed questionnaires were created to gather information on the sociodemographic characteristics and quality of life of children with epilepsy. According to our research, children with epilepsy were more likely to be between the ages of 6 and 10. A self-designed questionnaire was used to evaluate the QOL in four distinct ways. The average score for each of the four components was evaluated, and it was found that cognitive functioning, which gave a bad average score, was much more degraded than physical, emotional, and social functioning, which gave a reasonable average score. Childhood epilepsy is associated with a variety of cognitive deficits, behavioural issues, intellectual decline, etc. The major barriers can be addressed through proper counselling and education to the caretakers which can ensure a better QOL in CWE.

TMP057

Therapeutic Strategies for Diabetic Retinopathy: Harnessing the Power of PPARs

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Diabetic retinopathy is a progressive microvascular complication associated with diabetes mellitus and has become widely recognized as a primary cause of blindness worldwide. Despite the progress made in medical technology and conventional treatments, such as laser therapy and anti- Vascular Endothelial Growth Factor injections, steroids, there's still lack of effective and long-lasting treatments for diabetic retinopathy. In addition, these treatments can be costly, intrusive and linked to potential adverse reactions. The FIELD and ACCORD trials have shown that administering the PPARα agonist Fenofibrate is advantageous in slowing down the progression of diabetic macular edema and proliferative diabetic retinopathy. Three notable randomized clinical trials, namely DCCT, UKPDS and ACCORD-Eye have demonstrated the advantageous effects of systemic blood glucose regulation in retinopathy. Treatment with the PPARγ agonist Rosiglitazone had demonstrated a reduction of over 50% in the risk of proliferative diabetic retinopathy. Saroglitazar being the Dual PPAR agonist having property of both PPAR alpha as well as gamma which is beneficial in the treatment of retinopathy. Like Saroglitazar, Gallic acid being a phenolic compound found naturally have also proven to upregulate PPAR alpha as well as gamma.

TMP058

A Comprehensive Review on Pharmacological Study of Plant Nardostachys Jatamansi

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Nardostachys jatamansi is a high value medicinal plant with a variety of biological characteristics due to its sesquiterpenes, nardosinone, flavonoids, valepotriates and iridoids. It is used as diuretic, analgesic, and cytotoxic herb used to treat conditions such as corpulence, seizure disorder, indigestion, spasticity, hyporeflexia, chronic constipation, mental instability, neurasthenia and poisoning of snake. It has anti-hepatocellular carcinoma properties by inhibiting cell proliferation, induced apoptosis, and preventing cell cycle arrest at S phase. Nardostachys Jatamansi extract is used for strengthening the heart, palpitation of the heart and lowering blood pressure. It also has hypotensive and antispasmodic properties, possibly mediated by activation of the K-ATP channel. Nardosinone was found to inhibit the expansion of cell surface area brought on by AngII and reduce the mRNA expression of ANP, BNP, & -MHC. Alzheimer's disease is an irreversible neurodegenerative disorder with no proven drug for treatment. Nardostachys Jatamansi DC is an ayurvedic medicine to treat neurological disorder. Jatamansinol extends lifespan, improves locomotor activity, learning and memory, reduces A42 protein level, boosts antioxidant enzyme activities, and inhibits AChE, BuChE, and cholinesterase activities. This offers the first proof that jatamansinol shields against Tau's neurotoxic effects in a Drosophila model of AD.

TMP059

Triple Negative Breast Cancer: Metastasis: Discovering Possible Role of miRNAs using Bioinformatics Approach

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Triple-negative breast cancer (TNBC) is the most aggressive form of breast cancer characterized by a poor prognosis and restricted treatment alternatives. It is very heterogeneous and tends to spread to other organs such as the lung, liver, and bone causing metastasis. Therefore, there is a requirement for a biomarker to elucidate the metastatic possibility as early as possible. MicroRNAs (miRNA) have become attractive biomarkers due to their regulatory role over potential metastasis-associated genes. This study aimed to identify key miRNAs dysregulated in metastatic TNBC (TNBC-M) patients and their possible targets. The MicroRNA transcriptomic data (Mir-seq) was downloaded from The Cancer Genome Atlas Program (TGCA) and differentially expressed miRNAs (DEmiRNAs) were identified using the DESeq2 package in R. Literature Survey was further conducted to find their existence w.r.t TNBC metastasis. Target prediction was done using Targetscan. Targets were then used to construct a protein-protein interaction (PPI) network via STRING, with interactions visualized in Cytoscape. Hub genes were identified using Cytohubba. Gene Ontology analysis was performed to elucidate potential biological involvement. The data was obtained from patients in the TCGA database and 5 Metastasis were compared with 108 Primary TNBC. Analysis using R showed that two miRNAs (miR-2277, miR-135b) were significantly downregulated ($P < 0.005$, log fold change < -2). The top 10 hub genes were

taken using the MCC matrix in Cytohubba. Gene ontology analysis revealed that targets of the dysregulated miRNAs were involved in metastasis. The study identified downregulated miRNAs (miR-2277, miR-135b) in metastatic triple-negative breast cancer, which indicates their exclusive role by targeting gene/mRNAs responsible for metastasis.

TMP060

Evaluation of Erlotinib in Combination with PPAR-γ for the Treatment of Diabetes Mellitus

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Tyrosine kinase inhibitors are effective in the targeted treatment of various malignancies. Also the computational analysis have shown that tyrosine kinase Inhibitors can bind partially to the PPAR-γ receptors. Therefore, the study was aimed to evaluate the effect of tyrosine kinase inhibitors in combination with PPAR-γ full agonists in animal model of type 2 diabetes mellitus. In this study, diabetes was induced by high-fat diet followed by a low-dose streptozotocin administration. Fasting blood glucose level was measured after 5 days of STZ administration and the animals having FBG levels above 200mg/dl were included in the study. At the end of treatment, analysis of biochemical parameters like glucose, lipid profile, SGPT, SGOT, urea, and creatinine levels were measured. Animals were sacrificed liver and pancreas were excised for histopathological examinations. The disease control group has shown a significant decrease in body weight, HDL levels, and an increase in fasting blood glucose, triglycerides, and total cholesterol. The combination of erlotinib and pioglitazone produced statistically significant ($p<0.05$) improvement in blood glucose, total HDL, triglycerides, and total cholesterol levels after 4 weeks of treatment as compared to erlotinib alone. Disease control animals treated with pioglitazone, erlotinib and combination of erlotinib and pioglitazone showed significant improvement in oxidative stress parameters. Histopathology data showed decreased lipid infiltration and inflammation of liver cells and pancreatic damage were decreased by both combination therapies. Results of this study indicate that TKIs can act as an Oral hypoglycemic agent in combination with the PPAR- γ full agonists.

TMP061

Possible Drug Repurposing and Accelerated Wound Healing

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Healing of a wound is a multifaceted process that involves several factors to be considered for proper completion. Improper healing of wounds is a widespread phenomenon that affects millions of people across the world constantly. Treatment of acute or chronic diabetic wounds has been one of the major clinical challenges past several years as diabetic patients have much more deprived healing of wounds which often leads to surgery of the injured site or amputation of the wounded part is usually done in severe cases. Angiogenesis plays a major role in the

process of neovascularization and so angiogenesis is a potential target for wound healing as the newer blood vessels formed over the injured surface are important to provide nutrients, immune cells, and oxygen for the healing of wounds. Several classes of drugs act on different growth factors for treating certain disorders and these drugs can be repurposed for the healing of different types of wounds. These drugs might have the potential to initiate the neovascularization development through angiogenesis which aids the accelerated wound healing process. Repurposing of drugs is also economical compared to that of other treatment methods and it can be delivered to a wider range of people in need.

TMP064

Drug-Resistant Tuberculosis: Achievements So Far and Road Ahead

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Drug-resistant tuberculosis (DR-TB) represents a pressing global health issue, leading to heightened morbidity and mortality. The rise in DR-TB cases, despite extensive research, underscores the need for enhanced prevention, diagnosis, and treatment methods. This review delves deep into the genetic origins of DR-TB, spotlighting modern advances in detection, including AI-based tools. Special emphasis is given to the emerging potential of personalized drug-delivery systems, notably nano-carriers, and the relevant patents in this arena. The article critically examines the inherent challenges of current DR-TB treatments, highlighting their complexity, potential side effects, and the socioeconomic strain they impose, particularly in under-resourced regions, emphasizing the cost-effective and accessible solutions. By offering insights, this review aims to serve as a compass for researchers, healthcare practitioners, and policymakers, emphasizing the critical need for ongoing R&D to improve treatments and broaden access to crucial TB interventions.

TMP065

Analyzing Drug Interactions in Common Pharmaceutical Combination for Geriatric Patients

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This study investigates potential drug interactions within common pharmaceutical combinations for geriatric patients. Given the complex medication regimens often prescribed for this demographic, understanding and mitigating potential interactions are critical to ensure safe and effective healthcare outcomes. Utilizing a comprehensive approach, we reviewed medical records and medication histories of geriatric patients. Machine learning algorithms were employed to analyze patterns and identify potential interactions among commonly prescribed pharmaceutical combinations. The study focused on a diverse range of medications commonly used in geriatric care. The analysis revealed several instances of drug interactions within the studied pharmaceutical combinations. Commonly prescribed medications for geriatric patients showed varying degrees of compatibility, emphasizing the importance of a tailored approach to medication management in this population. In conclusion, this research sheds light on the nuanced landscape of drug interactions within common pharmaceutical combinations for geriatric patients. The findings underscore the need for vigilant medication management and personalized prescribing practices to optimize the safety and efficacy of healthcare interventions in the geriatric population.

TMP066

Anti-inflammatory Potential Ciclopirox with Probable Implications in Alzheimer's Disease

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This study was conducted to investigate the potential of Ciclopirox as an ion-chelator in the treatment of Alzheimer's disease. Neuroinflammation is the root cause of this neurodegenerative disease. Pertaining to the antioxidant and anti-inflammatory property of the drug, behavioural, antioxidant and molecular assessments were carried out. Ciclopirox was evaluated owing to its strong iron-chelation capacity as iron accumulation contributes to Alzheimer's disease pathology. Molecular docking of Ciclopirox (ligand) with 2CKM (acetylcholinesterase) as target protein was carried out using Autodock Tools to explore its molecular behaviour in Alzheimer's disease. HRBC membrane stabilization assay using rat blood sample was performed to determine anti-inflammatory activity. The Docking results showed that the Binding energy value for Ciclopirox and 2CKM is '-7.9 Kcal/mol' thus effectively verifying the high binding affinity and the resultant Acetylcholinesterase inhibitory activity of Ciclopirox. % Protection against inflammation and subsequent haemolysis increased with increasing concentration of Ciclopirox (maximum of 84.28% at 200mcg and 87.91% at 1000mcg). Ciclopirox has shown potential as an iron-chelator in treatment of Alzheimer's with data showing substantial

improvement in levels of proven biomarkers of disease manifestation. The desirable outcome obtained from the studies will prove to be advantageous in repurposing Ciclopirox as an effective mode of treatment for Alzheimer's disease.

TMP067

Public Health Approaches to Address Childhood Obesity

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This thorough analysis looks at the development of cholesterol-lowering vaccinations throughout history, present developments, and potential future developments. The previous section explores seminal research and discoveries that paved the way for the creation of vaccinations intended to treat dyslipidemia, with a particular emphasis on the PCSK9-targeting, cholesterol-lowering VLP vaccine. Deciphering the complex interactions between PCSK9 and LDL cholesterol becomes essential to comprehending the background. Moving forward to the present, the paper looks at recent innovations, such as the ground-breaking advancements in vaccination tactics and technology. Particular focus is given to new vaccination discoveries that might transform cholesterol control by offering creative and reasonably priced alternatives for current therapies. This section provides a thorough summary of current investigations, clinical studies, and developing patterns related to vaccinations that decrease cholesterol. The main focus of this study is looking forward, with conjecture about how these vaccinations could affect worldwide heart health based on new discoveries and advances. Expected advancements in vaccine technology, delivery methods, and their incorporation into conventional healthcare systems are explored, offering a prospective viewpoint on the revolutionary possibilities of immunizations that decrease cholesterol. In conclusion, this analysis not only examines the historical turning points and contemporary developments in vaccines that decrease cholesterol, but it also imagines a time in the future when these vaccinations will be essential for controlling dyslipidemia and lowering.

TMP068

Evaluation of Effect of Methylglyoxal on Neurological Function in Experimental Animals

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Alzheimer's is a progressive neurodegenerative disease and it is characterized by mild cognitive impairment and dementia. Streptozotocin (Stz) was administered through i.c.v route. It produces oxidative stress, neuroinflamation, Aβ (amyloid-beta) accumulation and tau phosphorylation. MGO (methylglyoxal) is a dicarbonyl compound which plays a role in pathogenesis of AD by oxidative stress, impaired glucose metabolism and tau phosphorylation when induced (3 µmol/l) i.c.v in rat model. Comparative evaluation of Stz, MGO provides valuable insights in the distinct pathological mechanisms of AD. The study was designed to evaluate effect of Methylglyoxal and investigate neurological effect of Methylglyoxal (MGO) & STZ along with MGO as well as to find out possible mechanism of action due to which it causes cognitive impairment. The Wistar female rats were divided

into 5 groups each consisting of 6 animals, NC-Normal control; SC-Sham control (i.c.v saline); Stz (Streptozotocin, icv-2mg/kg); MGO (Methylglyoxal, icv-3µmol); Stz+MGO (5µl). Neurobehavioral parameters were assessed. Biochemical estimations like MDA, glutathione was performed. Histopathological examination was conducted using Haematoxylin and Eosin (H.E) staining. Collective data of neurobehavioral parameters, biochemical estimations, and histopathological analysis illustrate that there is significant deterioration of cognitive function. Significant changes observed in histopathological evaluation and immuno-histopathological evaluation demonstrated elevated Gfap markers in animals administered with Stz, MGO, Stz+MGO, whereas the normal control and sham control demonstrated basal level. This provides the primary data for further research and development. Comparative study provides valuable insights in the pathological mechanisms for AD.

TMP069

Olsalazine Pretreatment Augments Chemosensitivity of Gemcitabine in Hepatocellular Carcinoma

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Recently, olsalazine a DNA hypomethylating agent was found to inhibit the growth of breast cancer cells. The present study was carried out to evaluate the effects of olsalazine pretreatment in the potentiation of chemosensitivity of gemcitabine for the treatment of hepatocellular carcinoma. Molecular docking was performed to analyze the interaction of olsalazine with DNMT1. Cytotoxicity of olsalazine, gemcitabine and combination were measured on Human HePG2 cells using MTT assay. Antiproliferative effects was assessed using animal model of N-Nitrosodiethylamine and Carbon Tetrachloride induced hepatocellular carcinoma. The change in body weight, liver weight and survival rate were measured. The blood samples were collected for estimation of serum biochemistry. Liver homogenate was used for the estimation of TNF-α and IL-6, oxidative stress markers and P53 levels. Histopathology and immunohistochemistry were performed on liver sections to detect the morphological changes and P53 expression. Docking analysis revealed the interactions between olsalazine and DNMT1 with a binding energy score of -5.34. Olsalazine pretreatment potentiated antiproliferative effect of gemcitabine in cell line study. In the group receiving olsalazine pretreatment showed significant reductions in relative liver weight and improved survival rate of gemcitabine group. Serum biochemical markers like SGPT, SGOT, ALP and bilirubin revealed improved liver functions. Olsalazine pretreatment also reduced the levels of CRP, LDH, TNF-α and IL-6 and oxidative stress markers dose dependently. Histopathology and immunohistochemistry showed improved liver morphology with potentiated induction of P53. In conclusion, sequential combination of olsalazine and gemcitabine improves the treatment outcomes during the progression of hepatocellular carcinoma.

TMP071

Targeting PI3K/AKT/mTOR Signalling Pathway Using Combinatorial Treatment Approach for Breast Cancer

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Breast cancer is one of the most common types of cancer affecting women worldwide. Standard use of therapy for breast cancer includes the use of Doxorubicin. However, due to the reported serious adverse events caused by standard line of treatment necessitates the need for development of a more targeted treatment option with reduced side effects and improved efficacy. A combination of TKI, tyrosine kinase inhibitor and ADD, PPARγ promoter can have potential benefit in treatment of breast cancer due to their ability to alter the expression of growth factors, regulate the cell proliferation and manage the glucose levels increased due to cancer proliferation. The present study aims to assess the anti-proliferative effect of this combination in MDA-MB-231 TNBC cell line. MDA-MB-231 cells were treated with different concentration of TKI and ADD to identify the IC50 concentration and its effects on cell proliferation, migration and apoptosis. The results showed that TKI and ADD combination showed synergistic inhibition in cell proliferation and cell migration as compared to individual treatment. The combination of TKI and ADD also exerted increased apoptosis than individual treatment. Based on the promising results obtained from in-vitro experiments, it was concluded that combination of TKI and ADD possesses anti-proliferative and apoptotic effect. Hence, proving the benefit combinatorial approach for treatment of breast cancer.

TMP072

Evaluating the Therapeutic Efficacy of Marine Plant Extract and Gemcitabine Combination in Pancreatic Carcinoma Using Nude Mouse Model

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Pancreatic cancer is one of the deadliest malignancies. Pancreatic cancer is a highly aggressive malignancy with limited treatment options, and exploring novel therapeutic strategies is crucial. The research hypothesizes that the combination of marine plant extract and gemcitabine may exhibit synergistic effects via inhibiting TGF-beta mediated pathways and inducing apoptosis while suppressing cell proliferation. The aim of the study is to investigate the protective effects of a Marine Plant Extract and its mechanism of action in Pancreatic Cancer. The Athymic nude mice were divided into the seven groups each consisting of 5 animals: DC- Disease Control, Marine plant extract (low dose)- Disease treated with Marine extract (p.o) for 42 days, , Marine plant extract (medium dose)- Disease treated with Marine extract (p.o) for 42 days, Marine plant extract (high dose)- Disease treated (p.o) for 42 days, Gemcitabine (low dose)- Disease treated with Gemcitabine (i.p) for 42 days, Gemcitabine (high dose)- Disease treated with Gemcitabine (i.p) for 42 days, Combination treated(Marine Extract and Gemcitabine). Biochemical estimations were performed including

antioxidant parameters, TFG-beta, Caspase 9, Bcl-xl and Tumor Growth delay. Tumor weight and Tumor Volume were found to be reduced in treatment groups.

TMP073

Association of Serum Vitamin D Levels and Complications of Type 2 Diabetes Mellitus: A Retrospective Study

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The increased prevalence of vitamin D deficiency in the Indian population may be a factor in the increased incidence and progression of T2DM. Our study aims to explore the association between serum vitamin D levels and T2DM complications. A case-control study was conducted in a tertiary care hospital in India, using the medical records of all T2DM patients with reported vitamin D levels, admitted to the General medicine department from 2019 to 2022. Patients were grouped as cases and controls based on the presence and absence of diabetic complications, respectively. The association of diabetic complications with vitamin D levels were presented in terms of Odd's ratio (95% CI). A total of 475 T2DM patients were included in the final analysis, where 49.7% were males, and the average age was 61.13 + 12.05 years. The vitamin D levels in the population are as follows: severe vitamin D deficiency (21.9%), vitamin D deficiency (41.5%), vitamin D insufficiency (22.9%) and vitamin D sufficiency (13.7%). Univariate logistic regression revealed significant associations between vitamin D levels and complications, including neuropathy (OR: 3.036, p=0.035), retinopathy (OR: 0.965, p=0.001), nephropathy (OR: 0.966, p=0.001), diabetic foot disease (OR: 0.969, p=0.023), and peripheral vascular disease (OR: 0.896, p=0.30). However, multivariate analysis showed a significant association only with nephropathy (OR: 2.134, 95%CI [1.236-3.682]). Our study reveals that vitamin D levels were associated with an increased risk of diabetic nephropathy. Further long-term studies with larger sample sizes are needed to understand its association with other diabetic complications.

TMP074

Prevalence of Adverse Drug Reactions with Dipeptidyl Peptidase-4 (DPP-4) Inhibitors in Type 2 Diabetic Patients in South India: A Retrospective Study

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DPP-4 inhibitors are widely recognized for their efficacy and persistence among diabetic patients. The present study aimed to identify the prevalence of ADRs associated with DPP-4 inhibitors. This retrospective cross-sectional study included type 2 diabetic patients (>18 years) treated with DPP-4 inhibitors from 2019 to 2021. ADR identification relied on reported events or abnormal symptoms/laboratory values from the patient's medical record. Causality was assessed using Naranjo algorithm and WHO-UMC criteria, and severity was evaluated with the modified Hartwig and Seigel scale. Data analyses were performed using SPSS v.20. The study included 796 patients prescribed with DPP-IV inhibitors, with a majority being males (58%) and a mean age of 59.56 ± 9.53 years. Among the DPP-4 inhibitors, teneligliptin (66.6%) was the most prescribed, followed by vildagliptin (22.5%), sitagliptin (7.9%), linagliptin (2.6%), and saxagliptin (0.4%). Adverse events were observed in 26.6% of the study population. A total of 212 adverse events were observed with saxagliptin-associated adverse events being the highest (66.6%). Hepatic adverse events (37.7%) were the most common, followed by gastrointestinal events (16.5%), electrolyte imbalance (12.3%), and hypoglycemia (8.9%). Most adverse events were possible based on WHO-UMC criteria (78.7%) and Naranjo scale (86.7%), followed by probable according to WHO-UMC criteria (21.2%) and Naranjo scale (13.2%). Among the observed events, 58% were of moderate severity, and 42% were mild. The prevalence of adverse events associated with DPP-4 inhibitors was 26.6% among our study population. Most adverse events were considered possible, underscoring the importance of vigilant monitoring in the Indian population.

TMP075

Exploring the Health Dynamics: A Comprehensive Study on Knowledge, Attitudes, and Practices among Parents/Guardians of 5-10-Year-Olds in the Koraga Tribal Community of Udupi District, Augmented by Anthropometric and Laboratory Correlations

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Despite favourable healthcare indicators in Udupi District, Karnataka, India, malnutrition persists among children aged 5-10 years, especially affecting the vulnerable Koraga tribal community. This study assesses the knowledge, attitude, and practices (KAP) of parents/guardians in this community regarding malnutrition and worm infestation, correlating these factors with anthropometric assessments and laboratory investigations. The present cross-sectional study was performed on 122 parents/guardians using a validated 74-item KAP questionnaire. Anthropometric evaluations, conducted in accordance with World Health Organization standards, included measurements like height-for-age (HAZ), weight-for-age (WAZ), and Body Mass Index for age (BAZ) for the children. Laboratory assessments involved blood sampling for haemoglobin estimation and stool specimen collection for helminth analysis. All these data were correlated with the KAP. A significant positive relationship between knowledge and practice (rho = 0.183, p = <0.043), a weak positive relationship between knowledge and attitude (rho = 0.138, p = <0.131), and a negative correlation between attitude and practice (rho = -0.008, p=<0.926). Among 137 Koraga children assessed, 84.7% were underweight, 94.16% were stunted, and 94% were wasted. In addition to that 84.7% children were found to be anaemic, while reports of worm infestation were found to be negative in all. A weak positive correlation was identified between the overall KAP score and both haemoglobin values (rho=0.102, p<0.266) and BAZ (rho=0.031, p<0.731). Conversely, negative correlations were observed between KAP and WAZ (rho= -0.078, p<0.419), as well as between KAP and HAZ (rho= -0.008, P<0.930). The study highlights a potential association between overall KAP and specific health indicators, emphasizing the necessity for targeted interventions to address nutritional challenges and enhance health outcomes among the Koraga tribal community in Udupi District.

TMP076

A Cross-Sectional Study on Misuse and Overuse of Paracetamol as an Over-the-Counter Drug

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Paracetamol is widely utilized non-prescription non-steroidal anti-inflammatory drugs (NSAIDS). Easily accessibility raised concerns for its overuse and abuse, which can result in negative health consequences and pose issues for public health management. Hence, the cross-sectional study was designed to evaluation misuse ad overuse of paracetamol. This study was conducted to assess the frequency, distribution, and root causes of paracetamol consumption among diverse student populations. A heterogeneous group of students with varied academic backgrounds were chosen as representative samples and administered a standardized questionnaire. The survey collected data on student demographics, usage patterns, reasoning, dosage methods, grasp of prescribed parameters, and knowledge of potential risks associated with misuse and excessive use of paracetamol. A total of the 345 university students participated which comprised of 53.9% females and 43.1% males. The average score for knowledge of pharmacological indications of paracetamol was 2.44. Only 68.1% (235) understood the package labelling, including instructions for consumption, warnings, and contraindications, and only 62.9% (217) responded positively to the possibility of potentially harmful interactions between paracetamol and other OTC or prescription drugs. The factors influencing the decision to use OTC drugs were familiarity, severity of symptoms, accessibility, time, convenience and cost. The findings of this study suggest that university students have moderate awareness, knowledge, attitude, and practices in terms of the safe use of OTC medicines. Activation campaigns, health education courses and interventions should emphasize the potential risks and side effects and the importance of discussing with medical professionals before taking such medications.

TMP077

Advancements in Male Contraception: Bridging the Gender Health Gap

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This review explores the imperative need for advancements in male contraception, shedding light on the existing gender health gap. The discussion delves into the reasons behind the necessity of male contraceptives, emphasizing the side effects associated with female contraceptives, thus advocating for a more equitable responsibility in family planning. The paper examines current research in male contraception, providing insights into the evolving landscape of contraceptive methods for men. Furthermore, it outlines the future prospects of male contraceptive research, envisioning a more inclusive approach to reproductive health. Additionally, the review addresses challenges in female contraceptives, acknowledging the importance of overcoming obstacles to achieve a balanced and

comprehensive framework for contraceptive choices. This exploration aims to contribute to the ongoing discourse on gender equity in reproductive health by spotlighting the advancements, challenges, and potential of male contraception.

TMP078

Adipose Tissue Wasting During Cancer Associated Cachexia

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Cachexia, commonly known as wasting syndrome, is found in chronic conditions such as cancer, autoimmune diseases, HIV, burn patients, chronic obstructive pulmonary disease, and chronic kidney disease. Weight loss, anorexia, and skeletal muscle deterioration are clinical features of cachexia. In the last decade, most of the research has shown that skeletal muscle wasting is accompanied by adipose tissue loss. Since most of the research in cachexia is carried out in cancer patients, this review will focus on cancer-associated adipose tissue loss in cachexia. To collect data about the adipose tissue wasting in cancer cachexia, keywords like “adipose tissue wasting,” “adipose tissue and cachexia,” “adipose tissue wasting and cancer,” “were searched in databases ScienceDirect, PubMed, and Scopus. The search interval was from 2010 to 2023. Due to the presence of a tumor, both host and tumor-derived factors are involved in adipose tissue wasting. Chronic inflammatory markers such as TNF-α and IL-6, as well as tumor-derived factors like Parathyroid hormone-related protein and leukaemia inhibitory factor, along with the chronic activation of the sympathetic nervous system, orchestrate a complex pathway leading to adipose tissue wasting. During adipose tissue wasting, excessive lipolysis emerges as the primary cause rather than the apoptosis of adipocytes. Excessive lipolysis results in elevated free fatty acids in circulation, ultimately contributing to skeletal muscle wasting. Given the complexity of signaling pathways, there is currently no specific treatment available to cure cachexia. This review provides implications of different signaling pathways in adipose tissue wasting in cancer cachexia.

TMP079

Cannabidiol Mitigates Beta-Amyloid-Induced Cognitive Impairment in a Rat Model of Alzheimer's Disease

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Cannabis sativa, commonly referred to as cannabis or hemp, contains a molecule called cannabidiol (CBD). One specific form of CBD is approved as a drug in the U.S. for seizures. In addition, CBD is known to cure a variety of illnesses, including anxiety, pain, Parkinson's disease, Crohn's disease, dystonia, and many others. However, there is still much to learn, especially when it comes to CBD therapy and the role neurodegenerative disorders play in the aetiology of AD via the APOe pathway. The study was performed on Wistar rats, Aβ was injected through (ICV) on day 1 (5µg/5µl, unilaterally). For 21 days, CBD was given orally at doses of 20, 40, and 60 mg/kg body weight every

day. The Morris water maze test was used to measure learning and memory in rats on the 7th, 14th and 21st days after the start of dosing. A number of biomarkers were assessed in brain homogenates, including acetyl cholinesterase, dopamine, noradrenaline, oxidative markers, inflammatory indicators, Aβ level, and ROS. Moreover, histo- and immunohistological analyses were carried out to look at cellular level alterations in brain tissues. In addition to oxidative damage and a cholinergic deficit, the abundance of findings from Aβ triggered severe learning and memory impairment. As contrast to Aβ, CBD treatments at various doses were able to dose-dependently lessen behavioral impairments set on by Aβ, as well as oxidative stress, an inflammatory marker, an decrease Aβ, and changes in the brain's levels of ROS, dopamine, and noradrenaline levels. We reached to novel finding that observed cognitive improvement in the Aβ-injected rats may be linked to the antioxidant activity and APOe pathway of CBD restoration of cholinergic and lipid dysregulation functioning.

TMP080

Gene Therapy for Type 1 Diabetes Mellitus: A Minireview

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Type 1 diabetes mellitus (T1DM) is a persistent autoimmune condition characterized by the self-destruction of cells through T-cell-mediated mechanisms. This autoimmune disease is prevalent among young patients and is associated with a high mortality rate. This review centres on the present condition and future prospects of gene therapy as treatments for Type 1 Diabetes Mellitus (T1DM). In order to investigate the research question, we have incorporated the databases PubMed, Science Direct, Scopus, and Google Scholar. The outcomes of this review are as stated: (1) Cell sensitization can occur from different cell sources. (2) Stem cell therapies, which involve the use of embryonic stem cells and induced pluripotent stem cells, show potential for generating and replacing damaged or lost cells. (3) Stem cell-based therapies, like stem cell therapy, are being explored. (4) Another area of interest is the promotion of cellular replication. The goal of this minireview is to give an in-depth look at the important genes and proteins that can be explored to make gene therapy successful in in treatment of type 1 diabetes mellitus (T1DM), with a focus on the genes that are linked to T1DM. Gene therapy methods provide encouraging opportunities for future treatments of diabetes. Gene therapy is proposed as an alternative approach for the treatment of type 1 diabetes mellitus (T1DM).

TMP081

A Review on Advancements in Intra-Nasal Drug Delivery: Potential Applications and Challenges

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Intra-Nasal drug delivery is an efficient of administering medications directly into the nasal cavity. It involves the absorption of drugs through the nasal mucosa, which provide a direct route to the blood stream, by passing the gastrointestinal tract and liver metabolism. Intra-Nasal drug delivery is one of the focused delivery options for brain targeting, as the brain and nose compartments are connected to

each other via the olfactory route and via peripheral circulation. There are various advancements which enhances the absorption of drug administered through intranasal route like Nanotechnology based formulations, Mucoadesive and permeation enhancers, In situ gel formulations, micro emulsion and Nano emulsion, Drug device combination systems, Bio adhesive nanofibers, Targeted Drug delivery. The therapeutic applications of Intra-Nasal drug delivery include the treatment of neurological and psychiatric disorders such as migraine, depression, anxiety and Alzheimer's disease. Additionally, intra nasal drug delivery has been used to treat pain and inflammation as well as to deliver vaccines and hormone replacement therapy. There are several outcomes like Enhanced drug bioavailability, Potential for combination therapies, improved patient compliance etc. In conclusion, advancements in intranasal drug delivery have the potential to revolutionize drug administration and improve therapeutic outcomes. Continued research, development, and collaboration between scientists, clinicians, and regulatory bodies are essential to overcome these challenges and fully realize the potential of intranasal drug delivery in various therapeutic applications.

ABSTRACT- POSTER PRESENTATIONS (HERBAL TECHNOLOGY)

HTP001

A Scientific Study on Khirni Stembark

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Manilkara hexandra (Roxb.) Dubard, used as a Khirni or Rayan in most of the tropical regions of India. The stem bark is useful in conditions like flatulence, colic, dyspepsia, stomatitis and dental disorders. A complete pharmacognostic profile was generated including development of validated HPTLC method for estimation of four triterpene acids due to scarcity of reports available on it. The stembark was evaluated for pharmacognostic parameters such as macroscopy, microscopy, ash value, extractive values, total phenolics, procyanidins and saponins. A validated HPTLC method for quantification of oleanolic acid (OA), ursolic acid (UA), betulinic acid (BA) and lupeol (LU) was developed as per ICH guidelines. The method was performed using stationary phase as silica gel $60F_{254}$ HPTLC plates and petroleum ether: toluene: ethyl-acetate: formic acid (7:1:2:0.3, V/V/V/V) as a mobile phase followed by the densitometric scanning at 545 nm after derivatization using anisaldehyde–sulfuric acid reagent. Transverse section of stembark showed presence of rhytidoma and discontinuous rows of phloem fibres associated with idioblasts containing prisms of calcium oxalate. Phloem showed ceretanchyma and cut ends of a few latex cells. The stembark was found to contain 8.31% of procyanidins and 2.84% of phenolics. Lupeol content was 0.418+0.06% w/w (high amount) and ursolic acid 0.032 +0.008% w/w in stembark (low amount). The quality parameters and HPTLC method developed would serve as useful gauge in standardization of *Manilkara hexandra.*

HTP002

Scientific Studies on *Stachytarpheta indica*

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Stachytarpheta indica (Fam. Verbenaceae) is a valuable indigenous plant used for chronic respiratory, digestive, liver and inflammatory disorders. Systematic scientific studies of this plant are lacking, so the present investigation was aimed at development of quality parameters for the plant through phytopharmacognostical studies, along with evaluation of its cytotoxic potential. Pharmacogenetic, physicochemical and phytochemical tests and assays were performed, followed by isolation of marker compounds using specific extraction technique as well as column chromatography. The isolated compounds were characterized by spectral analysis. Cytotoxicity assays of methanolic extract was carried out on lung, colon and breast cancer cell lines (A549, HT29 and MCF7, respectively). The pharmacognostical studies established various diagnostic characters and phytochemical studies lead to isolation of verbascoside and 6, 7, 8-trimethoxy-5-methyl-3-(8-methylnoyl)-2Hchromen-2-one. The cytotoxicity studies revealed negligible cytotoxicity on A-549 cell lines and no effects on HT-29 and MCF7 cell lines. The phytopharmacognostical studies carried out in the study would serve as a useful tool for the identification of the plant. It is the first report for the isolated marker compounds in this plant, along with first report of negligible cytotoxic activity.

HTP003

Exploring Role of Finger Millet in Diabetic Wound Healing

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India has 77 million diabetics, the second highest number in the globe. Diabetes affects around 463 million adults (20-79 years) worldwide; by 2045, this figure is expected to rise to 700 million. A number of clinical trials have demonstrated that a lack of protein, lipids, carbohydrate, vitamins and minerals can impair wound healing capabilities. A standardized diet must be provided during wound healing phase of both regular and diabetic patients that includes amino acids, sugars, fats and vitamins. Cereal grains have been a vital component of the human diet for thousands of years, helping to shape a healthy human civilization. The current evaluation emphasises the relevance of gluten-free, non-acid-forming, easy-to-digest diets that includes finger millet with low glycaemic index. Its low glycaemic index food feature is believed to be a suitable choice for those with celiac disease (disease caused by ingestion of gluten-containing cereal protein) and diabetes, as intake of the grain helps to regulate blood glucose levels. Several papers exist that demonstrate the crop's anti-diabetic, anti-tumorigenic, anti-diarrheal, antiulcer, anti-inflammatory, atherosclerogenic effects, antioxidant, and antibacterial characteristics. To summarize, Finger Millets are used to treat diabetic people because they contain polyphenols that reduce lipid peroxides on the wound. There are several factors which contributes that accelerate wound healing property. Calcium has one of the roles in homeostasis of mammalian skin and serves as a modulator in keratinocyte proliferation and differentiation.

HTP004

A Review on Phytochemical Investigation of *Cuscuta reflexa* by Various Analytical Techniques

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The *Cuscuta reflexa* is a parasitic plant that belongs to the family Convolvulaceae. Common names for it include Akashabela, Amarbel and Dodder plant. It is rootless, leafless parasitic twining climber that absorb food from other plants by its amazing structure called a haustorium. The plant *Cuscuta reflexa* is used extensively in ayurveda and has various therapeutics qualities. It has gained attention because of its phytochemical composition, which is the source of its pharmacological characteristics. The review emphasizes on multiple analytical techniques for estimation of various phytoconstituents found in *Cuscuta reflexa*. The investigation encompasses a wide array of analytical techniques including Chromatographic techniques like HPLC, HPTLC, TLC, GC-MS, Column Chromatography and Mass Spectrometry. Various bioactive including Phenolics, Alkaloids, Flavonoids, Tannins, Steroids etc. have been isolated and characterized from various plant parts of *Cuscuta reflexa.* Various analytical methods help in identification and estimation of important phytoconstituents and thus ensure the quality of the herbal drugs. This review discusses the various analytical techniques used for the estimation of

quercetin, kaempferol, bergenin, ß-sitosterol and lupeol which are the important bioactive present in the plant.

HTP005

An Overview on Plant Based Vaccine

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This study offers a summary and assessment of plant-based vaccines as a promising method for vaccine manufacture. The effectiveness, scalability, safety and ease of distribution of plant-based vaccines are only a few of their many benefits. Transient expression methods, stable transgenic plants, and plant cell suspension cultures are only a few of the plant expression systems covered in the review that are used to produce vaccines. It investigates many plant species that have been effectively used for vaccine antigen expression, including rice, maize, tobacco and lettuce. The paper also looks at how different vaccination antigens, like viral proteins, bacterial antigens, and subunit vaccines, are expressed in plants. Additionally, extensive preclinical and clinical evaluations are done to determine the immunogenicity and effectiveness of plant-based vaccines.

HTP006

A Review on Exploring Herbal Approaches to Combat Biofilm Formation

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Because of their increased resistance to conventional antibiotics, biofilms complex colonies of bacteria encased in a self-produced extracellular matrix present significant issue in both medical and industrial settings. The possibility of natural remedies as complementary approaches to address biofilm-related problems is investigated in this work. Natural agents with antibacterial qualities and the ability to interfere with the formation and integrity of biofilms have drawn interest. These agents can be produced from a variety of sources, such as plants and other organic materials. The methods by which these organic substances interact with biofilms, prevent bacterial development, and maybe increase sensitivity to traditional antimicrobial treatments are being studied in this study. The effects of specific natural agents on biofilm formation, composition, and quorum sensing mechanisms are investigated by means of in vitro experiments and molecular analysis. The results provide insight into how well natural remedies work to inhibit the growth of biofilms and lessen their pathogenicity. This work adds to our knowledge of biofilm biology and emphasizes the potential of natural agents as an additional strategy for managing biofilms.

HTP007

Marker Analysis of *Manilkara hexandra* by HPLC and TLC Autobiography

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Manilkara hexandra (Sapotaceae) is highly valued for their utility in the diseases of gum and teeth. Literature survey revealed no information on estimation of reported phytoconstituents. Thus, present work was carried out for phytochemical profiling of various extracts using HPLC. Moreover, ORAC assay for antioxidant and AChE inhibitory activities of *Manilkara hexandra* stem bark and leaves were assessed. The marker compounds such as myricetin, quercetin, kaempferol, luteolin and apigenin were identified using Co-TLC in different extracts of plant and quantified using HPLC. Acetylcholine esterase inhibitory assay was carried out using TLC bioautography method. The compound showing potential AChE activity was isolated and further characterized through spectral analysis like FTIR and H^1NMR. HPLC method revealed 3.04070%, 0.6604%, 3.0447% and 0.6062% w/w of quercetin, kaempferol, luteolin and apigenin in stem bark extract respectively and 5.5559% and 1.7855% w/w of myricetin and quercetin in leaves respectively. Macerated ethyl acetate stem bark extract and hydrolysed ethyl acetate leaf extract showed maximum scavenging potential in ORAC assay. Saponified petroleum ether extract of stem bark and leaves as well as isolated compound exhibited significant AChE inhibitory activity. Validated simultaneous HPLC estimation methods designed for above markers proved to be simple, precise, accurate and specific and can be employed to quantify these markers individually in plant. Moreover, antioxidant potential using ORAC assay and AChE inhibitory activity of the *M. hexandra* stem bark and leaves reported first time.

HTP008

Phyto-Chemical Profile of Dioeceous Plant *Juniperus Indica* with Respect to its Gender, Age and Habit

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Present study consists of detailed pharmacognostical and phytochemical investigations of *Juniperus indica* plant volatile oil. This is a multi-variable targeted study includes variables like age [matured / immature state] of plant, gender [as it's a dioeceous plant] and four major habits; of Niti valley Byans valley, Dharma valley, Johar valley of Chamoli district, Uttarakhand, India. The study is first report of morphological and microscopical study of leaves and stem of male and female plants. Total phenolics, Tannin, flavonoids estimated by colorimetry method reflected matured male contain highest flavonoids & tannin while matured female berries contain highest phenolic content. Volatile oil content by hydro distillation was found that immature female plant of Niti and byas valley had highest yield. Result of highest anti-oxidant activity with least IC_{50} of male plant extract. HPTLC method was developed for simultaneous estimation of major bioactive phyto-constituents Amentoflavone and epicatechin; results reflected highest epicatechin content in female plant of Dharma valley and highest Amentoflavone in matured female plant of Dharma valley. Developed HPTLC method was also validated with ICH guidelines and confirmed for repeatability, optimum recovery, precision and robustness. The plant has

potential in fragrance industry need to be confirmed for immature female gender plant. If plant is to be incorporated as powder or extract in therapeutic formulation need to be of male gender with maturity.

HTP010

A Review of Medicinal Plants for the Treatment of Postmenopausal Osteoporosis

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In recent times, osteoporosis, once a silent epidemic, has emerged as a serious health risk. Osteoporosis is linked to high rates of death, morbidity, and expensive medical costs worldwide because it makes bones more brittle and increases the risk of fractures. Despite being a significant risk factor for osteoporosis in postmenopausal women due to ovarian hormone deficiency, hormone replacement therapy (HRT), which is arguably the most effective treatment, is not recommended because it raises the risk of cardiovascular and breast cancer. There are certain side effects connected to the other therapeutic agents that are currently on the market. It is thought that phytoestrogens contribute to the preservation or enhancement of skeletal health in this particular context. This work examines scientific data on medicinal plants whose antiosteoporosis properties have already been established. How these plants work may vary in certain situations, they act by strengthening defences against oxidative stress, or they bind with estrogen receptors that show responses at the cellular and molecular levels. This review covers eighteen plants and provides a brief synopsis of each plant's morphology, phytoconstituents, family, common name, and potential mechanism of action.

HTP011

Formulation and Evaluation of Topical Microemulsion-Based Gel Containing Anti-Arthritic Herbal Drugs

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In the current scenario, there is an augmentation in topical formulations by virtue that they can be prepared by incorporating herbal APIs for more desirable local action. It is convenient for the patients to use topical formulations rather than taking oral formulations for many diseases like fungal infection, acne, arthritis etc. One of the modernistic technologies in Novel Drug Delivery System used topically is microemulsion based gel, which carries virtue of bi-fold controlled release i.e. microemulsion incorporated gel. Microemulsions have been known to increase cutaneous absorption of both lipophilic and hydrophilic APIs when correlated to conventional vehicles. A microemulsion based gel for topical therapeutic application was prepared using extracts of herbs like Fenugreek, *Calotropis procera, Sesamum indicum, Curcuma longa*, Boswellia gum, Eucalyptus oil and Parijat oil. A microemulsion formulation containing optimized S-mix of Tween 80 and PEG was developed. The proportion of oil, water and S-mix was determined by ternary diagram. The formulation was evaluated for various

formulation parameters like spreadability, thixotropic property, washability, greasiness and drug content. The formulation was found to have acceptable spreadability, washability, greasiness and thixotropic properties. The developed formulation can be used as a complementary therapy along with oral anti-arthritic medicines to enhance the overall therapeutic benefit to the patient.

HTP012

Investigations on the Effect of the Combination of *Pueraria Tuberosa* & *Piper Nigrum* Extracts on Isolated Leydig Cells Through *In-Vitro* Studies

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Pueraria tuberosa and *Piper nigrum* are the *Vajikarana* drugs of *Ayurveda* listed to cure male infertility. The objective of this study was to investigate the effect of extract of *Pueraria tuberosa* in combination with the different doses of extract of *Piper nigrum* on isolated leydig cells through *in vitro* studies. Isolated leydig cells were incubated with various doses of *Pueraria tuberosa* extract (10, 100, and 1000 µg/ml) as well as a combination with *Piper nigrum* extract at doses of 5, 10, and 20%. The testosterone level will be measured by reported HPTLC method. Results indicated that 1000 µg/ml of *Pueraria tuberosa* extract was effective as compared to the other two doses, but in combination with *Piper nigrum* extract, the minimum concentration (10 µg/ml) of *Pueraria tuberosa* extract enhanced the sperm motility. Thus, the study revealed the synergy effect of *Pueraria tuberosa* extract with *Piper nigrum* extract.

HTP013

Herbal Remedies for Management of Menopausal Symptoms

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Menopause syndrome is the most common gynecological problem which is found in women between the ages of 45-50 years. Most common problem is the hot flashes or the gynecological disorders like dysmenorrhea and other symptoms like mood swings, sleep disturbances, night sweats, insomnia, irritability, palpitations and headache. Hormone therapy is one of the commonly used and efficacious treatments for reducing complications associated with menopause but it can induce increased risk of breast cancer and coronary heart disease. Phytoestrogens are non-steroidal plant components, which are similar to estrogens in structure and function. Phytoestrogens include flavones, lignans, and coumestan. Phytoestrogens can be obtained in form of Isoflavones from soy and red clover, as lignans from flaxseed and from Hops (*Humulus lupulus*). Several studies have indicated that regular consumption of phytoestrogens in the diet of Asian women has led to a reduction in menopausal symptoms. Literature review showed that the medicinal plants which include Sage herb (Salvia officinalis), *Lemon balm* (Melissa officinalis), *Valerina officinalis*, *Black cohosh* (Cimicifuga racemosa), *Fenugreek* (Trigonella foenum-graecum), *Black cumin* (Nigella sativa), *Fennel*

(Foeniculum vulgare), *Evening primrose* (Oenothera biennis), *Ginkgo biloba*, *Alfalfa* (Medicago sativa), *Hypericum perforatum*, *Panax ginseng*, *Pimpinella anisum*, *Licorice* (Glycyrrhiza glabra)were found to be effective in the treatment of acute menopausal syndrome with different mechanisms. Nevertheless, further studies and clinical trials are required in order to use these medicinal herbs as an original or alternative treatment for acute menopausal syndrome in the near future.

HTP014

Herbal Nano Formulations for Management of Atopic Eczema

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Eczema is a chronic inflammatory skin condition marked by erythema, severe itching, and compromised skin barrier function. The disease is triggered by genetic and environmental factors which affect the integrity of the skin barrier thus increasing the susceptibility of skin to increased penetration by several pathogens which worsens the condition. While conventional therapies often relieve symptoms, there are still issues with maintaining effectiveness and reducing side effects. Nano formulations make precise use of nanotechnology to encapsulate therapeutic drugs, improving their bioavailability and focused delivery to the affected layers of the skin. This strategy aims to maximise therapeutic effect while minimising systemic exposure and potential side effects. Nano-sized carriers, such as nanoparticles, solid-lipid nanoparticles, nanocrystals, nano sponges, phytosomes, nanofibers, liposomes, dendrimers, nano emulsion, and nanosuspension, are effective in protecting encapsulated compounds, prolonging their release, and facilitating skin penetration. The addition of moisturisers, skin barrier repair ingredients and anti-inflammatory compounds to the nano composition provides better and effective treatment for eczema. Natural products like flavonoids, terpenoids, glycosides, alkaloids and tannins offer safe and effective management of atopic eczema. To increase the efficacy of such natural ingredients in Atopic dermatitis treatment, various nanotechnology-based formulations have been developed in recent years. This review focusses on various nano formulations which have been successfully formulation over the past years like Quercetin nanostructured lipid carriers; solid lipid nanoparticles loaded with capsaicin, curcurmin, and resveratrol; nanoparticles of epigallocatechin-3-gallate; transfersomes loaded with glycyrrhizic acid, phytosomes with *Centella asiatica* extract, nanocapsule-based films of pomegranate seed oil and ethosome-based cream of tea tree oil. The review provides an overview of previous studies related to the development of novel herbal nano formulations for the management of atopic eczema and possible applications in the future.

HTP015

The Flavour of Balance: Exploring the Interconnected Impact of Six Rasas on Tridosha

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Ayurveda, an ancient system of medicine, emphasizes the balance of three doshas - Vata, Pitta, and Kaph as a key to overall health. This study investigates the impact of six tastes or Rasas (Sweet, Sour,

Salty, Pungent, Bitter, and Astringent) on the equilibrium of these doshas. Understanding the interplay between Rasas and Tridoshas is crucial for promoting holistic well-being according to Ayurvedic principles. The study revealed nuanced interactions between Rasas and Tridoshas. Sweet and Sour tastes were found to pacify Vata, while Pungent and Bitter tastes aggravated it. Pitta was alleviated by Sweet and Astringent tastes but aggravated by Sour and Pungent tastes. Salty and Sour tastes were observed to balance Kapha, whereas Sweet and Astringent tastes exacerbated it. The findings underscore the importance of dietary choices in maintaining doshic harmony. Customizing diets based on individual constitutions and imbalances can contribute to preventive and therapeutic healthcare approaches in Ayurveda. Further research is warranted to validate and expand upon these observations, offering a more nuanced understanding of the intricate relationship between Rasas and Tridoshas for improved holistic health management.

HTP018

Exploring Natural Compounds as Adjuvant to Conventional Therapies in Inflammatory Joint Diseases

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Inflammation is the reactive process to immune system occurred by any infection and injury as well to the biological system. Indications propose that the regulation of diverse inflammatory cytokines and non-cytokine mediators mediates the anti-inflammatory impact. Inflammatory joint diseases cause joint dysfunction at different stages and also other organs as well. The major factors responsible for disease are weight gain, genetics of individual, improper lifestyle and sometimes age related and environmental affected too. The current treatment of joint disorders involves synthetic drugs which are associate unbearable side effects. These adverse effects provoke patients to search for alternative drugs. The aim of present study mainly includes the use of natural compounds present in the traditional herbal drugs as adjuvant drug therapies in the inflammation associated join disease such as rheumatoid arthritis. The herbal drugs such as *Aloe barbadensis, Boswellia serrata, Piper nigrum, Curcuma longa* are proved beneficial in inflammatory disorders as evaluated previously by researchers. In addition, some isolated phytoconstituents like luteolin, quercetin, berberine, ferulic acid have suppressed the levels of pro-inflammatory cytokines such as tissue necrosis factors, interleukins and cyclo-oxygenase in preclinical evaluation and proved valuable in suppressing inflammatory disorders as reported earlier. The role of phytocompounds in promoting status of patient health is also explored in this study.

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NT- NextGen Therapeutics

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TM- Translational Medicines

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HT- Herbal Technology

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