



ICDDTM'25

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3rd
Announcement

INTERNATIONAL CONFERENCE ON DRUG DISCOVERY AND TRANSLATIONAL MEDICINE 2025 (ICDDTM'25)

**Fostering Global Interdisciplinary Collaboration for
Sustainable Innovation in Drug Discovery and Translational Medicine**

Pre-Conference Workshops: 24th - 25th November 2025 | Main Conference: 26th - 27th November 2025

Hospital Sultan Abdul Aziz Shah (HSAAS), Universiti Putra Malaysia (UPM), Selangor



Early-Bird Registration



**10% off for group registrations
of more than or equal to 10 pax**

<https://icddtm25.macr-cancer.org>

All abstracts will be published in Medicine and Health journal (indexed in WoS).

About ICDDTM'25

The future of healthcare innovation depends on dismantling silos and fostering global interdisciplinary collaboration to tackle complex medical challenges.

This conference will focus on addressing these challenges through dedicated tracks on cancer, infectious diseases, inflammatory and metabolic diseases, mental health and neurodegeneration, as well as the transformative potential of emerging technologies like artificial intelligence. By prioritising sustainable global partnerships, integrating diverse expertise, and harnessing technological advancements, the conference aims to accelerate the translation of research into impactful healthcare solutions.

Through keynote addresses, panel discussions, and interactive workshops, participants will gain valuable insights into cutting-edge practices shaping the future of medicine. Together, we aspire to drive transformative progress and create a healthier, more equitable world.

ICDDTM'25 Plenary Speakers



Prof. Dr. Chas Bountra
(Pro-Vice Chancellor for Innovation)
Expertise: Translational Medicine
University of Oxford, England



Prof. Dr. Christopher Twelves
(Honorary Consultant in Medical Oncology)
Expertise: Early & Late Phase Clinical
Cancer Trials
Leeds University, United Kingdom



Prof. Dr. Karolien De Bosscher
(Principal Investigator, VIB Center for
Medical Biotechnology)
Expertise: Nuclear Receptor Signalling
Ghent University, Belgium

Special Plenary Lecture



Prof. Dr. K. Miraz Rahman
(Professor of Medicinal Chemistry)
Expertise: Drug Design & Synthesis
King's College London, United Kingdom



Prof. Dr. Roger Ho Chun Man
(Senior Consultant Psychiatrist)
Expertise: Psychiatry
National University of Singapore, Singapore

ICDDTM'25 Invited Speakers



Prof. Dr. Paul Ho Chi-Lui
(Professor of Pharmacy)
Expertise: Pharmaceutical Science
Monash University, Malaysia



Prof. Dr. Hasniza Zaman Huri
(Deputy Vice Chancellor for Academic)
Expertise: Precision Medicine
Universiti Malaysia, Malaysia



Prof. Dr. Zamberi Sekawi
(Deputy Vice Chancellor for Research &
Innovation)
Expertise: Medical Microbiology
Universiti Putra Malaysia, Malaysia



Prof. Dr. Amedeo Amedei
(Head of Diabetes Care Unit at UMMC)
Expertise: Immunology
University of Florence, Italy



Prof. Dr. Mohd Cairul Iqbal Mohd Amin
(Professor of Pharmacology)
Expertise: Pharmacology
Universiti Kebangsaan Malaysia, Malaysia



Prof. Dr. Claire Wells
(Professor of Cancer Cell Biology)
Expertise: Cancer Cell Biology
King's College London, United Kingdom



Prof. Dr. Lim Lee Ling
(Head of Diabetes Care Unit at UMMC)
Expertise: Diabetes Care
Universiti Malaysia, Malaysia



Prof. Dr. Lim Shen-Yang
(Consultant Neurologist at UMMC)
Expertise: Neurology
Universiti Malaysia, Malaysia



Dr. Muthukkumaran Thiagarajan
(President of Malaysian Oncological Society,
Medical Doctor)
Expertise: Clinical Oncology
Hospital Kuala Lumpur, Malaysia



Dr. Lin Kool Ong
(Senior Lecturer in Biomedical Science)
Expertise: Translational Neurorecovery
University of Southern Queensland, Australia



Dr. Vijay Ivaturi
(Co-Founder & CEO)
Expertise: Pharmacometrics
Pumax-AI Inc, USA

IMPORTANT DATES

24 AUG 2025	Early-Bird Registration Deadline
24 SEPT 2025	Normal Rate Registration Deadline
24 SEPT 2025	Abstract Submission Deadline
24-25 NOV 2025	Pre-Conference Workshops
26-27 NOV 2025	ICDDTM'25 Conference

ICDDTM'25 Tracks

**Cancer | Infectious Diseases |
Inflammatory & Metabolic Diseases |
Mental Health / Neurodegeneration |
Miscellaneous - Drug Design / Medicinal
Chemistry / Drug Delivery / Clinical
Pharmacy**

Who Should Attend?

Academics, clinician scientists,
medical doctors, pharmacists, health
policy-makers, industrial players,
researchers, postdoctoral fellows,
science enthusiasts, scientists,
technologists, undergraduate &
postgraduate students.

ICDDTM'25 Activities

PRE-CONFERENCE WORKSHOPS

The workshops will focus on key drug
discovery skills, including data
analytics, artificial intelligence, clinical
trials, and using technology to
enhance productivity, sustainability,
and promote cross-boundary
collaboration in translational research.

Main Organiser



Local Organising Partners



International Organising Partners



Sponsors



For further information: Dr. Chua Eng Wee (Secretary)

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O-CAN-002

Comprehensive Analysis and Evaluation of Toxic Contaminants in Rice Grains and Their Association with Potential Cancer Risk in Human Health

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ABSTRACT

Arsenic contamination in rice poses a significant public health concern, particularly in countries with high rice consumption such as Indonesia. The use of contaminated groundwater for paddy field irrigation has been identified as a primary pathway through which arsenic enters the food chain. This study aimed to analyse and evaluate arsenic concentrations in organic rice samples collected from multiple regencies across North Sumatra Province. A descriptive study design was utilised to evaluate and characterise arsenic contamination in 39 organic rice samples, comparing white, red and brown rice varieties. These samples were collected from 13 regencies representing diverse agroecological zones within North Sumatra. To assess the potential health risk associated with arsenic exposure, daily intake and excess cancer risk (ECR) were estimated based on the average rice consumption and body weight of Indonesian population. The total arsenic content in the organic rice samples was quantified using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). A total of 39 rice samples including white, red, and brown rice were collected from 13 regencies and analysed for total arsenic content. The findings revealed a wide range of arsenic concentrations across rice types and regions. White rice samples generally contained arsenic levels below the World Health Organisation (WHO) safety limit of 0.3 mg/kg, ranging from 0.0011 to 0.0084 mg/kg. In contrast, red rice exhibited the highest levels of contamination, with 11 out of 13 samples exceeding the safety threshold, some surpassing 0.9 mg/kg. Brown rice showed intermediate arsenic concentrations, with several samples approaching or exceeding the permissible limit. The health risk assessment indicated that most white rice samples posed a low cancer risk ($ECR < 1 \times 10^{-5}$). Organic rice samples tended to exhibit lower arsenic levels. However, exceptions were noted, highlighting the influence of local environmental factors such as irrigation water sources and soil composition.

Keywords: Arsenic; cancer risk; food safety; ICP-MS; rice contaminant

O-CAN-007

Formulation and Characterisation of Ibrutinib-Quercetin Co-loaded Nanoparticles for Enhanced Anticancer Therapy

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ABSTRACT

Ibrutinib, an irreversible Bruton's tyrosine kinase inhibitor effective against chronic lymphocytic leukemia (CLL) and small lymphocytic lymphoma (SLL), is a biopharmaceutics classification system class II drug with poor solubility, low bioavailability (3.9%), high first-pass metabolism and a short half-life (4-6 hours). This study developed ibrutinib-loaded nanoparticles, combined with *Moringa oleifera*-derived quercetin for synergistic effect, to improve solubility, bioavailability and enable sustained release. The nanoparticles were prepared via emulsion solvent evaporation using ethyl cellulose, chitosan, and cyclodextrin with a factorial design. The study examined the effects of independent variables X1 (amount of ethyl cellulose/chitosan/cyclodextrin) and X2 (amount of tween 80) on dependent variables Y1 [drug entrapment efficiency, % drug encapsulation efficiency (DEE)] and Y2 [cumulative drug release (CDR), % CDR] utilising a 2² factorial design. Formulations were analysed for percentage of DEE, percentage of CDR, particle size (nm), surface morphology, zeta potential, fourier-transform infrared (FTIR) spectroscopy and differential scanning calorimetry (DSC). 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assays and qualitative assessments of cytotoxicity on HeLa cells were conducted through *in vitro* cell culture. After 8 hours of dissolution, the maximum drug releases observed were 93.5% (FCHTM8), 85.5% (FCHT3), and 88.0% (FCDTM7), while the minimum drug releases were 63.0% (FECT6), 78.0% (FECTM4), and 70.5% (FCHT7), respectively. Scanning electron microscopy (SEM) studies indicated that the nanoparticles exhibited a spherical morphology and a smoother surface. Particle size (FCHTM8-210.2; FCDT4-533.5) was within the ideal range for nanoparticles. Zeta potential assessments demonstrated that the formulations possessed excellent physical stability. Additionally, FTIR and DSC analysis showed no significant interaction between the drug and polymer. MTT assay on HeLa cells were attributed to the best formulations based on the highest percentages of DEE and CDR. Cell proliferation was significantly reduced ($p < 0.05$), demonstrating the efficacy and synergistic effect of ibrutinib-loaded nanoparticles and quercetin on HeLa cell compared to pure drugs. Results indicate that the polymeric nanoparticles of ibrutinib combined with quercetin are promising candidates for enhancing drug release, solubility, and bioavailability, thereby contributing to safe and effective treatment of cancer.

Keywords: Anticancer; ibrutinib; nanoparticles; quercetin

O-CAN-020

Real-World Analysis of Prognostic Factors for First-Line Osimertinib Efficacy in Chinese Non-Small Cell Lung Cancer Patients with EGFR Mutation

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ABSTRACT

Osimertinib is the first-line treatment for advanced non-small cell lung cancer (NSCLC) patients with epidermal growth factor receptor (EGFR) mutations and is also administered as a second-line option. However, concurrent gene mutations and other clinical factors like age, gender, smoking, alcohol and neutrophil-to-lymphocyte ratio (NLR) have been shown to significantly affect treatment outcomes. This study analysed the association between gene mutations and clinical response to first-line osimertinib in 184 EGFR-mutant NSCLC patients, with clinical and genetic data collected retrospectively and prospectively from Affiliated Hospital of Binzhou Medical University, Yantai Affiliated Hospital of Binzhou Medical University and Yuhuangding Hospital. Non-parametric tests, Kaplan-Meier survival analysis and Cox regression models with both forward and backward stepwise selection were used to evaluate prognostic factors. The median progression-free survival (PFS) was 12 months (95% CI: 10.525–13.475). Concurrent mutations were identified in 16.3% of all patients, with *TP53* (4.89%), *MET* (2.17%) and *PIK3CA* (2.17%) being the most common. For non-parametric tests, overall, patients with concurrent mutations had a significantly shorter median PFS compared to those without (median PFS: 8.0 months, 95% CI: 7.25–8.75 vs. 13.0 months, 95% CI: 11.42–14.59; $p < 0.001$). Furthermore, when comparing patients with concurrent mutations to those without, significant differences were observed for both *TP53* ($p = 0.010$) and *MET* ($p = 0.029$). Kaplan-Meier curves also demonstrated similar outcomes (log-rank $P < 0.05$). In Cox regression analysis, concurrent mutation was identified as the only independent prognostic factor, consistently retained in both forward and backward stepwise models (HR = 2.426, 95% CI: 1.514–3.890, $p < 0.001$). Concurrent gene mutations is an independent predictor of prognosis in EGFR-mutant NSCLC patients treated with first-line osimertinib. *TP53* and *MET* were significantly associated with poor prognosis.

Keywords: Concurrent mutation; EGFR mutation; NSCLC; osimertinib; prognostic factors

O-CAN-023

Effects of Zerumbone on the Invasiveness of Breast Cancer Cells under DMOG-induced Hypoxia

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ABSTRACT

The hypoxic tumour microenvironment, regulated by HIF-1 α , plays a critical role in breast cancer progression, and although zerumbone (ZER) shows anti-cancer properties, its activity under hypoxia remains poorly understood. This study examined ZER's effects on migration and invasion of breast cancer cells under normoxia and dimethyloxalylglycine (DMOG)-induced hypoxia. IC₂₀ values for MCF-7 and MDA-MB-231 cells under both conditions were determined via 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide assay, and invasion or migration were assessed using Transwell assays with Matrigel-coated and uncoated inserts, alongside 3D spheroid invasion assays. In MCF-7 cells, ZER at 25 μ M and 50 μ M significantly reduced invasion under both normoxia and hypoxia ($p < 0.0001$), while migration was significantly reduced only at 50 μ M ($p < 0.01$). In MDA-MB-231 cells, ZER significantly inhibited invasion under normoxia at 12.5, 25, and 50 μ M, but under hypoxia only at 25 and 50 μ M. Migration was significantly suppressed under normoxia at 12.5, 25 and 50 μ M, but under hypoxia only at 50 μ M. In 3D spheroid models, ZER showed limited anti-invasive effects at lower doses but caused spheroid disintegration at higher doses. These findings suggest ZER holds potential as an alternative to conventional chemotherapy, but hypoxia and 3D tumour spheroid architecture limit its efficacy, warranting further studies using hypoxic 3D models to better define its therapeutic potential in breast cancer.

Keywords: Breast cancer; DMOG-induced hypoxia; invasion; zerumbone; 3D tumour spheroids

O-CAN-030

Chitosan Nanogels as pH-Responsive Nanocarriers for Transcytosis-Driven 5-FU Delivery in Colorectal Cancer

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ABSTRACT

Colorectal cancer (CRC) is a major global health burden with rising incidence in Malaysia. While 5-fluorouracil (5-FU) remains a chemotherapy mainstay, its efficacy is limited by rapid clearance, off-target toxicity, and poor tumour penetration. Chitosan-based nanogels (CSNG) offer promising drug delivery properties, but endothelial barriers in the tumour microenvironment (TME) often hinder their effectiveness, and transcytosis - an active transport pathway relevant to nanoparticle delivery - remains underexplored in CRC. This study investigated transcytosis-mediated uptake and therapeutic activity of 5-FU-loaded CSNG in CRC cells. CSNG were synthesised via ionic gelation and characterised for physiochemical properties, with pH-responsive drug release assessed at gastric, TME, and physiological pH. Anticancer activity was evaluated in 2D cultures (HCT-116 CRC cells and CCD-112 normal colon cells) and a 3D co-culture spheroid model with HCoMEC endothelial cells. Transcytosis and uptake were assessed via transport assays and fluorescence imaging. CSNG

showed uniform size distributions (254 ± 3 nm unloaded, 176 ± 11 nm loaded), good colloidal stability, and $69.1 \pm 0.4\%$ loading efficiency. Drug release was pH-responsive, peaking at TME-relevant pH 6.5 (43%). CSNG-5FU selectively reduced HCT-116 viability (25%) while sparing CCD-112 cells (76%); unloaded CSNG were non-toxic. About 45% of CSNG transcytosed the endothelial barrier, and in co-culture spheroids, CSNG-5FU suppressed tumour growth by ~40%. Despite greater CSNG internalisation in CCD-112 cells, selective cytotoxicity in HCT-116 cells indicates pH-triggered release drives efficacy. CSNG-5FU can cross endothelial barriers and selectively deliver 5-FU to CRC via transcytosis, representing a promising strategy to enhance targeted therapy while reducing systemic toxicity.

Keywords: Chitosan nanogels; colorectal cancer; systemic toxicity; targeted drug delivery; 5-fluorouracil

O-CAN-036

Genome-wide Polygenic Risk Scoring for Colorectal Cancer: Chromosome-level Insights in an East Asian Cohort

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ABSTRACT

Polygenic risk scores (PRS) aggregate effects of multiple genetic variants to quantify inherited disease susceptibility, but most PRS models, developed in European populations, may have reduced predictive validity in East Asian cohorts. This study established a genome-wide PRS workflow for colorectal cancer (CRC) using harmonised public genome-wide association study data and an East Asian-specific reference panel (1000 Genomes EAS subset). Genotype data were preprocessed in PLINK2, and polygenic scoring was performed using PRSice-2 with a clumping-and-thresholding approach (250 kb, $r < 0.1$) across all 22 autosomes, with chromosome-specific PRS computed independently and assessed via quantile and correlation analyses. After harmonisation, 6.09 million variants were retained. The overall PRS was approximately normally distributed (mean = 43.65 ± 3.42 ; range = 27.99–54.62), with a 9.14-point difference between top and bottom quintiles (47.92 vs 38.77), indicating clear separation of genetic risk. Chromosome-level analysis showed moderate positive contributions across multiple loci, with chromosomes 7, 9, 18 and 19 showing the strongest associations ($r = 0.086$ – 0.065), suggesting CRC genetic risk arises from dispersed polygenic effects rather than single-chromosome dominance. This work delivers a reproducible, ancestry-aligned PRS workflow optimised for East Asian genomic architecture, highlighting the translational value of polygenic scoring for population-level cancer risk stratification and locally calibrated precision oncology models.

Keywords: Colorectal cancer; East Asian population; genome-wide analysis; polygenic risk score; PRSice-2

O-IFD-001

Gamma-lactams: A Novel Antibiotic Class on the Horizon?

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ABSTRACT

Methicillin-resistant *Staphylococcus aureus* (MRSA) exhibits multidrug resistance, and with only a few effective antibiotics remaining, novel agents are urgently needed. Gamma-lactam compounds, featuring a 5-membered carbon ring unlike 4-carbon beta-lactams, represent one such class. HCD1, a novel gamma-lactam, showed strong antibacterial activity (MIC < 8 µg/mL) against 90 MRSA and 20 Methicillin-susceptible *Staphylococcus aureus* isolates. This study evaluated HCD1's antibacterial, safety, and efficacy properties using in vitro and in vivo models, including time-kill, single-step film-forming and cytotoxicity assays, alongside acute/sub-acute toxicity, survival rate and ED₅₀ determination in animal studies, plus gene expression analysis of an exposed MRSA isolate. HCD1 demonstrated bactericidal activity with low toxicity (IC₅₀ > 300 µg/mL against WRL-68 and Vero cells), and no resistant mutants emerged up to 16x MIC. In SD rats, single-dose (2000 mg/kg) and repeated-dose (125 mg/kg) toxicity evaluations showed no mortality or behavioural changes. HCD1 achieved an 83% survival rate in MRSA-infected mice, with an ED₅₀ of 38.76 mg/kg. Transcriptomic analysis indicated HCD1 disrupts MRSA survival by repressing energy production and dysregulating transmembrane transporters and biofilm formation. These findings support gamma-lactam compounds as promising candidates for safe and effective novel anti-MRSA antibiotics.

Keywords: Acute toxicity; animal model; MRSA; novel antibiotic; systemic infection

O-IFD-007

The Antibacterial Effect of Gallic Acid Loaded Graphene Oxide Nanocomposite against Methicillin Resistant *Staphylococcus aureus* and its Potential Mechanisms of Action

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ABSTRACT

Methicillin-resistant *Staphylococcus aureus* (MRSA) is known as one of the top perilous pathogens. Recent studies have reported that carbon-based nanosheets exhibit antibacterial activity against different bacteria, including MRSA. Gallic acid-loaded graphene oxide (GAGO), a carbon-based nanoformulation has shown antibacterial activity against MRSA. This study aimed at elucidating the antibacterial effects of GAGO and its potential mechanisms of action against MRSA. GAGO was synthesised, characterised and shown to be stable for up to 90 days. Antibacterial activity was evaluated through disk diffusion, colony-counting method and time-kill study. The mechanism of action was evaluated by high resolution transmission electron microscopic (HRTEM) observation, membrane disruption and leakage of DNA and protein, as well as reactive oxygen species (ROS) generation. Quantification of *mecA* gene expression and transcriptomic analysis were also performed to determine the molecular mechanisms of GAGO against MRSA. The ability of GAGO to reduce intracellular survival of MRSA in THP-1 macrophages was also assessed. GAGO (300 µg/mL) inhibited MRSA by damaging the cell wall and membrane, leading to the leakage of intracellular components and irreversible morphological changes. It also induced ROS production, even though less effectively than gallic acid (GA) or graphene oxide (GO) alone. Furthermore, GAGO (300 µg/mL) also did not affect the *mecA* expression, thereby not inducing resistance. Transcriptomic analysis revealed broad effects of GAGO (300 µg/mL) on multiple genes and pathways, impairing MRSA's defense responses and reducing its ability to develop resistance. Additionally, GAGO demonstrated potential in targeting intracellular MRSA, even though toxicity to THP-1 macrophages was observed.

The present study highlights the antibacterial potential of GAGO against MRSA and its multiple mechanisms of action. Further optimisation is required to improve its safety and efficacy, but GAGO shows promise as a novel antimicrobial agent to combat antibiotic resistance.

Keywords: Antibacterial; antibiotic resistance; gallic acid; GAGO; graphene oxide; MRSA

O-IMT-001

Inhibition of Endoplasmic Reticulum Stress Improves Acetylcholine Mediated Relaxation in the Aorta of Type-2 Diabetic Rats

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ABSTRACT

Endoplasmic reticulum (ER) stress contributes to endothelial dysfunction and vascular complications in type-2 diabetes (T2DM). This study examined ER stress in endothelial regulation and evaluated the therapeutic potential of Tauro-ursodeoxycholic acid (TUDCA) in restoring vascular function in a rat model of T2DM, induced via high-fat diet and low-dose streptozotocin in male Sprague-Dawley rats. Rats were divided into control (CON), diabetic (DM) and TUDCA-treated diabetic (DMT, 150 mg/kg/day i.p.) groups. After 15 weeks, aortic endothelium-dependent relaxation was assessed via organ bath, alongside Western blotting for binding immunoglobulin protein (BIP), phosphor-ERK

(PERK), endothelial nitric oxide synthase (eNOS), and protein kinase B (Akt) and enzyme-linked immunosorbent assay for oxidative stress markers [superoxide dismutase (SOD), malondialdehyde (MDA)] and inflammatory cytokines (TNF- α , IL-6). DM rats showed impaired acetylcholine-mediated relaxation ($42.57 \pm 5.05\%$) via eNOS/PI3K/Akt and nicotinamide adenine dinucleotide phosphate (NAD(P)H) pathways, while TUDCA significantly improved relaxation in DMT rats ($84.91 \pm 10.32\%$), nearing control levels ($89.89 \pm 4.90\%$) through eNOS/PI3K/Akt, NAD(P)H and ATP-sensitive potassium channels channels. Elevated BIP and PERK expression in DM rats (1.07 ± 0.07 and 0.88 ± 0.09) indicated increased ER stress, which TUDCA reduced (0.44 ± 0.12 and 0.56 ± 0.10) while restoring eNOS and Akt expression. SOD activity and MDA levels, elevated in DM rats, showed partial reduction with TUDCA, while IL-6 remained unchanged, suggesting redundancy in inflammatory signalling. These findings establish ER stress as a key driver of endothelial dysfunction in T2DM and highlight TUDCA as a promising therapeutic agent for restoring vascular function, warranting further dose-response and long-term studies.

Keywords: Endothelial cell dysregulation; endoplasmic reticulum stress; tauro-ursodeoxycholic acid (TUDCA); type-2 diabetes; vascular complications

O-IMT-002

Evaluation of *Cinnamomum zeylanicum* Extracts Effects on Non-Alcoholic Fatty Liver Disease in High Fat Diet-Fed Mice Model

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ABSTRACT

Non-alcoholic fatty liver disease (NAFLD) is a leading metabolic disorder marked by excessive hepatic lipid accumulation and may progress to cirrhosis or liver failure. Its rising prevalence poses a global health challenge, yet only limited Food and Drug Administration-approved therapies are available. Natural products with multi-targeted effects are increasingly explored as alternatives. *Cinnamomum zeylanicum* (CZ) exhibits antioxidant, anti-inflammatory, hypolipidemic and anti-diabetic properties, indicating potential therapeutic value. This study investigates the protective effects of CZ extracts in high-fat diet (HFD)-induced NAFLD mice. Fifty male Swiss albino mice were randomly assigned into five groups: sham control (SC), negative control (NC), positive control (PC; metformin 100 mg/kg/day) and CZ-treated groups (low dose: CZ100, high dose: CZ500). Except SC, all groups were fed HFD for six weeks to induce NAFLD. Treatments were administered for another 6 weeks alongside HFD. Body weight, fasting blood glucose, oral glucose tolerance test (OGTT), lipid profile [total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL), high density lipoprotein (HDL)], liver enzyme biomarkers [aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP)], C-reactive protein (CRP) and histopathological analysis (H&E) were performed. Additionally, molecular docking assessed phytoconstituents' binding affinity to HMG CoA reductase, PPAR- α and AKT1. CZ extract significantly reduced body and liver weight, blood glucose, lipid parameters (TC, TG, LDL), liver enzymes (AST, ALT, ALP) and CRP compared to NC. Histological analysis revealed amelioration of steatosis, inflammation, and hepatocellular damage in CZ-treated groups, with higher efficacy observed in CZ500. Docking studies demonstrated strong interactions of eugenol acetate derivative with HMG CoA reductase (-7.5 kcal/mol), PPAR- α (-9.5 kcal/mol) and AKT1 (-8.8 kcal/mol), indicating its molecular role in lipid regulation and hepatoprotection. Ethanolic extracts of CZ demonstrated significant therapeutic effects against NAFLD in HFD-fed mice through improvements in biochemical, histological and molecular parameters, supporting its potential as a natural candidate for managing chronic metabolic liver diseases.

Keywords: *Cinnamomum zeylanicum*; high-fat diet; molecular docking analysis; non-alcoholic fatty liver disease

O-IMT-004

Enhanced Permeation and Sustained Delivery of Bioactive Molecule for Diabetic Retinopathy: A Comparative Evaluation of Two Nanoparticulate Approaches

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ABSTRACT

Diabetic retinopathy (DR) is a progressive microvascular disease associated with diabetes, which can result in blindness and visual impairment. Low bioavailability and rapid precorneal elimination create problems in effective long-term ocular medication. To provide prolonged ocular delivery for the treatment of DR, this study aimed to develop and evaluate nanoparticulate systems using bioactive (BIA) derived from *Nigella sativa*. Using Soxhlet extraction and maceration processes, BIA has been extracted from *Nigella sativa* seeds. A high-purity fraction was then obtained by purification using chromatographic techniques. Thin layer chromatography (TLC), ultra violet-visible (UV-Vis) spectroscopy, differential scanning calorimetry (DSC), fourier transform infrared spectroscopy (FTIR), and powder X-ray diffraction (P-XRD) were used to describe the physicochemical characteristics of the purified BIA after it had been concentrated using rotary evaporation at a lower pressure. For nanoemulsion hydrogel system, based on solubility and emulsification capability, coconut oil, Span 20, Tween 80 and hydrophilic polymer were selected as key ingredients. A low-energy stirring technique was used to develop the nanoemulsion. The developed nanoemulsion was added to a hydrogel matrix made of hydrophilic polymers to improve eye retention and maintain drug release. In addition to this, also developed microneedle incorporated polymeric nanoparticles containing BIA. The DSC, FTIR and P-XRD analyses showed no distinct interactions with excipients and TLC verified the purity of the isolated BIA. Both formulations were evaluated based on their specific parameters and compared for physicochemical properties, drug loading, adhesion and *in-vitro* drug release kinetics to determine the most effective system for sustained ocular drug delivery. The developed nanoparticles showed excellent encapsulation efficiency, low polydispersity index and a uniform droplet size below 200 nm. *In-vitro* release experiments showed a sustained drug diffusion profile over a long period. In the management of diabetic retinopathy, the optimised nanoparticulate systems showed promising physicochemical stability, increased bioavailability, and sustained drug release, making it a viable option for efficient ocular deliveries of selected BIA.

Keywords: Bioavailability; diabetic retinopathy; hydrogel; microneedles; nanoemulsion

O-IMT-005

Pharmacogenomic Predictors of Methadone-Induced Sexual Dysfunction in Malaysian Male Opioid Users

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ABSTRACT

Opioid Use Disorder (OUD) is a major global health challenge. In Malaysia, methadone maintenance therapy (MMT) is a primary treatment, but it is frequently associated with sexual dysfunction (SD), adversely affecting treatment adherence and quality of life. However, current evidence on the genetic underpinnings of methadone-induced SD remains scarce, particularly within the Malaysian population, whose unique genetic ancestry may influence these risk associations. Most prior pharmacogenomic studies in OUD have focused on treatment efficacy or addiction risk, leaving the genetic predictors of debilitating side effects like SD largely unexplored. To address this gap, this study explored the relationship between genetic polymorphisms and SD in Malaysian men on MMT. A cross-sectional study was conducted with 121 male participants (aged 18-60) on stable methadone doses for ≥ 3 months. Sexual function was assessed using the International Index of Erectile Function (IIEF-15) and the Sexual Desire Inventory (SDI-2). Testosterone and prolactin levels were measured from blood samples. Forty-six SNPs across OPRM1, ABCB1, COMT and SHBG genes were genotyped. Multivariate regression adjusted for confounders, with Bonferroni correction for multiple comparisons. Of the 121 patients, 40 (33.1%) had low testosterone. Significant associations were identified between specific SNPs and testosterone levels, including variants in ABCB1 (rs2235067, rs2032583), OPRM1 (rs2075572), SHBG (rs727428) and COMT (rs6269). Furthermore, MMT-induced SD was significantly associated with polymorphisms in OPRM1 (rs12209447, rs3778152), DRD4 (rs12720390), ABCB1 (rs2235015), SHBG (rs1799941) and COMT (rs4680). This study demonstrates that genetic variability significantly influences the risk of methadone-induced SD and hormonal changes. These findings highlight the potential of pharmacogenomic profiling to identify patients at high risk for this side effect, enabling more personalised treatment strategies to improve adherence and quality of life in OUD management.

Keywords: Genetic polymorphisms; methadone; opioid use disorder; pharmacogenomics; sexual dysfunction

O-IMT-012

Association of SLC2A2 and OCT1 Polymorphisms with Risk of Type 2 Diabetes and Pharmacogenomics Response of Metformin in Bangladeshi Indigenous Population

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ABSTRACT

As the prevalence of type 2 diabetes mellitus (T2DM) in Bangladesh is rising drastically, understanding of the genetic relevance with this disorder is essential for developing novel therapeutics like personalised medicine. Thus, in this study, we aimed to explore the association of two polymorphisms in the solute carrier family 2 member 2 (SLC2A2) gene, rs8192675 (T>C) and rs5404 (C>T), with diabetes susceptibility and related complications accompanied by two polymorphisms of Organic Cation Transporter 1 (OCT-1), rs12208357 and rs628031, with pharmacogenomics of metformin in the indigenous peoples residing in the Chittagong Hill Tracts of Bangladesh. In line with STROBE guidelines, a case-control study involving face-to-face interviews followed by blood collection was conducted on 500 indigenous adults (250 T2DM patients: case and 250 normoglycemic people: control). The blood samples were analysed for genotyping of SLC2A2 SNPs rs8192675 by Tetra-primer Amplification-Refractory Mutation System-Polymerase Chain Reaction (ARMS-PCR) and rs5404 by Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP), as well as OCT-1 SNPs by PCR-RFLP followed by validation by Sanger sequencing, and calculated with logistic regression and non-parametric tests. Both of the rs8192675 C and rs5404 T alleles were predominant in cases and significantly associated with disease susceptibility (OR: 2.35 and 3.99, respectively). In rs8192675, heterozygous T/C (OR: 3.24) and homozygous C/C (OR: 6.62) genotypes showed strong association while C/T genotype of rs5404 T allele (OR: 5.72) linked significantly with the exposure of T2DM. Among concomitant comorbidities, the rs8192675 genotype showed moderate associations while rs5404 heterozygotes represented an over-prevalence of ocular complications. Along with, OCT-1 SNPs showed significant association with metformin response. Mutant variants were predominantly present in metformin non-responders. Findings of this study

can conclude that genetic polymorphism of SLC2A2 and OCT-1 genes were strongly associated with susceptibility of T2DM and metformin responses.

Keywords: ARMS-PCR; indigenous population; metformin; single nucleotide polymorphism; type 2 diabetes mellitus

O-IMT-017

Recurrent Acute Kidney Injury in Hospitalised Adults: Incidence, Risk Factors and Outcomes - A Systematic Review and Meta-analysis

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ABSTRACT

Acute kidney injury (AKI) is a sudden decline in renal function associated with chronic kidney disease (CKD), increased mortality, and recurrent AKI. Timely identification of risk factors is critical for early intervention and prevention of recurrence. This systematic review and meta-analysis aimed to update evidence on the incidence, predictors, and outcomes of recurrent AKI in hospitalised adults. A systematic literature search was conducted across PubMed, Scopus, Ovid MEDLINE, Virtual Health Library, Web of Science and Google Scholar for studies published between February 2018 and June 2024. Eligible studies examined risk factors for recurrent AKI in hospitalised adults. Study quality was assessed using the Newcastle-Ottawa Scale. Data were extracted into Excel and analysed using Comprehensive Meta-Analysis (CMA) software to estimate pooled effect sizes with 95% confidence intervals (CI). The protocol was registered in PROSPERO (CRD42024572504). Seven studies comprising 160,898 patients were included. The pooled incidence of recurrent AKI was 22.8% (95% CI: 0.19–0.27). Significant continuous predictors included elevated blood urea nitrogen (MD = 6.45, 95% CI: 3.20–9.69), reduced haemoglobin (MD = 0.54, 95% CI: –0.74 to –0.34), and higher baseline serum creatinine (MD = 0.13, 95% CI: 0.04–0.22). Categorical predictors included male sex, diabetes, and pre-existing cardiovascular, liver, cerebrovascular, and respiratory conditions. Recurrent AKI was associated with increased mortality (OR = 2.81, 95% CI: 1.77–4.47) and prolonged hospital stay (MD = 1.01 days, 95% CI: 0.89–1.12). Meta-regression identified publication year as a source of heterogeneity ($p = 0.004$). Recurrent AKI is a prevalent clinical complication with adverse outcomes. Early risk identification and structured monitoring strategies are essential to reduce recurrence and improve patient outcomes.

Keywords: Acute kidney injury; incidence; outcomes; recurrent AKI; risk factors

O-IMT-022

Anti-angiogenesis Potential and Molecular Simulation of New Diarylpentanoid Analogue as TLR4 Antagonist

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ABSTRACT

Angiogenesis is the process of the formation of new blood vessels from existing blood vessels. Angiogenesis can lead to tumour growth and metastasis. The angiogenesis signalling is associated with the activation of TLR4/MD-2, which initiates overexpression of the angiogenesis marker, vascular endothelial growth factor (VEGF). Hence, the inhibition of the TLR4/MD-2 signalling serves as a potential strategy to attenuate angiogenesis to control tumour growth and metastasis. Two new diarylpentanoid analogues, N6 and N8, were previously reported as an MD-2 inhibitor that block lipopolysaccharide (LPS)-induced TLR4 activation in breast cancer cells. This study aims to elucidate the effects of these compounds on LPS-induced VEGF expression and its anti-angiogenesis effects. Drug likeness, pharmacokinetic and absorption, distribution, metabolism and toxicity (ADMET) of both compounds were predicted *in silico*. Auto dock vina and iMODS dynamic simulation were performed to predict binding affinity and stability. Selected compound N6 was then proceeded for VEGF expression *in vitro* and angiogenesis *in vivo*. N6 performs favourable drug likeness, pharmacokinetic and ADMET profiles compared to N8. Docking analysis showed that N6 forms strong and stable interactions with TLR4/MD-2 (PDB 3FXi). It attenuates LPS-induced overexpression of VEGF in breast cancer cells and suppresses LPS-induced angiogenesis *in vivo*. new diarylpentanoid analogue N6 as a potential anti-angiogenesis agent.

Keywords: Angiogenesis; chick chorioallantoic membrane; *in silico*; pharmacokinetic analysis; TLR4-MD2 complex

O-IMT-032

Preparation and Characterisation of Biocompatible Lecithin-based Andrographolide Nanoparticles: Pharmacokinetics and *In vitro* Drug Release Profile

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ABSTRACT

Andrographolide (AGP), derived from *Andrographis paniculata*, is a promising anticancer and anti-inflammatory agent due to its ability to inhibit NFκB, and regulate mucus-secreting. However, its poor oral bioavailability limits its clinical potential. Soy lecithin-based liposome nanoformulations have gained attention for their biocompatibility, high encapsulation efficiency, and controlled drug release, making them suitable for improving AGP delivery. This study aimed to develop and characterise a soy lecithin-based liposomal formulation of AGP (Lipo-AGP) and evaluate its pharmacokinetic and *in vitro* release profiles. Lipo-AGP was prepared by thin-film hydration, and particle size reduction was done using the extrusion method. Characterisation techniques included dynamic light scattering (zeta-nanosizer), Fourier transform infrared spectroscopy, and scanning electron microscopy. Pharmacokinetic studies were performed in female Balb/c mice administered a single oral dose of 2 mg/kg of lipo-AGP and AGP. Terminal blood samples were collected at various time points up to 180 minutes to measure plasma AGP concentrations for both Lipo-AGP and free AGP using high-performance liquid chromatography. *In vitro* drug release was assessed in simulated intestinal fluid (pH 7.4) using dialysis tubing, with sampling over 24 hours. Lipo-AGP exhibited a vesicle size of 178.9 ± 20.8 nm, a zeta potential of -27.73 ± 1.02 mV, a polydispersity index of 0.28, and a high entrapment efficiency of 95.7%. Pharmacokinetic results showed a 1.5-fold increase in AGP absorption rate, a 2.8-fold increase in half-life, and a 58% reduction in clearance compared to the free drug. The *in vitro* release study demonstrated sustained AGP release over 24 hours. These findings indicate that lipo-AGP significantly improves oral bioavailability and provides controlled release of AGP. Soy lecithin-based liposomal nanocarriers offer a promising strategy for improving the pharmacokinetic profile and therapeutic potential of lipophilic compounds like AGP.

Keywords: *Andrographis paniculata*; andrographolide; lecithin; liposome; nanoformulation

O-IMT-036

Molecular Docking and QSA-Guided Optimisation of Quercetin Derivatives for PPAR γ Activator

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ABSTRACT

Activation of Peroxisome Proliferator-Activated Receptor gamma (PPAR γ) plays an important role in enhancing insulin sensitivity for the treatment of type 2 diabetes mellitus (T2DM). Although thiazolidinediones are established PPAR γ agonists, their long-term use is limited by adverse effects such as weight gain, oedema, and cardiovascular risk. Therefore, the discovery of safer natural PPAR γ modulators is crucial. Flavonoids, particularly quercetin, have shown potential biological interactions with PPAR γ ; however, their quantitative structure–activity relationship (QSAR) and molecular mechanism of binding remain poorly characterised. This study evaluated 20 quercetin derivatives using molecular docking and QSAR analysis to identify and optimise potential PPAR γ agonists. Docking was performed using PLANTS with PPAR γ receptor (PDB ID: 6TSG) as a target, followed by a QSAR study based on 13 pharmacochemical descriptors to determine key structural factors influencing agonist activity. The study continued with disconnection analysis of the selected compound in order to propose a feasible synthetic pathway. Compound 17 (quercetin-5-O-dodecanoate) exhibited the most favourable docking score (-121.160 ± 0.669), indicating stronger binding affinity than the reference agonist rosiglitazone (-93.819 ± 0.538). Quercetin-5-O-dodecanoate interacted strongly with amino acid residues Cys285, Ser289, Leu349, and Gln286 which are essential for its agonist activity. The developed QSAR model showed excellent statistical reliability ($R = 0.991$; $Q = 0.917$; $F = 70.604$; $p < 0.0001$), confirming a robust correlation between molecular descriptors and predicted activity. Disconnection analysis demonstrated that Quercetin 5-O-dodecanoate is feasible to be synthesised through three reaction steps using a *steglich* esterification approach. This study demonstrates that quercetin derivatives, particularly quercetin-5-O-dodecanoate, have strong potential as novel PPAR γ agonists. The findings provide a predictive framework for computer-aided drug design and rational design of novel, safer anti-diabetic agents derived from flavonoid scaffolds.

Keywords: Molecular docking; PPAR γ ; QSAR; quercetin derivatives; T2DM

O-MHN-001

Targeting Myeloperoxidase for Neuroprotection: Mitigating Oxidative and Inflammatory Responses in Experimental Traumatic Brain Injury

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ABSTRACT

Myeloperoxidase (MPO), an oxidative enzyme abundantly released from neutrophil azurophilic granules, has emerged as a critical mediator of secondary injury cascades in traumatic brain injury (TBI). Pharmacological inhibition of MPO represents a potential therapeutic approach in mitigating oxidative stress, neuroinflammation, and functional impairments following TBI. In a weight drop-induced rat model of TBI, the effects of MPO inhibition were assessed using 4-aminobenzoic acid hydrazide (4-ABAH), an irreversible MPO inhibitor. A total of 30 male Sprague Dawley rats (8-12 weeks) were utilised for this study. Animals were given 4-ABAH (40 mg/kg, b.i.d., i.p.) either for one day (acute regimen) or five days (repeated regimen) after suffering from weight drop-induced TBI. Y-maze tests, actophotometer, rearing, and beam walking were among the behavioural evaluations. In addition to histological investigation, measurements were made of brain oedema, reduced glutathione, nitrite, catalase, malondialdehyde and MPO activity. TBI led to reduced glutathione and catalase levels, increased brain oedema, higher MPO activity, malondialdehyde, and nitrite levels, and impaired locomotor performance and short-term memory. Acute 4-ABAH treatment partially alleviated the TBI-induced alterations in locomotor activity (beam walking and cylinder tests) and restored malondialdehyde, nitrite, and glutathione levels but failed to attenuate brain oedema, histopathological changes, MPO activity, catalase depletion, or deficits in actophotometer and Y-maze performance. In contrast, repeated post-treatment significantly ameliorated histopathological damage, biochemical imbalances, and behavioural deficits. While acute MPO inhibition confers limited neuroprotection, repeated inhibition provides significant improvements in oxidative, inflammatory, and functional outcomes following TBI. These findings highlight MPO as a promising targeted treatment for traumatic brain damage.

Keywords: Brain oedema; myeloperoxidase; traumatic brain injury; weight-drop method; 4-aminobenzoic acid hydrazide

O-MHN-004

Pre-Treatment of MSCs with *Mucuna pruriens* Enhances Neuroregeneration in Parkinson's disease: An In Vitro, In Silico and In Vivo Analysis

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ABSTRACT

Parkinson's disease (PD) is a neurodegenerative disorder marked by dopaminergic neuronal loss in the substantia nigra, leading to dopamine deficiency and motor impairment. Current therapies are largely symptomatic, highlighting the need for regenerative and disease-modifying strategies. *Mucuna pruriens* (MP), a natural source of levodopa (L-DOPA), has shown neuroprotective and neurogenic potential. This study integrates in vitro, in silico, and in vivo analyses to evaluate the therapeutic efficacy of MP-pretreated stem cells from human exfoliated deciduous teeth (SHEDs) in PD. By network pharmacology (NP) MP-derived targets were identified and molecular docking (AutoDock Vina) was performed using L-DOPA (from MP) as the test compound against DRD2 (5CNJ), GAPDH (5LVX), COMT (5KOJ), and GRM3 (3PBL). *In vitro* studies, SHEDs were treated with hydro-alcoholic MP extract (10-100 µg/ml) in neuronal induction medium for 9 days. Neuronal differentiation was assessed morphologically at days 0, 3, 6 and 9, and confirmed by immunofluorescence staining for β-III tubulin and tyrosine hydroxylase (TH). Then Wistar rats were administered rotenone (2 mg/kg, s.c.) for 21 days to induce PD-like pathology. Post-induction, groups received intranasal MP extract, MP-pretreated SHEDs, MP-pretreated SHED secretome for 28 days. Behavioral (rotarod, open field), oxidative stress [malondialdehyde (MDA), superoxide dismutase (SOD), catalase], neurotrophic/neurotransmitter [brain-derived neurotrophic factor (BDNF), dopamine] and histological [hematoxylin and eosin (H&E)] outcomes were evaluated. NP studies suggested involvement of PI3K–Akt, apoptotic and inflammatory pathways. The L-DOPA showed strong binding affinity with DRD2 (–7.6 kcal/mol) and GAPDH (–7.3 kcal/mol), followed by COMT (–6.8 kcal/mol) and GRM3 (–6.0 kcal/mol), mapping to dopaminergic, PI3K–Akt, apoptotic and inflammatory pathways. *In vitro*, MP enhanced SHED neuronal differentiation with significant neurite outgrowth and upregulation of β-III tubulin and TH ($p < 0.01$). *In vivo*, MP-treated groups demonstrated improved motor function ($p < 0.01$), reduced oxidative stress, elevated BDNF and

dopamine ($p < 0.01$), and preservation of dopaminergic neurons. *Mucuna pruriens*–pretreated SHEDs and their secretome promote neuroregeneration via multi-target mechanisms, supporting their potential as complementary therapeutics for PD.

Keywords: *Mucuna pruriens*; network pharmacology; neuroprotection; Parkinson’s disease; SHED

O-MHN-006

In-silico Investigation of Potential Flavonoids for the Management of Alzheimer's Disease

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ABSTRACT

Alzheimer's disease (AD) is a neurodegenerative disorder which progresses with time. It is identified through cognitive decline and memory impairment. Current therapeutic options provide limited efficacy, necessitating the exploration of novel bioactive compounds. Flavonoids, a class of polyphenolic compounds derived from natural sources, are reported to possess neuroprotective properties through various mechanisms. The present work aims to investigate the potentials of some selected flavonoids in the management of AD through preliminary molecular docking studies. An in-silico approach was employed to preliminarily evaluate the binding affinities of selected flavonoids against prominent AD targets, including tau protein kinase I (TPKI), butyryl cholinesterase (BuChE), beta-secretase (BACE 1), and acetyl cholinesterase (AChE). Molecular docking was performed using AutoDock Vina (Version 1.2.7) and binding interactions were analysed. The best obtained compounds from docking studies were taken forward for MD simulation. Molecular docking revealed satisfactory binding scores, exhibiting strong interaction. Ochnaflavone showed docking scores of -10.3, -11.4, -9.236 and -8.991, which were comparable to the standard drug Donepezil (-8.141, -10.1, -7.844 and -6.702) and the co-crystal ligands (-9.215, -10.3, -8.135 and -7.824) against TPKI, BuChE, BACE 1, and AChE respectively. Stability of the complexes was confirmed through MD simulation studies. The findings suggest that flavonoids, hold promise as potential therapeutic agents for Alzheimer's disease. Their dual functionality as enzyme inhibitors and antioxidants could be taken as a basis for their further exploration and evaluation.

Keywords: Alzheimer's disease; flavonoids; MD simulation; molecular docking; neuroprotection

O-MHN-008

Nano-Based Transdermal Drug Delivery of Antipsychotics for the Management of Schizophrenia

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ABSTRACT

Schizophrenia affects roughly 24 million individuals between the ages of 15 and 30 years old globally and is considered one of the most complicated and dangerous mental illnesses. It is characterised by a variety of symptoms, involving delusions, hallucinations, disordered speech or behaviour, and cognitive impairment. It has been associated with significant impairment and can influence many aspects of life, including personal, familial, social, educational, and vocational functioning. Transdermal drug administration may be viewed as a dependable solution to challenges commonly experienced by the healthcare team and the patients themselves. Nano-formulations improve medication retention, specificity, and targeting due to their tiny particle size. They offer several advantages, including painlessness, minimum skin irritation (they do not modify the basic structure of the stratum corneum of the skin and do not disrupt the skin barrier function), and enhancing macromolecular drug penetration. The invasomes were prepared by the thin film hydration method. The levosulpiride invasomes preliminary trial batches were prepared by using various terpenes. Experimental design was used to optimise the prepared formulations. Then after, evaluation was done for optimised formulations. Ex vivo permeation study and in vivo study were performed. Finally, stability study was done to check the formulation's stability. Analysis carried out by differential scanning calorimetry, powder X-ray diffraction and Fourier-transform infrared spectroscopy confirmed compatibility of active pharmaceutical ingredient with all excipients. The optimised formulation exhibited enhanced entrapment efficiency, a low polydispersity index, robust physicochemical stability and a uniform vesicular size below 200 nm. The transdermal flux results indicated a highly efficient permeation profile. Transdermal antipsychotic drug administration may be a dependable approach to increase medication adherence and reduce repeated dosage, hence improving patient compliance.

Keywords: Invasomes; levosulpiride; schizophrenia; transdermal

O-MHN-012

Lactic Acid Bacteria LAB12-derived Postbiotics Conferred Protection against Oxidative Stress *In Vitro*

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ABSTRACT

Alzheimer's disease (AD), which is the leading cause of dementia, is on the rise globally. However, it remains incurable as existing therapies alleviate only the symptoms. It is increasingly recognised that AD pathogenesis could be driven by gut dysbiosis, which raises the possibility of AD prevention through dietary modifications. In this regard, bioactive metabolites (i.e., postbiotics) from probiotics may be a viable option. Building upon our previous findings on the inhibition of RhoA signalling and β -amyloid in APP gene-transfected neuroblastoma cells by postbiotics derived from *Lactiplantibacillus plantarum* LAB12, a unique probiotic lactic acid bacterial (LAB) strain isolated from *tempeh*, this study assessed their antioxidative properties and profiled their bioactive metabolites. This study also examined their protective effects against lipopolysaccharide (LPS)-induced RAW264.7 (a murine macrophage cell line), which mimic the neuroinflammatory events in AD. The LAB12-derived postbiotics were profiled for their total phenolic content (TPC) and antioxidative properties as well as short-chain fatty acid (SCFA) level. RAW264.7 were exposed to the postbiotics in the presence of LPS after which the reactive oxygen species (ROS) and nitric oxide (NO) levels were measured. The LAB12-derived postbiotics yielded increased TPC and exhibited greater antioxidant activities when compared to control. GC-MS analysis confirmed the presence of SCFA namely acetate, butyrate, propionate and valerate in the postbiotics. The LAB12-derived postbiotics also significantly attenuated LPS-induced ROS and NO generation in RAW264.7. The present *in vitro* findings imply the potential protective effects of LAB12-derived postbiotics against neuroinflammation, which warrants validation using *in vivo* AD models.

Keywords: Antioxidants; Alzheimer's disease; *Lactiplantibacillus plantarum* LAB12; oxidative stress; short-chain fatty acids

P-CAN-003

Beyond VEGF: 9-methoxycanthin-6-one Inhibits Cancer Angiogenesis by Targeting the Upstream Regulator HIF1A in Endothelial Clls

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ABSTRACT

Angiogenesis, the formation of new blood vessels is a fundamental process in tumour growth and metastasis. While most anti-angiogenic therapies focus on targeting vascular endothelial growth factor (VEGF), resistance and alternative signalling pathways have limited their long-term effectiveness. This study investigates the anti-angiogenic potential of 9-methoxycanthin-6-one (9MC) and elucidates its mechanism of action using a proteomics approach on EA.hy926 endothelial cells. EA.hy926 endothelial cells were treated with 9MC at IC₅₀ for 24 hours. Protein extracts were subjected to in-solution tryptic digestion and were analysed via LC-MS/MS (LTQ-Orbitrap Velos Pro). A total of 66 differentially expressed proteins were identified using PEAKS Studio with label-free quantification. Five key proteins with high pathway connectivity were selected from the 66 proteins for transcript validation using RT-qPCR. Pathway analysis was performed using Ingenuity Pathway Analysis (IPA) software to identify enriched signalling pathways, upstream regulators and molecular networks modulated by the treatment. IPA identified the Carbohydrate Metabolism, Energy Production and Small Molecule Biochemistry network as the most disrupted in 9MC-treated EA.hy926 cells. Although HIF1A was not detected among the differentially expressed proteins, it was predicted as a central upstream regulator based on network analysis and its extensive regulatory interactions. Its predicted inhibition was associated with impaired glycolysis, reduced ATP production and disruption of the HIF1A–NOS3–VEGF axis, which ultimately led to suppression of hypoxia-driven angiogenesis. These findings establish a new mechanistic basis for the anti-angiogenic effects of 9MC by targeting upstream signalling pathways involving HIF1A which results in metabolic and angiogenic disruption. While HIF1A suppression was predicted based on network inference, further validation using protein-level assays and in vivo models is essential to confirm its functional role and therapeutic relevance.

Keywords: Angiogenesis inhibition; HIF1A; ingenuity pathway analysis (IPA); proteomics; 9-methoxycanthin-6-one

P-CAN-005

A Standardised Extract from *Eurycoma longifolia* (SEEL30) as Potential Anti-ovarian Cancer Agent: In Vivo Efficacy and Acute Toxicity Evaluations

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ABSTRACT

Ovarian cancer remains one of the deadliest gynaecological malignancies, often diagnosed at an advanced stage, which complicates treatment and reduces overall survival rates. The development of alternative anti-cancer drugs is urgently needed due to the limitations of current chemotherapeutic agents, including narrow therapeutic indices and severe side effects. Drug discovery efforts now focus on identifying potent active ingredients with minimal toxicity. In our previous research, a patented Standardised Extract from *Eurycoma longifolia* (SEEL30), containing a consistent amount of a quassinoid biomarker, demonstrated significant in vitro anticancer and anti-angiogenesis activities against the A2780 ovarian cancer cell line. This study aimed to evaluate the in vivo anti-cancer and toxicity effects of SEEL30 to validate those in vitro findings. A xenograft model was established by subcutaneously injecting A2780 cells into the dorsal side of NCR nu/nu nude mice. After two weeks of tumour development, the animals were divided into three groups (n = 6): Group 1 (vehicle control), Group 2 (50 mg/kg SEEL30) and Group 3 (100 mg/kg SEEL30). Treatments were administered orally and daily for three weeks, with tumour size and body weight recorded biweekly. Tumours were harvested for histopathological and vascularisation analysis. Additionally, acute toxicity was assessed in healthy, non-pregnant female Sprague Dawley rats treated with SEEL30 at 300 mg/kg (n = 1) and 2000 mg/kg body weight (n = 4) via oral gavage following OECD 420 guideline over 14 days, with evaluations on physical behaviour, histology, and female-related hormone levels. SEEL30 significantly reduced tumour size in a dose-dependent manner. No adverse behavioural or physical effects were observed, and the LD50 exceeded 2000 mg/kg. Liver enzymes (alkaline phosphatase (ALP), aspartate aminotransferase (AST), alanine transferase (ALT)) levels and hormone (testosterone, follicle stimulating hormone (FSH), luteinizing hormone (LH), progesterone and oestrogen) analyses showed no significant differences between treated and control rats. These findings suggest that SEEL30 has a broad therapeutic window and potential for development as a botanical drug. However, further pharmacokinetic studies, preclinical and clinical trials are necessary.

Keywords: Acute toxicity; *Eurycoma longifolia*; ovarian cancer; standardised extract

P-CAN-013

Potential of Intermittent Dosing to Delay the Development of Resistance in Non-Small Cell Lung Cancer with Afatinib

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ABSTRACT

Non-small cell lung cancer (NSCLC) remains a therapeutic challenge, largely due to the emergence of resistance that compromises the long-term efficacy of treatments such as tyrosine kinase inhibitors (TKIs). This study investigates whether an intermittent dosing strategy, incorporating a treatment-free interval, can delay the growth of resistant cancer cells compared to the standard daily treatment with afatinib, a second-generation TKI. The impact of intermittent versus continuous dosing of afatinib on resistance development was evaluated using a 3D spheroid model and in vivo systems. The 3D spheroids were established using a co-culture of HCC827 (afatinib-sensitive) and H1975 (afatinib-resistant) cells at a ratio of 99.0: 0.1% via the hanging drop method (6,000 cells in 30 µL per droplet) using petri dish. The spheroids were treated with either continuous (daily) or intermittent (500 pM afatinib with 72-hour drug-free intervals) dosing for 8 days. In vivo experiments were conducted in nude mice (n = 8 per group; 4 female and 4 male) bearing established tumours (100-200 mm), treated for 30 days. Tumour growth was monitored and harvested to assess whether the intermittent treatment can delay the emergence of de novo resistant cells using an appropriate assay. Preliminary results from the 3D spheroids model showed that spheroid size was largest in the untreated control group, followed by the intermittent group, with the smallest spheroid observed in the continuous afatinib treatment group, consistent with the expected anti-proliferative effect of afatinib. In vivo, the overall tumour volume in the intermittent group is smaller than that of the control group. In contrast, the continuous group experiences tumour size reduction during the treatment cycles, followed by regrowth approximately 20 days after treatment. Intermittent dosing may represent a promising alternative strategy in NSCLC, as it delays the development of resistance, as opposed to continuous treatment. This approach, previously demonstrated in 2D cultures to reduce enrichment of resistant cells, warrants further investigation.

Keywords: Hanging drop; HCC827 cell lines; in ovo; NCI-N1975; non-small lung cancer

P-CAN-022

Repurposing FDA-Approved Drugs in Treating Non-Small Cell Lung Cancer with Deletion 19 and T790 Driver Mutations

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ABSTRACT

Non-small cell lung cancer (NSCLC) remains one of the leading causes of cancer-related deaths globally. First, second, and third generation tyrosine kinase inhibitors (TKI), which bind to epidermal growth factor receptor (EGFR), are used as the treatments for NSCLC worldwide. However, mutation in EGFR causes challenges in the efficacy of the drugs. The third-generation TKI, Osimertinib effectively overcomes T790M-mediated resistance; however, its elevated cost significantly restricts accessibility, particularly among patients in low and middle-income countries (LMICs). As an alternative, drug repurposing study is crucial to identify drugs with anticancer potential against NSCLC. This study aims to evaluate the anticancer potential of FDA-approved drug in NSCLC models harbouring EGFR mutations, specifically exon 19 deletion and T790M, using in silico screening method. Molecular docking predicts the binding affinity between a ligand and its target protein, helping to determine the optimal binding pose and identify potential drug candidates. Of 3,067 FDA-approved drugs, 99 and 204 compounds bound to 6LUD (T790M EGFR) and 7TVD (del19 EGFR), respectively. Drugs previously investigated in anticancer studies, along with those exhibiting serious adverse effects, steroids, central nervous system (CNS)-active agents and compounds unsuitable for long-term use, were excluded. The structure of the protein and compounds were prepared using BIOVIA Discovery Studio, followed by the docking process executed by PyRx software. The molecular docking identified two candidate drugs, from the benzimidazole and piperazine classes, with strong affinity for EGFR allosteric sites and potential to suppress NSCLC cell proliferation and survival. The study suggests that these drugs may have potential therapeutic effects on NSCLC with EGFR Del19 and T790 mutation. Further tests, such as in vitro, in ovo and in vivo are necessary to validate the efficacy of the drugs.

Keywords: Drug repurposing; EGFR; non-small cell lung cancer; tyrosine kinase inhibitor; virtual screening

P-CAN-024

Synergistic Combination of Thioredoxin and Luteolin in HCT116 Colorectal Cancer Cells

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ABSTRACT

Colorectal cancer (CRC) is the third most common cancer worldwide and second contributor to cancer-related mortality. Despite advances in surgery, chemotherapy, radiotherapy, and targeted therapies, the cancer treatment efficacy is often limited by resistance mechanisms, including the upregulation of antioxidant defense systems in cancer cells. 1-methylpropyl 2-imidazolyl disulfide (PX-12) is a thioredoxin (Trx) inhibitor that targets Trx by covalently binding to its active-site cysteine residues, thereby suppresses its antioxidant function and demonstrates anticancer effects in CRC, pancreatic, and lung cancers. Luteolin, a naturally occurring flavonoid, has been reported to disrupt the nuclear factor erythroid 2-related factor 2 (NRF-2) pathway, thereby reducing antioxidant defense and sensitising cancer cells to oxidative stress. Since both agents target the antioxidant defense mechanisms, the combination of PX-12 and luteolin is being investigated to evaluate the synergistic effects of PX-12 and luteolin on HCT116 human CRC cells. HCT116 cancer cells were treated with different concentrations of PX-12 (0-80 μ M) and luteolin (0-320 μ M) for 24 and 48 hours. The 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) assay was then carried out, with PX-12 treated with IC₂₀ concentration of 9 μ M for 24 hours and 1 μ M for 48 hours and IC₅₀ concentration of 43 μ M for 24 hours and 40 μ M for 48 hours while luteolin was introduced with varying concentrations (0-320 μ M) prior to conducting MTT assays. The cytotoxic effects of single agents and combination treatment and the synergy were determined using the Chou-Talalay method. Both assays will thereafter be performed using the combination concentrations that are obtained from the MTT assays. MTT assays showed a significant synergistic cytotoxic effect as PX-12 and luteolin in combination reduced the cell viability more effectively than either agent alone. Combination Index (CI) values were consistently below 1.0, indicating a strong synergistic interaction. The most ideal combination concentrations with best CI value were 9 μ M PX-12 with 10 μ M luteolin for 24 hours treatment and 1 μ M PX-12 with 80 μ M luteolin for 48 hours treatment. The initial findings provide strong evidence for the synergistic anti-cancer activity of the PX-12 and luteolin combination therapy.

Keywords: Colorectal cancer; combination therapy; luteolin; PX-12; ROS

P-CAN-027

Erythropoietin-Functionalised Tamoxifen Nanocarriers Enhance Selectivity and Uncover Erythropoietin-Oestrogen Receptor Network Convergence in Breast Cancer

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ABSTRACT

Erythropoietin (EPO) and its receptor (EpoR) in breast cancer subtypes, and their interaction has raised debate over the safety of EPO use in cancer patients due to potential tumour-promoting effects. Nonetheless, EPO liganding may offer a route for receptor-mediated tumour targeting and synergistic modulation when combined with tamoxifen. We developed EPO-functionalised tamoxifen nanostructured lipid carriers (EPO-TAMNLC) and integrated in vitro characterisation with systems-biology enrichment to identify actionable interception points within the EPO–ER signalling interface. Tamoxifen-loaded NLCs were prepared by lipid melt-emulsification and highpressure homogenisation. Particle size, polydispersity index, zeta potential, entrapment efficiency, and morphology were measured. Short-term stability across pH was assessed by a composite of OD700 turbidity, Ostwald ripening rate and zeta potential. Release kinetics were profiled in Franz cells. EPO-TAMNLC binding affinity and stoichiometry were quantified by isothermal titration calorimetry. Network pharmacology analyses predicted shared targets and pathway intersections between tamoxifen and EPO, providing a systems-level context for mechanistic enrichment. EPO–TAMNLC association and in vitro performance (MCF-7, HDFa) were evaluated. Optimised TAM-NLC showed mean size of 46.6 nm, polydispersity index of 0.27, 99.7% entrapment efficiency and zeta potential of –23.8 mV. Composite stability metric discriminated pH-dependent behaviour more effectively than single-parameter readouts, and release was sustained. Calorimetric confirmed high affinity specific EPO-NLC binding with defined stoichiometry, supporting successful liganding. EPO surface functionalisation achieved ~55% association, enhanced early cytotoxicity, and improved selectivity for MCF-7 over HDFa. Network pharmacology revealed shared targets and pathway convergence between tamoxifen and erythropoietin, prioritising three interception layers: (i) oestrogen-receptor signalling and G1/A effectors; (ii) delivery/transport determinants; and (iii) EpoR-convergent signalling. The EPO-TAMNLC preserves sustained release anti-tumour activity; EPO liganding increases early efficacy and selectivity in vitro. The network-derived interception layers, i.e. ER axis, delivery/transport and EpoR convergence, provide specific targets for rational combinations and resistance mitigation during translational development.

Keywords: Breast cancer; erythropoietin; nanostructured lipid carrier; systems biology; tamoxifen

P-IFD-002

Evaluation of Anti-Biofilm Properties of Phytocompounds against Methicillin-Resistant *Staphylococcus aureus*

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ABSTRACT

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of hospital-acquired infection, primarily due to its ability to form biofilms for surviving under various conditions. Biofilm formation promotes bacterial survival by significantly increasing antibiotic resistance, making infections more enduring and challenging to treat. Therefore, this study aimed to screen the biofilm-forming ability among the MRSA isolates and to evaluate the anti-biofilm activity of phytocompounds against biofilm-forming MRSA isolates. The biofilm-forming capabilities of 68 MRSA isolates were screened using a microtiter plate assay with crystal violet staining. The optical density was measured at 570 nm, and isolates were categorised as non-, weak, moderate, or strong biofilm producers. The anti-biofilm activity of 86 phytocompounds representing 12 chemical groups was evaluated for their ability to inhibit biofilm formation against two selected strong biofilm-producing MRSA isolates. Compounds showing a good biofilm inhibition ($\geq 50\%$) were selected for further evaluation. Biofilm screening was detected at varying levels among isolates. A total of 17 isolates (25%) were classified as non-biofilm producers (OD: <0.238), 25 isolates (36.8%) as weak biofilm producers (OD: $\geq 0.238 \leq 0.477$), 20 isolates (29.4%) as moderate biofilm producers (OD: $\geq 0.477 \leq 0.954$) and six isolates (8.8%) as strong biofilm producers (OD: ≥ 0.954) based on optical density readings. Of the 86 phytocompounds tested, eight (comprising two phenylpropanoids, two cinnamic acid derivatives, one aldehyde and ketone, one phenol and two terpenes) showed significant biofilm inhibition at 1 mg/mL, inhibiting biofilm formation by over 50% against both MRSA isolates, namely A5613 and F149. This study highlights the potential of specific phytocompounds as effective anti-biofilm agents against MRSA. Thus, this potential alternative could be considered for managing biofilm-associated MRSA infections in future clinical practice.

Keywords: Anti-biofilm activities; Methicillin-resistant *Staphylococcus aureus*; MRSA biofilm; phytocompounds

P-IFD-003

8-Oxoguanine DNA Glycosylase 1 Inhibition Downregulated the Severe Inflammatory Reactions Associated with Malaria Infection in Mouse Model

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ABSTRACT

Malaria is one of the most significant parasitic diseases worldwide. Its pathogenesis has been closely associated with excessive immune response leading to severe inflammation. Inflammation has been linked to oxidative stress, with 8-oxoguanine (8-OG) being the most implicated DNA base. Base excision repair of 8-OG is catalysed by 8-oxoguanine DNA glycosylase 1 (OGG1) enzyme, making this enzyme as important target for therapeutic intervention in inflammatory conditions. This study aimed at exploring the potential of targeting OGG1 during malaria infection to suppress the severe inflammation. *Plasmodium berghei* ANKA infection in male ICR mice was used as malaria model. Suppression of OGG1 activity in malarial mice was carried out by means of treatment with OGG1 inhibitors, i.e., TH5487 and O8-OGG1 inhibitor. Circulating serum level of OGG1 was determined by means of ELISA. Systemic cytokines [tumor necrosis factor alpha (TNF- α), interferon gamma (IFN- γ), IL-2, IL-6, IL-10] release was assessed using Cytometric Bead Array analysis. Histopathological study was conducted to evaluate the effects of treatment on the pathological conditions of major organs (brain, liver, spleen, lungs, kidneys) during the infection. The results revealed a positive correlation between OGG1 levels and infection severity, along with a significant contribution of oxidative stress in malarial mice. OGG1 inhibition markedly reduced serum levels of TNF- α , IFN- γ , IL-2, IL-6 and IL-10, and alleviated the associated severe histopathological conditions in major organs of malarial

mice. Results highlight the critical involvement of OGG1 in malaria pathogenesis. Its inhibition downregulated excessive cytokine production and mitigated severe histopathological condition of major organs during the infection, suggesting OGG1 as a promising therapeutic target in the treatment of malaria.

Keywords: Cytokines; malaria; OGG1; OGG1 inhibition; *Plasmodium berghei*

P-IFD-010

Drug Repurposing of FDA-Approved Compounds as NS2B/NS3 Serine Protease Inhibitors against Dengue Virus: An In Silico Approach

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ABSTRACT

Dengue fever remains a significant global health concern, affecting 100-400 million people annually in tropical and subtropical regions. Current treatment strategies are limited to supportive care, emphasising the urgent need for specific antiviral agents. One promising approach is drug repurposing, which identifies new therapeutic uses for existing food and drug administration (FDA)-approved drugs. This study focused on discovering potential inhibitors of the NS2B/NS3 serine protease, a key enzyme in dengue virus replication, using computational in silico methods. The 3U1I macromolecule of NS2B/NS3 serine protease was prepared as the receptor. Virtual screening of FDA-approved drugs was performed using the MTiOpenScreen platform, followed by molecular docking with AutoDock Vina to validate and compare binding affinities. The top five ligands from each method were analysed for their binding interactions using Biovia Discovery Studio. MTiOpenScreen identified Mk3207, Pamaqueside, Dihydroergotamine, Yohimbic acid and Ditercalinium as top candidates. AutoDock Vina revealed Pamaqueside, Mk3207, Venetoclax, Yohimbic acid and Lumacaftor with the highest affinities. Two drugs, Mk3207 and Pamaqueside, consistently ranked among the top in both analyses, showing strong binding interactions involving catalytic triad residues His51, Asp75 and Ser135. These findings suggest their potential as dengue virus inhibitors through stable ligand-receptor binding. This in silico study demonstrates that Mk3207 and Pamaqueside exhibit significant binding affinity to the NS2B/NS3 serine protease, indicating their potential for repurposing as anti-dengue agents. Further molecular dynamics simulations and in vitro/in vivo validation are recommended to confirm their inhibitory stability and biological efficacy.

Keywords: Dengue virus; drug repurposing; molecular docking; MTiOpenScreen; NS2B/NS3 serine protease

P-IMT-003

Effects of hAOX1 rs3731722, Drugs and Clinical Variables on Oxypurinol Concentration among Gout Patients Receiving Allopurinol

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ABSTRACT

Allopurinol is a widely used urate-lowering therapy for gout treatment. Its active metabolite, oxypurinol, has a longer half-life and plays a key role in reducing uric acid levels. However, its effectiveness can vary due to factors such as clinical characteristics, concomitant drugs used and genetic polymorphisms. This study aimed to investigate the relationship between human aldehyde oxidase 1 (hAOX1) rs3731722 polymorphisms, drugs and clinical factors with oxypurinol concentration in gout patients receiving allopurinol therapy. This prospective, cross-sectional study involved gout patients receiving allopurinol treatment at Hospital Canselor Tuanku Muhriz. Oxypurinol concentrations were measured using high-performance liquid chromatography with ultra-violet detection (HPLC-UV), while genotyping was performed using PCR-Sanger sequencing. Among 75 patients, 80% were male, with a mean age of 56.92 ± 15.14 years. No significant association was found between hAOX1 rs3731722 and oxypurinol concentration ($p = 0.664$). In the final adjusted model, creatinine clearance (CrCL) was the strongest predictor of oxypurinol concentration ($\beta = 0.685$, $p = 0.003$), followed by allopurinol dose ($\beta = 0.396$, $p = 0.001$) and body weight ($\beta = 0.361$, $p = 0.032$). In this study, the hAOX1 rs3731722 polymorphism was not significantly associated with oxypurinol concentration. CrCL, allopurinol dose, and body weight emerged as the main predictors. Higher CrCL was associated with lower oxypurinol concentrations, whereas higher allopurinol doses and greater body weight were associated with increased oxypurinol concentrations. These findings underlined the importance of adjusting allopurinol dosage according to renal function and body weight to optimise allopurinol therapy.

Keywords: Allopurinol; creatinine clearance; oxypurinol; hAOX1 rs3731722

P-IMT-013

Evaluation of Antioxidant Properties of Seven Selected Plant Species

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ABSTRACT

Malaysia is one of the 17 megadiverse countries where there are numerous plants with various biological properties. The biological properties include the antioxidant property, which is the ability of these plants to scavenge or neutralise the effect of free radicals, which in turn can attack DNA, proteins and lipids, causing ageing and various degenerative diseases such as Parkinson's disease, atherosclerosis and cancer. Methods: In this study, different assays were carried out to evaluate antioxidants (DPPH, XOD, FRAP, ABTS) as well as the total phenolic (TPC) and flavonoid (TFC) content of seven different plant species. The study revealed that the extracts from peel of *Parkia speciosa* (stink bean), the leaves of *Rhizophora mucronata* (mangrove tree) and *Eucalyptus* hybrids showed promising antioxidant properties. Of the three samples, the extract from the *Eucalyptus* hybrid leaf showed the highest antioxidant activity with a half-maximal inhibitory concentration (IC₅₀) of 11.43 and 8.63 µg/ml for DPPH and superoxide scavenging, respectively, and the highest percentage of ABTS cation scavengers of 99.98 ± 0.02%. The extract from the leaf of *Eucalyptus* hybrid also had the highest FRAP (1.53 ± 0.09 mM Fe(II)) and TPC (271.46 ± 39.08 mg GAE/g extract) values. The extract from the leaf of *Rhizophora mucronata*, on the other hand, has the highest TFC value with 23.59 ± 0.13 mg QE/g extract. The extract from the fruit of *Citrus hystrix* (kaffir lime) shows the lowest antioxidant capacity in all tests. The correlation analysis performed revealed high R² values between most pairs of antioxidant tests. Extracts from the peel of *Parkia speciosa*, the leaves of *Rhizophora mucronata* and *Eucalyptus* hybrid exhibited the highest antioxidant activity. These findings highlight their potential for development into plant-based nutraceutical products with modern claims.

Keywords: Antioxidant activity; *Eucalyptus* hybrid; phenolic and flavonoid content; *Parkia speciosa*; *Rhizophora mucronata*

P-IMT-016

Regulation of Genes and Adipocytokines Involved in Anti-obesity Activity in High-Fat-Diet-Induced Obesity in Mice Fed with Methanolic Extract of *Albizia Myriophylla* Bark

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ABSTRACT

Obesity, a leading cause of early morbidity and mortality worldwide and in Malaysia, is closely associated with insulin resistance and glucose intolerance. Previous studies have shown that *Albizia myriophylla* (ABZ) possesses anti-diabetic properties in experimental models, suggesting its potential anti-obesity effects. Thus, this research investigates the potential anti-obesity effect of ABZ extract. The anti-obesity effects of ABZ methanolic bark extract were evaluated in high-fat diet-induced obese mice. The study included a normal control group, a high-fat diet control group (HFDC), and treatment groups receiving ABZ extract at 10, 20 and 30 mg/kg for five weeks. Gene expressions related to lipid metabolism including hormone sensitive lipase, peroxisome proliferator-activated receptors α and γ (PPAR α , PPAR γ), sterol regulatory element-binding protein-2 (SREBP2) and Stearoyl-Coenzyme A-Desaturase (SCD) gene expression and adipocytokines including tumor necrosis factor- α (TNF- α), interleukin-6 (IL-6), adiponectin and leptin were analysed to determine the extract's regulatory effects. Mice treated with 30 mg/kg of ABZ methanolic extract showed significant upregulation of PPAR α and downregulation of PPAR γ , sterol regulatory element-binding protein-2 (SREBP2) and stearoyl-Coenzyme A-desaturase (SCD) gene expressions compared to the HFDC group. Treatment group also showed significantly reduced TNF- α and IL-6 levels while increasing adiponectin and leptin concentrations. The treatment group also showed weight reduction. The 30 mg/kg methanolic extract of ABZ bark is able to avert obesity by regulation of the genes and adipocytokines involved in lipid metabolism.

Keywords: Adipocytokines; *Albizia myriophylla*; anti-obesity

P-IMT-20

Palm Kernel Oil-Based Nanoemulsion for Capsaicin Delivery: Formulation Optimisation and Characterisation

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ABSTRACT

Capsaicin, a bioactive compound with established anti-inflammatory and analgesic properties, was selected as a model drug due to its potential application in managing psoriasis. This study focused on the development, optimisation, and characterisation of a palm kernel oil-based nanoemulsion as a topical delivery system for capsaicin. Palm kernel oil was chosen as the lipid phase owing to its biocompatibility, stability, and potential to enhance dermal penetration. Formulations were prepared using palm kernel oil with a non-ionic surfactant blend (Tween 80/Span 80) at three oil-to-surfactant ratios (1:2, 1:1.5 and 1:1.25). Physicochemical characterisation and stability assessments were carried out over a 30-day period. The 1:1.25 ratio formulation demonstrated optimal performance, exhibiting favourable organoleptic properties, a skin-compatible pH (5.36 ± 0.04), nanosized droplets (188.73 ± 1.002 nm), low polydispersity index (0.289 ± 0.016), and stable zeta potential (-43.10 ± 0.53 mV). It also showed desirable rheological behaviour, excellent spreadability, and minimal phase separation under stress conditions. Encapsulation of capsaicin was confirmed by attenuated total reflectance-fourier transform infrared (ATR-FTIR) analysis. This work establishes palm kernel oil as a promising carrier for nanoemulsion-based topical drug delivery, successfully incorporating capsaicin. The optimised formulation provides a strong foundation for further studies, including drug release profiling and in vitro evaluation, to explore its potential in skin-related therapeutic applications.

Keywords: Capsaicin; nanoemulsion; palm kernel oil; surfactant blend

P-IMT-023

Curcumin as Anti-inflammatory Agents Targeting the TLR4-MD2 Complex based on In-silico Studies

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ABSTRACT

The inflammation is triggered by the TLR4/MD-2 responds to harmful stimuli such as toxins, pathogens and damaged cells. Upon TLR4/MD-2 activation, it initiates the intracellular signalling that will trigger the release of inflammatory mediators. The inflammation can be reduced by plant-derived bioactive compounds such as curcumin. This study aims to discuss the pharmacological activity of curcumin via silico analysis. In silico, analysis was conducted through docking, molecular dynamics simulations and target prediction. Based on the molecular docking and dynamic simulations, results show that curcumin forms strong and stable binding interactions with the TLR4/MD-2. Besides interactions with TLR4/MD-2 act as anti-inflammatory agent, curcumin was found to target other proteins that are directly and indirectly associated with inflammatory responses.

Keywords: Inflammation; in-silico, target prediction; TLR4/MD2

P-IMT-024

Microneedle-Based Niosomal Drug Delivery: An Innovative Approach for Management of Psoriatic Arthritis

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ABSTRACT

Psoriatic arthritis significantly affects patients' quality of life and healthcare systems. As of now, the selected drug is available in the form of a tablet. We are the first to report the combination method using niosomes incorporated microneedles for intradermal delivery in psoriatic arthritis. Niosomes were prepared using cholesterol and Span 60. A thin film hydration method was used followed by lipid extrusion to obtain a uniform size. Niosomes were optimised using Box-Behnken design and evaluated for particle size, zeta potential, polydispersity, entrapment efficiency, X-ray diffraction (XRD), and transmission electron microscopy. A stereolithography 3D-printed template was used to create a silicone-based mould with a 25 x 25 microneedle array with suitable length and diameter. The polymers were selected based on mechanical strength and degradation rate. Niosomes-loaded microneedles were developed and analysed for surface morphology, in vivo and in vitro insertion, dermatokinetics followed by pharmacokinetic and pharmacodynamic studies. The optimised Niosomes showed a particle size of 241.9 nm, & polydispersity index of 0.234 with -19.7 mV zeta potential. The drug entrapment efficiency was 83.66% with drug permeation of 0.4425 mg/cm²/hr. Differential scanning calorimetry, fourier-transform infrared spectroscopy (FT-IR) and XRD results confirmed that the drug is converted into an amorphous form. The 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay showed an increase in cell viability in drug dose-dependent concentration. In the scratch assay, healing reached up to 90% within 24 hours. In vivo and in vitro insertion study showed 92.5% & 94.5% penetration, respectively. Pharmacokinetic study indicated that the Niosomes-loaded microneedles gave a higher concentration of drug in skin, around 0.92 µg/gm, compared to the conventional tablet formulation, which is 0.01 µg/gm. The microneedle has shown a well-reconstructed smooth epidermal layer with no sign of lesions. The prepared targeted Niosomal-loaded microneedles have shown improved drug release, permeation and bioavailability, overcoming the potential issues of available formulations.

Keywords: Intradermal; microneedles; niosomes; scratch assay; 3D printing

P-IMT-033

Integrated In Vitro and In Silico Characterisation of Prenylated and Geranylated 9H-Xanthen-1-one Derivatives: Antioxidant Potential

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ABSTRACT

Oxidative stress resulting from excessive reactive oxygen species (ROS) generation contributes to various pathological conditions, and antioxidant agents are vital to maintaining cellular redox balance. Approximately 80–95% of antioxidant drugs possess heterocyclic structures. Among them, oxygenated heterocyclic xanthenes are well established for their potent antioxidant effects; however, the antioxidant potential of their structural analogues, 9H-xanthen-1-ones, remains poorly characterised. The positional shift of the carbonyl group from the 9- to 1-position may influence electronic distribution and, consequently, antioxidant behavior. In this study, a series of previously synthesised xanthen-1-one derivatives (1–6) were evaluated for their in vitro antioxidant activity using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay and Ferric Reducing Antioxidant Power (FRAP) assay, with quercetin and ascorbic acid serving as reference antioxidants. Furthermore, molecular docking study was conducted to assess their interactions with NADPH oxidase (NOX), an enzyme associated with oxidative stress. Experimental results revealed that all compounds exhibited weak DPPH radical scavenging (<20%) and low FRAP reducing power (2.42–8.11% of ascorbic acid's activity), indicating limited electron-donating capacity. In contrast, docking analyses showed strong binding affinities toward NOX (–9.14 to –11.39 Kcal/mol), surpassing both quercetin (–8.42 Kcal/mol) and ascorbic acid (–5.44 Kcal/mol), through hydrogen bonding with NADP⁺-binding residues (threonine) and hydrophobic interactions with key FAD-binding residues (Ala300, Ala302). These findings highlight a discrepancy between poor in vitro performance in chemical-based antioxidant assays and promising in silico enzyme-targeting activity, suggesting that structural modification of xanthenones may enhance their redox-related therapeutic potential.

Keywords: DPPH; FRAP; molecular docking; oxidative stress; 9H-xanthen-1-ones

P-MHN-007

Inhibitory Effect of a Standardised Extract of *Centella asiatica* and its Triterpenes on Nitric Oxide Production in Lipopolysaccharide-Induced Microglial Cells: In Vitro and In Silico Evidence

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ABSTRACT

Alzheimer's Disease (AD) is associated with chronic neuroinflammation, in which hyperactivated microglia release pro-inflammatory mediators, including nitric oxide (NO). A key upstream pathway involves the activation of the Toll-like receptor 4/myeloid differentiation factor-2 (TLR4/MD-2) complex by lipopolysaccharide (LPS). *Centella asiatica* (SECA), traditionally used as a neuroprotective herb, contains four major triterpenes - asiatic acid, asiaticoside, madecassic acid, and madecassoside. While standardised extract of SECA exhibits anti-inflammatory activity, the specific contributions of its triterpenes and their mechanistic links to TLR4 remain unclear. UPLC was performed to identify and quantify triterpenes in SECA. The effects of SECA and its triterpenes on cell viability and NO production in LPS-induced BV2 microglial cells were evaluated using MTT and Griess assays, respectively. Molecular docking predicted interactions with the TLR4/MD-2 complex. SECA contains highest concentration of asiaticoside (34.9%) followed by madecassoside (34.8%), madecassic acid (18.4%) and asiatic acid (12.0%). SECA and its triterpenes (0.049–100 µg/mL) were non-toxic to BV2 cells, except for asiatic acid, which significantly reduced cell viability at 50 µg/mL. SECA and its triterpenes significantly suppressed NO production at highest concentrations (4.89–100 µg/mL), with SECA showing the strongest inhibitory activity, suggesting synergistic effects. Docking demonstrated favorable binding affinities with TLR4/MD-2 (–7.8 to –9.6 kcal/mol), with asiaticoside exhibit the strongest binding strength. Critical interactions included hydrogen bonding with Pro102 and Lys 242 residues implicated in LPS recognition. *In silico* findings provide a possible mechanistic basis for the observed suppression of NO in microglial cells. The combination of triterpenes within SECA appears to act synergistically to inhibit TLR4/MD-2 activation and downstream of NO release. Together, the *in vitro* and *in silico* results strengthen the rationale for SECA as a promising natural therapeutic candidate to modulate neuroinflammation in AD.

Keywords: Alzheimer's Disease; *Centella asiatica*; neuroinflammation; triterpenes; TLR4

P-MHN-010

Quantification of Mitragynine in Rat Plasma and Urine by LC-MS/MS Using Methanol Extract as a Calibration Matrix

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ABSTRACT

Mitragynine, the primary alkaloid in kratom leaves (*Mitragyna speciosa*), currently represent one of the most predominant classes of new psychoactive substances (NPS) in illicit drug markets. Despite the increased used, this substance is not commonly assayed in routine drug testing and may not be detected in standard screening procedure. Laboratory analysis for mitragynine detection still requires a mitragynine standard reference for quantification. This study aimed to validate a method for quantifying mitragynine in plasma and urine using LC-MS/MS without a mitragynine standard reference. The quantification method was developed using LC-MS/MS. Extraction was performed using ultrasound-assisted extraction. Plasma and urine were processed using protein precipitation followed by filtration using Milipore 0.45 µm filters. Mitragynine was detected as the parent ion m/z 399.2 and m/z 174.2 as the product ion. The method exhibited good linearity ($r^2 > 0.99$). Intra-day precision ranged from 0.189% to 3.28% in plasma and 0.41% to 1.16% for urine. Accuracy fell within acceptable ranges. Limit of detection and limit of quantitation for mitragynine in plasma were 1.83 µg/mL and 5.55 µg/mL, respectively, while those in urine were 1.84 µg/mL and 5.60 µg/mL. The method for quantifying mitragynine in plasma and urine without a mitragynine standard has been validated and proven precise and sensitive. It can be applied in research and clinical settings requiring mitragynine level measurements.

Keywords: Kratom; LC-MS/MS; method validation; mitragynine; plasma; urine

P-MHN-011

Neurovisual Benefits of Citicoline in Children with Global Developmental Delay and Cortical Visual Impairment: fVEP-Based Study

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ABSTRACT

Flash visual evoked potentials (fVEPs) are crucial for assessing cortical visual function in children with global developmental delay (GDD), particularly those with cortical visual impairment (CVI). Citicoline, known for its neurorestorative properties, may improve neuronal transmission in the visual pathway. This study aimed to investigate the neurovisual effect of citicoline in pediatric patients with GDD and CVI. Twenty children aged 1-6 years diagnosed with GDD and CVI were included. Data from hospital medical records were analysed cross sectionally. fVEP latency and amplitude were measured before and after citicoline administration. The mean participant age was 1.70 ± 1.17 years. dVEP latency averaged 24.43 ± 22.40 msec (right) and 21.22 ± 21.98 msec (left), while amplitudes were 18.14 ± 22.38 μ V and 18.97 ± 19.69 μ V, respectively. Citicoline administration was associated with reduced latency and increased amplitude, indicating enhanced cortical visual processing. Citicoline may provide neuroenhancement of visual pathway function in children with GDD and CVI. Further controlled studies are warranted to confirm its therapeutic potential.

Keywords: Citicoline; cortical visual impairment; flash visual evoked potential; global developmental delay

P-IMT-037

CaMKII-Dependent Cellular Senescence as a Potential Mechanism of Doxorubicin Cardiotoxicity in H9c2 Cardiomyocytes

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ABSTRACT

Anthracycline cardiotoxicity is classically attributed to oxidative stress and cardiomyocyte loss, but recent study suggests that cellular senescence may also contribute to long-term myocardial dysfunction. We previously showed that sublethal doxorubicin (Dox) exposure induces mitochondrial dysfunction and CaMKII activation in H9c2 cardiomyocytes. Here, we propose that Dox-induced, CaMKII-dependent cardiomyocyte senescence represents a potential mechanism of Dox cardiotoxicity. H9c2 cardiomyocytes were exposed to a previously characterised sublethal Dox dose that preserves viability while inducing persistent mitochondrial stress. Cellular senescence was assessed by senescence-associated β -galactosidase (SA- β -gal) staining Mitochondrial function, mitochondrial Ca^{2+} accumulation, and CaMKII activation were previously evaluated using JC-1, Rhod-2AM, a mitophagy probe, and phospho-CaMKII analysis. To determine the role of CaMKII, cells were co-treated with the CaMKII inhibitor KN-93 during Dox exposure. Sublethal Dox exposure significantly increased the proportion of SA- β -gal-positive H9c2 cells. These changes occurred alongside mitochondrial membrane potential loss, mitochondrial Ca^{2+} overload, enhanced mitophagy, and increased CaMKII phosphorylation. Pharmacological CaMKII inhibition with KN-93 markedly reduced SA- β -gal positivity and restored mitochondrial membrane potential, KN-93 also suppressed Dox-induced CaMKII phosphorylation. Sublethal Dox acts as an ageing provocation that induces a CaMKII-dependent senescent phenotype in H9c2 cardiomyocytes. These findings support cellular senescence, mediated in part by CaMKII activation, as a potential mechanism of doxorubicin cardiotoxicity, and identify CaMKII as a candidate therapeutic target to mitigate anthracycline-induced cardiac ageing.

Keywords: CaMKII; cellular senescence; doxorubicin cardiotoxicity

P-IMT-038

Effect of Butterfly Pea Flower Extract (*Clitoria ternatea*) on Gastric Histopathology and TNF- α Expression: Study Experimental in Male Wistar Rats Induced by Ibuprofen

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ABSTRACT

The widespread use of non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen can cause the side effect of gastric mucosal damage. Butterfly pea flower (*Clitoria ternatea*), rich in anthocyanins and flavonoids, has potential as an anti-inflammatory and antioxidant agent. This study aimed to prove the gastroprotective effect of the extract of *C. ternatea* flower against ibuprofen-induced gastric mucosal damage in wistar rats. True experimental study with a post-test only control group design was conducted. Thirty male Wistar rats were randomly divided into five groups: Normal Control (Kn), Negative Control (K-), and three treatment groups (P1, P2, P3), which were orally administered the flower extract at doses of 250, 500 and 1000 mg daily for 21 days. Except for the Kn group, all rats were induced with gastric damage using a 44 mg ibuprofen suspension. Parameters evaluated were tumor necrosis factor alpha (TNF- α) expression with Immunohistochemistry assessed by the immunoreactive score and histopathological damage with Haematoxylin-Eosin staining. Highly significant difference in was observed in the TNF- α expression among the five treatment groups ($p = 0.000$). Significant lower was founded in the TNF- α expression compared to the K-group ($p = 0.001$). Histopathological results shown K- group exhibited massive mucosal erosion and inflammatory cell infiltration, while the P3 group demonstrated significant improvement in the mucosal architecture, approaching normal conditions. Extract of *C. ternatea* flower exhibits a dose-dependent gastroprotective effect against gastric mucosal damage with 1000 mg dose proved to be the most effective in reducing inflammation by suppressing TNF- α expression, and promoting histopathological tissue repair.

Keywords: *Clitoria ternatea*; gastroprotective; histopathology; ibuprofen; TNF- α

P-IMT-041

Standardised *Moringa Oleifera* Ethanol Extract Normalises Immune Cell Profiles and Exhibits Pro-Apoptotic Activity in Malignant Lymphocytes

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ABSTRACT

Moringa oleifera is well recognised for its antioxidative, anti-diabetic, anti-inflammatory and anti-cancer properties. However, comprehensive evaluation of its immunomodulatory and regenerative functions remains limited. This study investigated the immunoregulatory potential of a standardised ethanol extract of *Moringa oleifera* leaves (MoETE) in both immunocompetent and cyclophosphamide (CP)-induced immunosuppressed animal models. Fresh *M. oleifera* leaves were collected from a herbal farm in Kampar, Selangor, and extracted using ethanol-water mixtures (100%, 70%, 50% and 0% ethanol). Cytotoxicity was assessed in primary lymphocytes from healthy donors and in T- and B-cell leukemia lines (Jurkat and BV173) via MTT assay. High performance liquid chromatography identified and quantified quercetin, kaempferol-3-O-glucoside, and niazirin as marker compounds. Among the extracts, the 70% ethanol preparation demonstrated the most notable bioactivity, exhibiting dose-dependent stimulation of primary lymphocytes ($EC_{50} = 28 \pm 3 \mu\text{g/mL}$) while exerting cytotoxicity toward BV173 ($IC_{50} = 125 \pm 6 \mu\text{g/mL}$) and Jurkat cells ($IC_{50} = 262 \pm 3 \mu\text{g/mL}$). To further evaluate immune-boosting and regenerative potential, both healthy and CP-induced immunosuppressed Sprague-Dawley rats received MoETE (150, 300, 600 mg/kg) orally for 28 days. Water and levamisole served as negative and positive controls, respectively. Hematological and organ-level assessments were conducted throughout the study. MoETE did not significantly alter red or white blood cell counts in healthy rats. However, in immunosuppressed rats, MoETE supplementation restored both erythrocyte and immune cell levels. Notably, MoETE increased CD8⁺ T cells and regulatory T-cell populations. Additionally, MoETE enhanced bone-marrow stem cell proliferation by promoting cell-cycle entry and reducing apoptosis, without altering stem-cell phenotype. Key surface markers-including CD105, CD90, and CD73-remained unchanged. Overall, this study highlights a novel biological activity of *M. oleifera*, its ability to enhance bone-marrow stem cells and modulate immune responses. These findings support MoETE as a promising natural immunomodulator with potential therapeutic value in immune restoration.

Keywords: Cancer; cell cycle; cell proliferation; immunomodulation; *Moringa oleifera*