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Transforming IGA Nephropathy Management with Artificial Intelligence

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ABSTRACT

IgA nephropathy (IgAN) is the most common form of primary glomerulonephritis globally, presenting with diverse clinical manifestations ranging from asymptomatic hematuria to end-stage renal disease (ESRD). Despite advances in understanding its underlying mechanisms, including genetic predispositions and galactose-deficient IgA1 (Gd-IgA1), significant challenges persist in achieving accurate diagnosis, determining prognosis, and optimizing management strategies. Recent advancements in artificial intelligence (AI) and machine learning (ML) provide transformative opportunities to overcome these hurdles. This review examines AI's role in IgAN, focusing on enhancing biopsy interpretation, refining risk stratification, and predicting disease progression. We discuss significant breakthroughs, acknowledge existing limitations, and explore future directions for integrating AI into clinical nephrology to improve patient outcomes and streamline workflows.

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Health Related Quality of Life (QOL) in Type 2 *Diabetes Mellitus* Patients: A Cross Sectional Study using Simple Patient Centered QOL (Pcqol) Questionnaire in a Tertiary Care Hospital in Tamil Nadu, India

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ABSTRACT

Background: Quality of life in type 2 diabetes patients have not been assessed using simple patient centered quality of life in Tamil Nadu, India. This is a reliable tool that can be implemented as part of routine clinical assessments.

Objectives: To assess the health-related quality of life in type 2 diabetes patients using simple patient centered questionnaire, based on current treatment plan and clinical outcome parameters.

Methods: In this cross-sectional descriptive study, 30 patients suffering from type 2 diabetes mellitus (DM) were enrolled and given a simple patient centered quality of life questionnaire. Five aspects each of general life and diabetes factors were listed out in order of importance by the patients and satisfaction levels in each were scored using 5-point Likert scale.

Results: Among general life related aspectsmajority of the patients had food (76.67%, n=23), religion (43.33%, n=13) and family/ friends (30%, n=9) as their first, second and third priorities, respectively. In that, majority were satisfied with food (35.78%, n=8) and religion (46.15%, n=6), while majority were neutral (55.56%, n=5) toward friends and family relationships.

Food (30%, n=9), sleep (20%, n=6) and fear of complication (33.33%, n=10) was prioritized by most of the patients, among diabetes related aspects. Majority were dissatisfied with food aspect (55.56%, n=5), neutral towards sleep (66.67%, n=4) and 70% (n=7) of them were neutral toward fear of complication as well.

Conclusion: This study reveals that simple patient centered QOL questionnaire identified priorities among type 2 diabetes patients in Tamil Nadu that mattered to their health-related quality of life.

Keywords: type 2 diabetes mellitus, quality of life, health-related quality of life, well-being, patient-centered.

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Design and Synthesis of Novel Thiazolidinone Derivatives Possessing Antimicrobial Activity

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ABSTRACT

A Series of novel derivatives of thiazolidinone were synthesized. The structure of the synthesized compounds was characterized by UV, IR, NMR & Mass spectral data, and evaluated for their antibacterial and antifungal activity. All the synthesized compounds showed good to moderate antibacterial and antifungal activity. Among the synthesized and tested compounds, Compound **TZ6** showed moderate antibacterial and antifungal activity as compared to the standards used.

Keywords: Thiazolidinone, antibacterial, antifungal, organic synthesis, microwave synthesis.

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Design and Evaluation of Resveratrol Loaded Liquisolid Compacts

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ABSTRACT

The solubility and dissolution rate of the BCS class II drug resveratrol were enhanced using liquisolid compacts. Solubility studies were conducted with various oils, surfactants, and co-surfactants, revealing that eucalyptus oil, Kolliphor RH 40, and propylene glycol demonstrated superior solubility compared to other excipients. A ternary phase diagram was constructed with different ratios of oil, surfactant, and co-surfactant to identify the self-emulsification region. Ten formulations were prepared and evaluated for dilution studies, self-emulsification time, particle size, morphology, zeta potential, and in-vitro release. Dilution studies indicated that formulations F4, F5, F6, and F9 were clear, while the others were turbid and precipitated. The self-emulsification time for all formulations ranged from 31 to 98 seconds. Formulation F4 exhibited the best particle size and zeta potential, measured at 22.03 nm and -1.20 volts, respectively. In-vitro release studies showed that F4 achieved 90.09% release compared to 39.62% for the drug in solution. Morphological analysis revealed spherical particles with sizes ranging from 10 to 40 nm. The selected formulations (F4, F5, F6, and F9) were converted into liquisolid compacts using Neuslin (Magnesium Aluminometasilicate) and Fuji Calin (Anhydrous Dibasic Calcium Phosphate) as adsorbents, resulting in eight formulations. Quality control parameters were within IP limits. In-vitro studies confirmed that F4 with Neuslin as the adsorbent achieved the highest release of 93.53%, compared to 80.30% for F4 with Fuji Calin. These results demonstrate that Neuslin is the superior adsorbent and that the liquisolid compact technique effectively enhances the solubility of resveratrol, offering potential for improving the solubility of other BCS class II and class IV drugs.

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In Vitro and *In Silico* Anthelmintic Activity of Aristolochia Bracteolata and Pergularia Demia

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ABSTRACT

***Aim and Objective*:** This study evaluates the phytochemical properties and anthelmintic activity of *Aristolochia bracteolata* and *Pergularia daemia*, medicinal plants known for their therapeutic potential. The research includes phytochemical screening, *in vitro* anthelmintic assays, and *in silico* docking studies to identify bioactive compounds and their mechanisms.

Method: Plant materials were authenticated and extracted using the maceration method. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, carbohydrates, saponins, and amino acids.

Result: The extracts showed significant anthelmintic activity against *Pheretima posthuma* (Indian earthworms), outperforming Albendazole in paralysis and mortality times. Docking studies identified β-sitosterol and β-amyrin as key compounds with high binding affinity to phosphoethanolamine methyltransferase, an enzyme critical for parasite growth.

Conclusion: The findings validate the anthelmintic potential of these plants, with phytochemicals exhibiting strong protein-binding capabilities. These results support their traditional use and highlight their promise for therapeutic development.

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In-Silico Screening and Validation of Brain Penetrating Peptides for Targeting CNS Related Disorders

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ABSTRACT

CNS related disorders are facing a rising concern due to their complexity in understanding the disease pathogenesis and their therapeutics targeting the disease. Therapeutics targeted to brain mostly don't reach the brain parenchyma, instead they accumulate in the systemic circulation owing to their inability of crossing the Blood Brain Barrier (BBB) and reaching the brain lumen. This has led to the decreased therapeutic potential of the currently available drugs in the treatment of CNS related disorders such as Alzheimer's and Parkinson's. In this regard, many strategies have been explored and employed in the treatment of the disease and prevention of its progression. One feasible approach is the usage of peptides in targeting the drug molecule to the brain parenchyma. Peptides are stretch of few amino acids that can be used a shuttle in targeting the drug for CNS related disorders. In this aspect, this work focuses on the in-silico design and development of a peptide that effectively targets the blood brain barrier for its abluminal delivery of the therapeutic molecule. Extensive literature survey for the search of BBB targeting peptides and the choice of mechanism of transport was performed to collect the entire lists of peptides that were reported to target BBB along with their corresponding mechanisms. Receptor mediated transport was chosen to be the mechanism and the receptor chosen for the in-silico studies was Transferrin Receptor. With this information, the list of peptides and their binding site were found using global docking servers to verify the binding site of the peptides is non-competitive to avoid competition in the iron homeostasis with regard to the transferrin receptor. After docking studies, the interacting residues were identified and a match was performed to find if any of the peptides have interacting residues in the active site of Transferrin receptor.

Keywords: CNS related disorders, Blood Brain Barrier, Receptor Mediated Transcytosis, peptide drugs.