E-SYMPOSIUM PROCEEDINGS

A bimonthly pharma refresh brought to you by Journal of Pharma Insights and Research (JOPIR) ISSN No. 3048-5428
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ORAL CANCER AND ITS TREATMENT

Miss Venkata Sowmyasree Golla

Assistant Professor, Annamacharya College of Pharmacy, Rajampet

sowmyapharma1998@gmail.com

Abstract: The term cancer of the mucosal surfaces such as the lips, oral tongue, buccal mucosa, floor of the mouth, lower and upper gingiva, hard palate, and retromolar trigone. Any malignant tumour that develops on the tongue, lip, palate, gingiva, cheek lining, or floor of the mouth is referred to as oral cancer. One of the top three cancer kinds in India is oral cancer. South and Southeast Asian nations, including India, have the greatest incidence of oral cancer. In India, squamous cell carcinoma accounts for 90–95% of all mouth cancer cases. The sixth most frequent cancer worldwide is oral cancer. In Southeast Asia, chewing betel quid, smoking, and drinking alcohol are all common oral practices that raise serious concerns about oral cancer. Even though the conventional therapeutic approaches currently available for patients with oral cancer have shown promise, there are still many unresolved issues. For example, surgical resection can result in permanent disfigurement, altered self-image, and physiological consequences that are debilitating. Additionally, chemotherapy and radiotherapy can cause significant toxicities that negatively impact patient welfare and quality of life. Consequently, patients who cannot endure surgery or who are otherwise unsuitable for it are typically saved for primary radiation therapy plus chemotherapy. However, brachytherapy can be the only treatment option for an early-stage tiny primary tumour.

Keywords: Buccal mucosa, Oral cavity cancer, Chemotherapy, Radiotherapy, Squamous cell carcinoma.

ACCELERATING DIAGNOSIS: BREAKTHROUGHS IN MICROBIAL IDENTIFICATION

Dr. Pavan Kumar Yanamadala

Associate Professor, Aditya Pharmacy College (A), Surampalem.

pavan.yanamadala@gmail.com

Abstract: The accurate and efficient identification of microbial pathogens is crucial for the successful treatment of infectious diseases. Although traditional methods are reliable, they often require a significant amount of time to produce results. Recent advancements in molecular diagnostics, mass spectrometry, and next-generation sequencing (NGS) have revolutionized the field by improving the speed and precision of microbial identification. Polymerase chain reaction (PCR) and its variations, such as real-time PCR, enable rapid amplification of genetic material, leading to a significant reduction in diagnostic turnaround times. Techniques like nucleic acid sequence-based amplification (NASBA) and loop-mediated isothermal amplification (LAMP) further enhance these capabilities, especially in resource-limited settings, by operating at constant temperatures. Mass spectrometry, particularly matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF), provides quick and accurate microbial identification through protein profile analysis. This method offers high throughput, cost-effectiveness, and the ability to detect antimicrobial resistance, influencing clinical decision- making and patient care significantly. NGS technologies offer comprehensive pathogen detection by sequencing entire microbial genomes, proving invaluable in diagnosing complex infections, monitoring outbreaks, and identifying antibiotic resistance genes. Despite limitations in terms of cost and complexity, hindering widespread adoption, the incorporation of these innovative technologies into clinical settings enhances the ability to diagnose and manage infectious diseases effectively. Molecular diagnostics, mass spectrometry, and NGS each offer unique advantages, from rapid and accurate pathogen identification to thorough genetic analysis and resistance profiling, ultimately leading to improved patient outcomes and more efficient public health interventions.

Keywords: Infectious Disease, Microbial Identification, Culture Sensitivity Tests, Antibiotic Resistance, Accuracy

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QbD ASSISTED FORMULATION AND OPTIMIZATION OF FLOATING TABLETS OF AN ANTIEMETIC DRUG

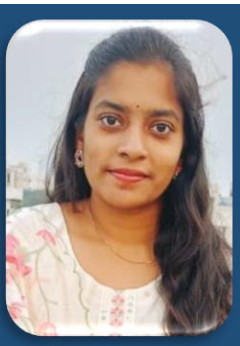
Dr Haranath Chinthaginjala

Associate Professor, Raghavendra Institute of Pharmaceutical Education and Research, Anantapur, Andhra Pradesh, India
haranathriper@gmail.com

Abstract: The present work was designed to formulate floating tablets of domperidone employing a central composite design. The central composite design was used to analyse the systematic consideration of input and output factors and to generate design space. The domperidone floating tablets were prepared by direct compression method. Drug excipient compatibility studies were performed through FT-IR and DSC analysis studies. The concentration of polymers such as HPMC K4M, Pectin and PVP K25 were selected as independent variables. Floating lag time, Total floating time and percentage drug release were selected as dependent variables. The model was found to be non-linear and the curvature effect was significant. Hence, the system suggested to central composite design. FT-IR studies demonstrated that there is no considerable interaction between the drug and the excipients. DSC studies revealed that drug and excipient were compatible. The pre-compression parameters of prepared formulations showed good flow properties. The evaluation of post-compression parameters indicated that all the prepared formulations are within the specified limits. The floating lag time of the prepared formulation was found to be less than 360 seconds and a total floating time of more than 24 hrs. The Percentage of drug release of all formulations was in the range of 72.93% to 98.26%. The outcomes revealed that preliminary design was used to further develop polymer obsessions. It was determined that the central composite arrangement would be used to formulate domperidone gastro retentive floating tablets with a lesser number of preliminaries and more outstanding elements.

Keywords: Domperidone, Central Composite Design, Floating tablets, HPMC, Pectin, PVP K25, Contour plots.

THE ENIGMA OF MOEBIUS SYNDROME: COMPREHENSIVE UNDERSTANDING OF A RARE DISORDER



Dr. Nandini Palivela

Assistant Professor, Aditya College of pharmacy, Surampalem.

nandinipalivela@gmail.com

Abstract: A rare congenital neurological condition called Moebius Syndrome affects the sixth and seventh cranial nerves, resulting in facial paralysis, poor eye movement, and other related symptoms. While the precise cause of Moebius Syndrome is unknown, several theories have been put forth, including vascular malformations, acquired ischemia episodes, exposure to toxins during fetal development, and genetic factors. Clinical manifestations include limb abnormalities, deficiencies in ocular abduction, and unilateral or bilateral nonprogressive congenital facial palsy, among other cranial nerve palsies. Due to the lack of specific laboratory tests for evaluation, it is primarily clinical. There is no particular pharmacological treatment for Moebius Syndrome, and the available pharmacological management is restricted. It is possible to include multivitamins in the treatment plan. Surgery techniques like the "smile operation" could also be used for this condition.

Keywords: Moebius Syndrome, Cranial nerves, Smile operation, Facial palsy, Ocular obduction, Fetal development.

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EVALUATION OF PROPHYLACTIC AND CURATIVE STUDY OF ETHANOLIC EXTRACT OF *TABERNAEMONTANA DIVARICATA* AGAINST GENTAMICIN INDUCED NEPHROTOXICITY IN RATS

Mr Minnel Simhadri Kedhernath#, Dr. Pushpa Kumari B*

Student#, Professor,*
Seven Hills College of Pharmacy, Tirupati.
minnalkedhar22@gmail.com

Abstract: Gentamicin (Aminoglycoside antibiotic) is notorious for causing kidney problems in both humans and animals. *Tabernaemontana divaricate,* a plant containing flavonoids, tannins, terpenoids and other compounds known to benefit kidneys health, is under investigation for its potential to mitigate gentamicin-induced kidney damage in Wistar rats. Adult female Wistar rats were divided into four groups to assess the nephroprotective and nephrocurative effects of *T.divaricata* in gentamicin- induced nephrotoxicity. The experimental setup was as follows: Group I received water for 28 days (control); Group II received gentamicin for 8 days (Nephrotoxic control); Group III received ethanolic extract of *T.divaricata* for 8 days (Nephroprotective) and Group IV received gentamicin for 8 days followed by ethanaolic extract of *T.divaricata* from day 9 to 28 (Nephrocurative). This improvement was marked by significant reductions in serum uric acid concentrations along with a decrease in urinary total protein levels, despite an increase in serum total protein levels. Furthermore, T.divaricata notably enhanced anti-oxidant enzymes like glutathione, superoxide dismutase (SOD), catalase and significantly reduced lipid peroxidation, effectively shielding renal tissues from gentamicin-induced damage in Wistar rats. Notably, *T.divaricata* treated nephrocurative animals exhibited superior recovery compared to those receiving nephroprotective treatment alone. In the foreseeable future, the bioactive compounds present in *T.divaricata* could emerge as promising therapeutic agents for renal disorders. This suggests that *T.divaricata* might shield against kidney dysfunctions triggered by oxidative stress. However, further exploration through clinical trials and detailed research involving metabolomics and new biomarkers is recommended to better understand the potential health benefits of *T.divaricata* compounds for renal health.

Keywords: Gentamicin, *Tabernaemontana divaricata*, Nephroprotective, Nephrocurative, Anti oxidants, Oxidative stress.

CRISPR:THE CUTTING EDGE TECHNOLOGY TRANSFORMING SICKLE CELL CARE

Miss Shreya Raj

Student, Aditya Pharmacy College (A), Surampalem.
shreyaraj130222@gmail.com

Abstract: Sickle cell disease (SCD) is a devastating genetic disorder caused by a point mutation in the HBB gene, leading to severe anaemia, chronic pain, and premature mortality. Despite advances in management, a cure remains elusive. CRISPR gene editing technology has emerged as a promising therapeutic strategy to correct this genetic defect. This approach utilizes the CRISPR/Cas9 system to precisely edit the HBB gene, restoring normal haemoglobin production and alleviating disease symptoms. Preclinical studies have demonstrated high editing efficiency, specificity, and safety. CRISPR gene editing offers several advantages over traditional treatments, including potential for a cure, reduced risk of complications, and improved quality of life. Furthermore, CRISPR gene editing may also address underlying comorbidities and reduce healthcare disparities. However, challenges remain, including delivery methods, off-target effects, and ethical considerations. CRISPR is a relatively new technology, and long-term safety and efficacy data are limited. Ongoing research aims to address these hurdles, paving the way for clinical trials and potential FDA approval. If successful, CRISPR gene editing could revolutionize SCD treatment, offering new hope to millions worldwide.

Keywords: CRISPR, Gene editing, Sickle cell anaemia, Gene therapy, RNA interference, Precision medicine.

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A RARE CASE REPORT ON NECROTIZING FASCIITIS OF THE ENTIRE HEAD AND NECK

Mr. Riton Shil*, Dr. Karthik M#,

Student*, Assistant Professor#,

Aditya Pharmacy College (A), Surampalem.

ritonshil545@gmail.com

Abstract: Necrotizing fasciitis (NF) Is rare but potentially lethal condition of the soft tissue which is present under the skin, early diagonosis and surgery minimize morbidity and mortality associated with NF. NF is characterized by its fulminating, and generalized necrosis of the superficial fascial layer and cutaneous tissue. NF occurs more commonly in patients with weakened immune systems, and occurs more frequently in the abdominal wall, perineum, and extremities. The NF progresses rapidly and crosses multiple tissues of the head and neck. outcomes range from severe disfigurement, loss of the eye and even to death, Non-specific erythema and localised painful swelling of the eyelids characterise the earliest manifestations of the disease, followed by formation of blisters and necrosis of the periorbital skin and subcutaneous tissues. Necrotising fasciitis is more common in females (54%). The soft tissue infection can follow local blunt trauma (17%), penetrating injuries (22%) and face surgery (11%). A case of NF of odontogenic origin and history of diabetes mellitus in 44years old male presented with 10 days history of progressive left facial necrosis and blurred vision of the left eye. It is associated with left periorbital pain, swelling, fever, and general malaise. On physical examination crepitus, fluctuation and local heat over entire face and scalp were observed. Broad spectrum antibiotics were given, tissue transfer was done to reconstruct the face Temporary tarsorrhaphy is necessary for Iatrogenic cicatricial lagophthalmos following serial debridements. The patient successfully survived an acute infection, demonstrating the importance of this treatment in preserving the body function, and appearance.

Keywords: Necrotizing fasciitis, Soft tissue infection, Odontogenic, Diabetes mellitus, Debridement.

ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS IN PHARMACEUTICAL RESEARCH

Miss Sana Sahil

Associate Professor,

College of Pharmacy ,Sri Satya Sai University of Technology and Medical Sciences.

sana.sahil991@gmail.com

Abstract: Artificial intelligence (AI) is a powerful tool that helps in the identification of various elements which are used for the cure of several diseases and in the diagnosis of that particular disease. The amazing advancements in AI technology and machine learning present numerous opportunities in the drug formulation and also in the testing of pharmaceutical products. By utilizing the AI algorithms the analysis of ex-biological data becomes easy. The Data analytics and AI tools in pharmaceuticals enable gathering insights from various data sources that not only help our researchers in the identification of associated targets for diseases but also in prediction of potential drug candidates with their interactions. This increases the potentiality of successful drug approvals in numerous fields. AI can help us in lowering drug trial costs and enhance the gross outcomes in the development of clinical area. AI algorithms can ensure about the process of formulation, mixing, production, management, storage and in the assistance of experimental design by predicting the pharmacokinetics and toxicity of drugs. Due to this the prioritization and optimization of lead compounds reducing the need for costly animal testing. The automated screening algorithms links the molecular descriptions, blueprinting which enables the better testing and learning solutions not only for the product delivery but also in the design of new products used for more effective treatment.

Keywords: Artificial intelligence(AI), Data analytics, Drug discovery, Algorithms, Pharmacokinetics.

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A CASE STUDY DESCRIBING A PATIENT WITH GRAVES DISEASE WHO PRESENTED WITH PANCYTOPENIA, JAUNDICE AND HEART FAILURE

Mr.Tejaswi Phanindhra Yelchuri

Student, Aditya Pharmacy College (A), Surampalem.

tejaphanindhraelchuri@gmail.com

Abstract: Graves' disease results in a wide spectrum of clinical symptoms. Delays in recognizing and treating Graves' condition could have major systemic effects such as heart, skeletal -muscle, bone and general weakness problems. About 4 out of 5 cases of hyperthyroidism in the world is caused by graves disease. Graves' disease estimated to affect 2-3% of the general population. We present the case of a 25-year-old patient who had a cough, ankle swelling, and an expanded belly a few months ago. Case report was examined and found to have ascites, diffuse goitre, bilateral exophthalmos, jaundice, and lower limb oedema. Investigations conducted in the lab revealed elevated levels of thyroid stimulating hormone together with positive anti-thyrotropin receptor antibodies and repressed thyroid stimulating hormone. In addition, the patient presented with cholestatic pattern of increased liver enzymes, pancytopenia, and coagulopathy. Bisoprolol[5mg] and propylthiouracil[50mg] medications should be started immediately who had been diagnosed with hyperthyroidism. In this case the use of bisoprolol and the return to euthyroid status were linked to a significant improvement in the symptoms of heart failure. The patient may have a heart attack or develop mental health issues if propylthiouracil and bisoprolol were not given.

Keywords: Graves' Disease, Thyroid disorders, Pancytopenia, Coagulopathy, Bilateral Exopthalmos

MIGRAINE IN MENSTRUATION: A REVIEW

Dr.Jayashri Patil*, Dr.Swapnil Deshmukh

*Assistant Professor, NESS Gangamai College of Pharmacy, Nagaon

#DCS A.R.A. College of Pharmacy, Dhule.

jayshreeapatil22@gmail.com

Abstract: Migraine is a chronic neurological disease that affects 10-12% of the population, with a clear majority in women, starting in adolescence. The women report that the attack lasted longer. The presence and severity of accompanying symptoms such as photophobia, phonophobia, nausea, vomiting and cutaneous allodynia are more common in women. Some clinical forms are described as well-resolved migraine. Multiple comorbidities have been described in women with migraine. Of these migraine-related diseases: vascular diseases, asthma, allergies, epilepsy, restless legs syndrome, and various chronic pain syndromes and psychiatric disorders. Fluctuating estrogen levels and menstrual disorders are associated with increased migraine prevalence during the perimenopause .Numerous biological processes are regulated by estrogens and progesterone via two different mechanisms: nongenomic and genomic. They affect a number of neurotransmitters and neuromediators, and they may alter the structure and function of several brain areas that are involved in the etiology of migraines. Sex hormones not only have a central effect but also quickly alter vascular tone. . Preventive treatment is indicated when the attacks are long-lasting, severe and disabling and do not respond to acute treatments. Short-term prophylaxis (at the time of headache vulnerability) employs standard drugs such as magnesium, ergotamine or NSAIDs; triptans are currently being evaluated for short-term prophylaxis.

Keywords: Menstruation, Migraine, Women, Hormones, NSAIDs.

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A CASE STUDY AND REVIEW OF THE LITERATURE DESCRIBING A NEW MUTATION IN THE TTN GENE THAT CAUSED LEFT VENTRICULAR NON-COMPACTION

Mr. Lokesh Achanta

Student, Aditya Pharmacy College (A), Surampalem.

lokeshachanta6@gmail.com

Abstract: The TTN gene codes for the production of titin, a massive protein. A 43-year-old man was admitted to the hospital after experiencing shortness of breath and tightness in his chest that got worse over the course of five hours. He had an earlier diagnosis of LVNC. The ECG revealed tachycardia and atrial fibrillation. The patient was diagnosed with LVNC, heart failure, arrhythmia, and atrial fibrillation. Echocardiography or CMRI are currently the primary methods used for the morphological diagnosis of LVNC. Recent genomic studies revealed that sarcomere protein genes that can cause LVNC include MYH7, ACTC1, TNNT2, MYBPC3, TPM1, TNNI3, and TNN. The titin gene (TTN), which has 364 exons, is a member of the sarcomere protein genes family. Here the TTN gene was found in this instance at chromosomal position chr2:179410276, exon 293, codon 87,857 of NM_133378, according to direct sequencing of the patient's gene exons using sequencing technology. A heterozygous nonsense mutation of amino acid 29,286 transcribed from tryptophan to stop codon was caused by a mutation in transcript 4 from G to A. This study identified a novel mutation site in TTN, which enriches the spectrum of pathogenic variants in LVNC and provides help for future genetic diagnosis.

Keywords: Left ventricular non-compaction, Titin gene, Cardiac magnetic resonance imaging.

CRISPR/CAS9 THERAPY REVOLUTIONIZING GENETIC MEDICINE

Ms. Deena Kumari Mutyala, Mr. Vinayak L

Student, Vikas Institute of Pharmaceutical Sciences

deenamutyala78@gmail.com

Abstract: The CRISPR/Cas9 genome editing system represents a groundbreaking advancement in genetic medicine, enabling precise and targeted modifications of DNA sequences. This technology employs the Cas9 nuclease, directed by guide RNA, to facilitate targeted gene alterations, paving the way for treatment strategies for monogenic diseases such as sickle cell anaemia, Duchenne muscular dystrophy, and cystic fibrosis. This paper highlights the in vivo applicability of CRISPR/Cas9 delivery, discussing the use of viral vectors and nanoparticle technologies. It addresses critical challenges including immunological reactions, off-target effects, and ethical concerns, and explores innovative solutions such as humanized Cas9 proteins, transient expression systems, and improved guide RNA design. The CRISPR/Cas9 toolbox is further expanded by advanced methods like base and prime editing, which offer greater precision and versatility in genetic modifications. Additionally, CRISPR/Cas9's applications in regenerative and personalized medicine demonstrate its potential to treat and cure various genetic diseases. However, to ensure the ethical and safe application of these technologies, stringent clinical trials and robust regulatory frameworks are required. As research progresses, CRISPR/Cas9 continues to be a promising therapeutic intervention and a pivotal force in the revolution of genetic medicine.

Keywords: CRISPR, Genetic medicine, Cancer, Drug delivery, Cystic fibrosis.

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ADAPTING TAILORED NANOCARRIERS TO EVOLVING ANTI MALARIAL MEDICATION DELIVERY NEEDS

Mr. Riton Shil*, Dr. Bhargava Narendra J#

Student*, Assistant Professor#,
Aditya Pharmacy College (A), Surampalem.

ritonshil545@gmail.com

Abstract: Adapting existing antimalarial nanocarriers to novel Plasmodium stages, medicines, targeting compounds, or encapsulating structures is a method that could lead to new nanotechnology-based, low-cost malaria treatments. Scientists investigated the modification of various liposome prototypes developed in our laboratory for the targeted delivery of anti malarial medicines to Plasmodium-infected red blood cells (pRBCs). These new models include: immunoliposome-mediated release of new lipid-based antimalarials; liposomes targeted to pRBCs with covalently linked heparin to reduce anticoagulation risks; heparin adaptation to pRBC targeting of chitosan nanoparticles; heparin use for Plasmodium stage targeting in the mosquito vector; and use of the non-anticoagulant glycosaminoglycan chondroitin 4-s. Pre-existing anti malarial nanocarriers and targeting molecules (grey boxes) have been adjusted in their nanocapsule, targeting molecule, and drug payload to respond to novel malaria parasite therapy techniques. Antimalarial medications have two distinct hosts: people and insect vectors. Encapsulation of pharmaceuticals in targeted nanovectors is a rapidly emerging area and pharmaceutical nanotechnology has been highlighted as a potentially vital tool in the future fight against malaria. These Nanoparticles may allow for low doses to limit the toxicity of the drug for the patient. Improvement of the efficacy of currently used hydrophilic (low membrane trespassing capacity) and lipophilic antimalarials (poor aqueous solubility), and use of “ORPHA” has the adaptability of nanovector. Despite the lack of commercial incentives for research in the field of nanomedicine for the treatment of malaria, various liposome and polymer-based nanocarriers have been developed for the targeted delivery of antimalarial drugs.

Keywords: Plasmodium, Nanocarriers , Orpha, PRbCs, Nanocarriers.

A POTENTIAL ADVANCE IN REDUCING COMPLICATIONS FROM TYPE 2 DIABETES AND CHRONIC KIDNEY DISEASE

Miss. Padmaja Rajana

Student, Aditya Pharmacy College (A), Surampalem.

padmajarajana2000@gmail.com

Abstract: The coexistence of type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD) poses significant challenges in management due to their combined impact on cardiovascular and renal outcomes. This abstract critically assesses the effectiveness and safety of Finerenone, a new nonsteroidal mineralocorticoid receptor antagonist, in patients with both T2DM and CKD. Recent clinical trials have shown that Finerenone effectively reduces albuminuria and slows the decline in kidney function in this high-risk group. Additionally, it demonstrates positive cardiovascular outcomes, positioning it as a promising treatment option beyond traditional therapies like angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs). Safety data suggests that Finerenone is generally well-tolerated, with manageable side effects such as hyperkalemia, renal function deterioration, non-fatal stroke, suppression of male hormone levels and non-fatal myocardial infarction. Despite its potential benefits, ongoing research is needed to understand its long-term impact on cardiovascular mortality and morbidity, especially in diverse patient subgroups. This review synthesizes current evidence, emphasizing the role of Finerenone in enhancing renal and cardiovascular outcomes in patients with T2DM and CKD, thus advocating for its inclusion in clinical guidelines. Future research should focus on refining patient selection criteria and treatment methods for Finerenone, as well as examining its effects on severe renal outcomes for the initiation of renal replacement therapy. Furthermore, investigating how Finerenone interacts with new treatments such as sodium-glucose cotransporter-2 (SGLT2) inhibitors could offer valuable information on improving combined therapies for better protection of the kidneys and heart.

Keywords: Finerenone, Nonsteroidal mineralocorticoid receptor, Hyperkalemia, Antifibrotic.

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HEYDE SYNDROME: AN UNKNOWN ORIGIN OF HAEMORRHAGING IN THE GASTROINTESTINE

Miss. Mounika Budati

Student, Aditya Pharmacy College (A), Surampalem.

budatimounika06@gmail.com

Abstract: Heyde's syndrome is a condition in which aortic stenosis coexists with gastrointestinal bleeding caused by angiodysplasia. The typical trio of acquired von Willebrand syndrome, gastrointestinal angiodysplasias, and aortic stenosis characterize this multisystem illness. GI angiodysplasias refer to delicate blood vessels that are apparent in the mucosa or submucosa of the GI tract and are prone to rupture, resulting in gastrointestinal bleeding in the geriatrics. Here's a case report of a 73-year-old female with a history of end-stage renal disease, chronic anaemia, diabetes mellitus, and hypertension who presented to the emergency department with a history of dark-tarry stools and abdominal cramping from one week. Laboratory tests revealed critically low haemoglobin, haematocrit, WBC count, platelet count, and high reticulocyte count. An echocardiogram revealed severe AS with an aortic valve area of 0.8 cm2. Because of the evident indications of angiodysplasia, the patient was referred to Gastroenterology The patient underwent a transcatheter aortic valve replacement (TAVR) procedure without complications and had unsuccessful events. HS is commonly seen in older individuals with GI bleeding and AS. Management involves aortic valve replacement, preferably TAVR, to reduce bleeding. Untreated Heyde's syndrome can cause severe complications like GI bleeding, anaemia, hemodynamic instability, shock, aortic stenosis, heart failure, and von Willebrand syndrome.

Keywords: Aortic stenosis, Angiodysplasia, Willebrand disease, Heyde's syndrome, Transcatheter aortic valve replacement.

HEMANGIOMA: A CASE-BASED APPROACH TO DIAGNOSTIC ACCURACY

Miss. Sowjanya Gandi

Student, Aditya Pharmacy College (A), Surampalem.

sowjanyagandi80@gmail.com

Abstract: Hemangiomas are a prevalent type of vascular tumor in the Indian population, with an estimated occurrence of 4-5%. These non-cancerous growths can manifest in any body part and are typically identified during infancy or early childhood. Complications associated with hemangiomas may involve ulceration, bleeding, and disfigurement, particularly if they are located in critical areas such as the face, etc. Detecting hemangiomas generally entails a physical examination and imaging procedures such as ultrasound or MRI. Here's the case report of a 24-year-old male patient, a developing tumor in his left buttock had been noticed over four years. The mass in the left gluteal region measured 8 x 6 cm and exhibited irregular, mushy, and slightly compressible enlargement characteristics. The patient's GPE and systemic assessment were normal, no signs of hip bone involvement in the pelvis were observed, and the diagnosis of hemangioma was based on clinical presentation and confirmed through imaging studies. The tumor was excised using an elliptical incision and sealed over a corrugated drain. Treatment options include observation, medication, laser therapy, or surgical removal, contingent on size and location of the tumor. Further investigations into the genetic and environmental factors contributing to the development of these growths. Furthermore, research on innovative treatment approaches, such as targeted therapies or immunomodulators, could enhance outcomes for individuals with hemangiomas.

Keywords: Hemangioma, Immunomodulators, Elliptical incision, Gluteal region, Tumor, Immunomodulation.

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POSTPARTUM THYROIDITIS: THYROID CHANGES IN POST-PREGNANCY

Miss. Shiny Petta

Student, Aditya Pharmacy College (A), Surampalem.

shinypetta@gmail.com

Abstract: Postpartum thyroiditis (PPT) refers to the transient occurrence of hyperthyroidism and hypothyroidism during the postpartum period, with the majority of women returning to a normal thyroid state within one year after childbirth. PPT is an autoimmune disorder which is a transient form of Hashimoto's thyroiditis occurring postpartum as a consequence of the immunologic flare following the immune suppression of pregnancy. This condition is thought to arise from immune system alterations during pregnancy and postpartum, which triggers an autoimmune response targeting the thyroid gland. It is a rare condition where the thyroid gland becomes inflamed within the first year after the pregnancy. Postpartum thyroiditis is an autoimmune disease associated with antibodies to thyroid peroxidase (TPO). Women experience symptoms in both the hyperthyroid and hypothyroid phases, but the association between PPT and postpartum depression remains undefined. Risk factors of PPT include personal or family history of autoimmune thyroid disorders, such as Hashimoto's thyroiditis or Grave's disease. The exact pathophysiology involves immune-mediated thyroid gland inflammation, resulting in transient hormone fluctuations. Approximately 25% of women with a history of PPT will develop permanent hypothyroidism in the ensuing 10 years. Hyperthyroidism typically occurs between 2 to 6 months postpartum, while the hypothyroid phase can manifest anytime between 3 to 12 months after delivery.

Keywords: Hypothyroidism, Early Pregnancy, Hyperthyroidism, Postpartum Thyroiditis, Thyroid-Stimulating Hormone, Levothyroxine, Inflammation, Auto-Immune.

A CASE REPORT AND SYSTEMATIC LITERATURE ANALYSIS ON THE IDENTIFICATION AND MANAGEMENT OF STATUS EPILEPTICUS IN INDIVIDUALS WITH DOWN SYNDROME

Miss. Hima Bindu Gudimetla

Student, Aditya Pharmacy College (A), Surampalem.

durgaammathalli5@gmail.com

Abstract: Down syndrome(DS) may be caused by chromosome 21 trisomy, an intellectual disability based on heredity. The neurological emergency status epilepticus has a serious risk to life and needs to be diagnosed and treated right away. The prevalence of epilepsy in India is 5.59-10 per 1000. Epilepsy is more common in children with DS than in children who typically develop. I report a case of a 45-year-old woman who exhibits modest and erratic upper limb parcel motions in conjunction with cognitive impairment. His medical background includes DS and the onset of Alzheimer's disease at the age of 40, followed by Late-onset myoclonic epilepsy in Down syndrome (LOMEDS) onset two years later. A diagnosis of non-convulsive SE with subtle motor components was obtained by the Salzburg criteria. It is commonly diagnosed as late-onset myoclonic epilepsy in Down syndrome in adults when patients experience tonic-conic and myoclonic seizures. After taking antiseizure medicine over the next few days Levetriacetam -2500 mg, valproic acid-1200 mg, and eslicarbazepine acetate- 400 mg along with propofol- 0.5 mg the patient's seizures resolved after ten days. Among the fifteen patients in the literature search, we found four having DS with SE. With 3 cases (75%), myoclonic status epileptus was the most common type of Status epileptic. In another case, a progressive symptomatic etiologic was seen.

Keywords: Down syndrome, Myoclonic, Status epileptics, Seizures, Chromosome 21

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RESTORING DAMAGED HEART BY STEM CELL THERAPY INTENDED FOR ACUTE CORONARY SYNDROME

Miss. Manjari Tekumudi

Student, Aditya Pharmacy College (A), Surampalem.

manjaritekumudi@gmail.com

Abstract: Acute coronary syndrome or coronary artery disease(CAD), is one of the leading causes of death globally, which refers to a group of heart diseases caused by reduced coronary blood flow to the myocardium. The disease severity ranges from an unstable appearance of ischemia symptoms, such as unstable angina, to myocardial death, which is the immediate life-threatening condition known as myocardial infarction. According to estimations, there were around 271 million CAD patients in the year 1990, and in 2019 the figure has increased to 523 million. The overall CAD prevalence was 6.2% in males and 10.8% in females. Cardiomyocyte loss is typically managed using guideline-directed medical therapy, and interventional or surgical methods; however, Stem Cell(SC) therapy emerges as a promising avenue for cardiac repair. The goal is to encourage the growth of new blood vessels, decrease inflammation, and potentially trigger the formation of new heart muscle cells by introducing stem cells from an external source into the damaged heart tissue, either directly through cellular replacement or indirectly through local paracrine effects. Various SC types have been used in studies of infarcted myocardium and clinical studies of CAD patients, including embryonic stem cells (ESCs) and induced pluripotent stem cells (iPSCs), muscle cells, multipotent stem cells such as bone marrow-derived cells, mesenchymal stem cells (MSCs), and cardiac stem and progenitor cells (CSC/CPCs). In conclusion, stem cell therapy holds the potential for augmenting traditional cardiac care in ACS patients.

Keywords: Acute coronary syndrome, Embryonic stem cells, Pluripotent stem cells, Multipotent stem cells, Mesenchymal stem cells, Cardiac stem and progenitor cells

NANOFORMULATIONS: A NEW FRONTIER IN ATHEROSCLEROSIS MANAGEMENT

Miss. Sara Aiswarya Bommeti

Student, Aditya Pharmacy College (A), Surampalem.

saraiswarya26@gmail.com

Abstract: Atherosclerosis (AS) is a chronic inflammatory disorder that affects the cardiovascular system and leads to high morbidity and mortality. Atherosclerosis worsens over time, with 50% of the population having cholesterol deposits by 40 years. 78% of Males are more likely to develop plaque after 45, while 66% of females are more prone to symptoms after 55. Factors like progesterone, stress management, and menopause contribute to atherosclerosis, with females experiencing higher systemic inflammation. Currently, oral medication is the mainstay of AS treatment, but side effects, low bioavailability, and other unfavorable factors limit its development. Nanomedicine is an emerging field of medicine using nanotechnology for advanced imaging and therapy. It has led to significant developments in cardiovascular diseases, including AS. It suggests novel oral nanoformulations such as liposomes, nanoparticles, nanoemulsions, and nanocapsules to improve their use in the treatment of AS. Numerous nanocarriers have been working for effective localization in atherosclerotic lesions. As a result of the creation of atheromatous plaques and artery stenosis, nanomedicines have displayed unique capabilities and provided de novo applications in diagnosing and treating atherosclerosis. It is widely assumed that with targeted drug delivery to atherosclerotic lesions and plaque, management of the onset and evolution of disease would be more effective than traditional treatment modalities. Nanotechnology can effectively cure over 50% of CVDs.

Keywords: Atherosclerosis, Nanomedicine, Cardiovascular system, Nanoparticles, Nanoformulations, Atherosclerotic lesions

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RECOGNITION OF *NAEGLERIA FOWLERI* (PRIMARY AMOEBIC MENINGOENCEPHALITIS (PAM))

Miss. Lalitha Maheshwari Dandipati

Student, Aditya Pharmacy College (A), Surampalem.

dpavanisandhya470@gmail.com

Abstract: The "Brain-Eating Amoeba" is actually a free-living amoeba (FLA) called Naegleria fowleri. When this parasite enters the central nervous system (CNS), it can lead to Primary Amoebic Meningoencephalitis (PAM), an acute, fulminant infection. Young adults worldwide are affected by PAM, a rare but deadly disease with a 95%–99% death rate that is mostly seen in affluent nations but has recently been recorded from emerging ones as well. PAM typically results in death less than two weeks after the initial exposure, despite having a low morbidity rate of 98%.Since warm water is the most favorable habitat in which N. fowleri can cause PAM, swimmers and divers are particularly vulnerable to contracting this illness. When infectious amoeba in the trophozoite phase enter a human being through the nose, they traverse the cribriform plate and make their way to the brain, where they severely damage the central nervous system (CNS). When a case goes misdiagnosed or is mistreated, brain damage results in cerebral hemorrhage and death within 3-6 days. Seizures, fever, intense headache, nausea, vomiting, light sensitivity, and disturbed mental state are some of the symptoms. Furthermore offers a thorough evaluation of the advantages and disadvantages of the diagnostic strategies now in use, including the investigation of cerebrospinal fluid, brain tissue examination, immunostaining procedures, and culture methods. The importance of early discovery in PAM management is emphasized, and the advantages of prompt identification for treatment, individualized care, and preventative measures are covered.

Keywords: *Naegleria fowleri*, Primary Amoebic Meningoencephalitis, Fulminant, Affluent, Vulnerable, Trophozoite phase, Cribriform plate, Cerebral hemorrhage, Cerebrospinal fluid

UTILIZATION OF AI IN 3D PRINTING TECHNOLOGY IN VARIOUS PHARMACEUTICAL SECTOR

Mr Shaizaan Motlekar*, Safa Baig*, Dr.Neeta Rai#

*Student, #Assistant Professor

School of Pharmacy, Vishwakarma University, Pune.

neeta.rai@vupune.ac.in

Abstract: In the Pharmaceutical sector, research into 3D printing technology is currently experiencing a global boom compared to traditional preparation technologies, 3D printing offers flexibility in the design of complex 3D structures within drugs. It provides precise control of drug release and a significant reduction in drug development time, driving a breakthrough in drug manufacturing technology and transforming the way we design, manufacture, and use drugs. The technologies used for 3D printing in Pharmaceuticals are BJ3DP, FDM, SSE, and MED and SLA describes the characteristics of this technology at each stage of preparation. Benefits of Artificial Intelligence and 3D Printing in the Pharmaceutical Industry. Recently, 3D printing (3DP) has illuminated a path for the on-demand production of fully customizable medicines. Leveraging AI within pharmaceutical 3DP removes the need for human expertise, as optimal process parameters can be accurately predicted by machine learning. AI can also be incorporated into a pharmaceutical 3DP 'Internet of Things', moving the personalized production of medicines into an intelligent, streamlined, and autonomous pipeline. The future perspective of these technologies will expedite the use of pharmaceutical 3DP in clinical settings and drive the global movement towards personalized medicine and Industry.

Keywords: Artificial Intelligence, 3D Printing, BJ3DP, FDM, SSE, MED and SLA, Leveraging AI, Internet of Things

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CAR-T THERAPIES IN MULTIPLE MYELOMA: PIONEERING THE FUTURE

Miss Mercy Pinipe

Student, Aditya Pharmacy College (A), Surampalem.

mercypinipe@gmail.com

Abstract: In recent years, remarkable advancements in cancer treatment have revolutionized patient care. Traditional methods like surgery, chemotherapy and radiation therapy have long been available, but a novel approach called chimeric antigen receptor (CAR) T-cell therapy has become a fundamental change in treating multiple myeloma (MM). This innovative therapy complements options such as autologous stem cell transplants and immunomodulatory drugs, including proteasome inhibitors and anti-CD38 antibodies with strong complement-dependent cytotoxic effects. Despite complexities and challenges associated with these treatments, the FDA's recent myeloma approval of the second CAR T- cell therapy for multiple myeloma demonstrates significant potential. The drug so far indicates that it could be highly effective treatment option. Furthermore, ongoing preclinical and clinical trials are exploring the ability of CAR T-cells to target specific antigens on myeloma cells, offering hope for patients with relapsed/refractory MM (RRMM). These advances have shown the potential of CAR T cell-based drugs or combination therapies to enhance treatment outcomes while reducing adverse effects. In this context, it is essential to investigate the origins and functions of CAR T-cells while acknowledging their limitations. Understanding these challenges allows the researchers to strategize and develop innovative approaches to overcome them. Multiple myeloma involves T-cell classifications and transcriptomic traits that influence surface targets expression, potentially enabling innovative strategies to attack the immune system..

Keywords: CAR T-cell therapy, Multiple myeloma, Autologous stem cell transplants, Proteasome inhibitors, Anti-CD38 antibodies

IN-SILICO EXPLORATION OF PHYTOTHERAPEUTIC AGENTS OF *PIMENTA DIOICA*: HOPE FOR DISCOVERY OF A NOVEL DRUG FOR URINARY TRACT INFECTIONS

Miss Irfana Mol K[#], Dr. Jayasheela D*
Research Scholar[#], Associate Professor*

Sri Ramakrishna College of Arts & Science (Formerly SNR Sons College) Tamil Nadu..

irfana.kn27@gmail.com

Abstract: Urinary tract infections (UTIs) are prevalent infections caused by bacteria that affect the urinary tract, particularly the bladder and urethra. Patients with urinary tract infections who become pregnant are at a higher risk of problems such as preterm labor and delivery complications. *Pimenta dioica* is an aromatic spice tree enriched with a wide range of bioactive compounds. This research investigates the phytotherapeutic potential of bioactive compounds from Pimenta dioica against urinary tract infections (UTIs) through in-silico methods. Ten phytocompounds of *Pimenta dioica* were retrieved from the KnapSack database including phenols like eugenol and gallic acid, and flavonoids such as ampelopsin and quercetin derivatives. Drug-likeness assessment based on Lipinski's Rule of Five identified six compounds suitable for further study. The molecular docking was performed against suitable targets such as DNA gyrase (PDB ID: 1KZN), and NAD+-dependent DNA ligase (PDB ID: 1TAE) and it revealed strong binding affinities of ampelopsin and myricetin with bacterial enzymes, crucial for UTI treatment. Absorption, distribution, metabolism, excretion, and toxicity analyses indicated favorable pharmacokinetic profiles and non-toxic properties for all selected compounds. Additionally, PASS analysis predicted their efficacy as bacterial efflux pump inhibitors. These findings suggest that Pimenta dioica extracts contain diverse bioactive compounds with potent anti-bacterial properties against multidrug-resistant UTI pathogens. The study underscores the potential of isolating and developing these compounds into novel UTI treatments, validating their traditional medicinal use and offering a promising avenue for drug discovery

Keywords: Phytocompounds, In-silico, *Pimenta dioica*, Urinary Tract Infections

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ENHANCED ANTIFUNGAL ACTIVITY OF THYME ESSENTIAL OIL CREAM WITH SILVER METAL COLLOID: BRIDGING TRADITIONAL REMEDIES AND MODERN INNOVATION

Dr Sachinkumar D. Pandey,

Assistant Professor, Viva Institute of Pharmacy, Maharashtra.

sachinkumarpandey@vivapharmacy.org

Abstract: Fungal infections of the skin represent a prevalent dermatological challenge, demanding effective topical antifungal treatments. The current landscape of antifungal therapy confronts multiple obstacles, including the rise of drug-resistant fungal strains, limited treatment choices, and adverse effects associated with existing antifungal medications. This study aimed to develop a novel herbal-metallic broad-spectrum topical antifungal formulation and evaluate its efficacy compared to conventional herbal drugs. Thyme essential oil, was investigated with varying amounts of silver metal colloid and stearic acid using a 3 2 factorial design. Design Expert 7 facilitated the optimization process based on significant impacts on viscosity, spreadability, and zone of inhibition (ZOI) ratio. Overlay plots from Design of Experiments (DoE) guided the formulation of an optimized batch of Thyme essential oil, demonstrating viscosity (55617.52±32.40 cP) and pH within desirable ranges, along with adequate spreadability. Results indicated that formulations enriched with silver metal colloids exhibited enhanced antifungal properties, particularly against Candida albicans, with a ZOI ratio of 1:1.3 compared to Thyme essential oil alone. This enhancement underscores the efficacy of silver metal colloids in augmenting herbal drugs, thereby improving their potency against fungal pathogens. The findings suggest promising directions for developing effective topical antifungal therapies, addressing current therapeutic challenges in dermatology.

Keywords: Topical antifungal, Herbal drugs, Silver metal colloid, Dermatological therapy, Fungal infections, Thyme Essential oil.

MANAGING VITAMIN B12 DEFICIENCY IN LONG-TERM METFORMIN USERS: CLINICAL INSIGHTS AND RECOMMENDATIONS

Miss Hepzibah Rani Gidla,
PharmD Intern, Aditya Pharmacy College (A), Surampalem.

hepzibahrani36@gmail.com

Abstract: Metformin is one of the most commonly prescribed drugs to patients with type 2 diabetes. Metformin is safe, effective, and cheaper; nevertheless, metformin increases vitamin B12 resistance which may lead to vitamin B12 deficiency in patients with T2DM. A considerable reduction in vitamin B12 levels is observed in long-term metformin usage, especially if metformin in doses above 2000 mg per day was used for the past 4 years. Vitamin B12 is a water soluble vitamin. It is a coenzyme for enzymes that are used in replication of DNA and neuroprotection within the cells. Therefore, vitamin B12 deficiency results in several clinical outcomes including altered blood picture like megaloblastic anemia and hypersegmented neutrophil generation along with peripheral neuropathy and progressive axonal demyelilation, Hyperhomocysteinemia (HHcy). The latest of medical care in diabetes-2023 released by the American diabetes association advise that B12 status should be checked regularly and if the patient on metformin, B12 replacement should be advocated. To tackle the problem of vitamin B12 deficiency due to metformin several possibilities exist such as, preventive calcium and vitamin B12 supplementation, discontinuation of metformin and replenishment of vitamin B12 stores orally or intramuscularly. Therefore, vitamin B12 level should be checked at least annually if on metformin and to continue with supplementation if metformin is still being used..

Keywords: Type 2 Diabetes (T2DM), Megaloblastic Anemia, Peripheral Neuropathy, Axonal Demyelination, Hyperhomocysteinemia, Neuroprotection.

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ROLE OF ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY & DEVELOPMENT

Miss Reethu Metilda Manukonda,

PG Scholar, Sri Vasavi Institue of Pharmaceutical Sciences, Tadepalligudem.

sirimanukonda963@gmail.com

Abstract: Artificial intelligence is revolutionizing various industries by processing huge amounts of data and automating routine tasks. The pharmaceutical sector has also been actively leveraging AI capabilities to optimize drug discovery and development procedures. This study explores the ways AI is aiding the process from target identification to clinical trials. During lead identification, machine learning algorithms analyze molecular databases to predict potential candidates. Deep learning models then help design these candidates by simulating chemical reactions. Virtual screening using neural networks further shortlists candidates for in vitro testing. AI then supports research at various drug testing stages through in silico simulations before animal/human studies. It also facilitates precision medicine by identifying unique molecular signatures in patients. AI-powered tools are assisting with clinical trial recruitment, monitoring adverse effects, and accelerating drug approval. Regulatory bodies will need to devise ethical frameworks for emerging areas like generative AI. Overall, AI offers enormous potential to develop safer and affordable drugs faster by streamlining resource-intensive processes.

Keywords: Drug design, AI tools, Clinical trials, Drug Development, Target Identification