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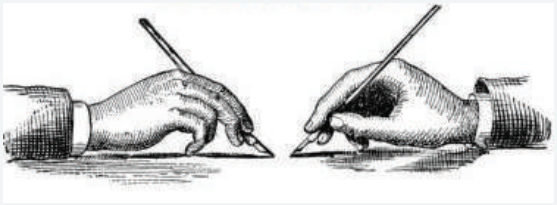
Editorial

E-mail: rxfactornpt@gmail.com



It is a privilege to present Issue 15 of RxFactor, continuing our mission to deliver clinically relevant and scientifically robust insights in Pharmacology and Therapeutics. This edition reflects the evolving interface between innovation, evidence-based practice, and global health priorities.

This issue highlights key advances shaping clinical practice, beginning with Oral Selective Estrogen Receptor Degraders (SERDs) in hormone receptor-positive breast cancer and copper histidinate as the first targeted therapy for Menkes disease. We also explore emerging areas such as space pharmacology and mechanopharmacology, reflecting the expanding scope of the discipline.

Further, we review peptide therapeutics with an emphasis on evidence-based use and examine the mental health implications of GLP-1 receptor agonists. Updated recommendations from the National Institute for Health and Care Excellence for Type 2 Diabetes Mellitus are also summarized for practical relevance.

Our pharmacovigilance section presents a case of Stevens-Johnson Syndrome in a patient with HIV following cotrimoxazole use.

This issue also features a dedicated thematic segment on Tuberculosis. We examine national and global control strategies, assess progress and persistent gaps, and review evolving treatment paradigms. Special emphasis is placed on the BPaLM regimen, which represents a significant advancement in the management of multidrug-resistant tuberculosis, alongside a concise update on the latest treatment guidelines.

As always, we conclude with engaging academic elements—including a crossword on skeletal muscle relaxants, the TB One-Word Blitz, an educational comics on newer drugs, and the extract.

We truly appreciate our authors and contributors, whose hard work and dedication help make our community's discussions richer and more valuable.

In this issue, we renew our promise to encourage thoughtful discussions, bring together different areas of expertise, and help all professionals in pharmacology keep learning and growing.

We hope this edition will give you helpful information and inspire you to explore further.

With regards,
Team RxFactor
National Association of Pharmacology and Therapeutics (NPT)
Jai Hind

Dr Ruchi Baghel
Chief Editor, Professor
Department of Pharmacology
Ruxmaniben Deepchand Gardi Medical College, Ujjain,
Madhya Pradesh

Dr. Snehalata Gajbhiye
Associate Editor
Associate Professor
Department of Pharmacology
AIMS Nagpur Maharashtra

Dr. Biacin Babu
Associate Editor
Associate Professor
Department of Pharmacology
VMCC & Safdarjung Hospital,
New Delhi

Dr. Aradhna Sharma
Associate Editor
Associate Professor
Department of Pharmacology
SLBS Govt. Medical College & Hospital Mandi,
Himachal Pradesh

Oral Selective Estrogen Receptor Degraders (SERDs): The Future of Endocrine Therapy for Estrogen Receptor-Positive Breast Cancer

Introduction

Hormone receptor–positive breast cancer accounts for nearly 70% of all breast cancer cases worldwide. Endocrine therapy remains the cornerstone of treatment, targeting oestrogen signalling pathways that drive tumour growth. For decades, therapies such as Tamoxifen and aromatase inhibitors have significantly improved survival outcomes in estrogen receptor–positive (ER+) breast cancer. However, a major clinical challenge is the development of endocrine resistance, particularly in advanced or metastatic disease. Mutations in the oestrogen receptor gene (ESR1) and adaptive signalling pathways can reduce the effectiveness of conventional endocrine therapies.

Recent advances in pharmacology have led to the development of oral selective estrogen receptor degraders (SERDs), a new class of drugs designed to directly target and degrade the estrogen receptor. Oral SERDs represent a transformative advancement in endocrine therapy for estrogen receptor-positive (ER+) breast cancer, offering oral alternatives to injectable fulvestrant with improved potency against resistance mechanisms. These next-generation agents promise better patient convenience and efficacy in both advanced and early-stage disease.

Understanding SERDs

Selective estrogen receptor degraders (SERDs) bind to the ERα, inducing a conformational change that prevents DNA binding and triggers ubiquitination and proteasomal degradation of the receptor. Unlike selective estrogen receptor modulators (SERMs) like tamoxifen, which can exhibit partial agonism, SERDs act as pure antagonists, fully blocking estrogen-dependent and independent signaling. Fulvestrant, the first SERD approved in 2002, requires monthly intramuscular injections at 500 mg, limiting adherence and bioavailability. Oral SERDs address these drawbacks by providing daily dosing with higher ER degradation potency, particularly in ESR1-mutated tumors—a key resistance driver after aromatase inhibitor (AI) therapy, occurring in up to 40% of metastatic cases. (Fig. 1)

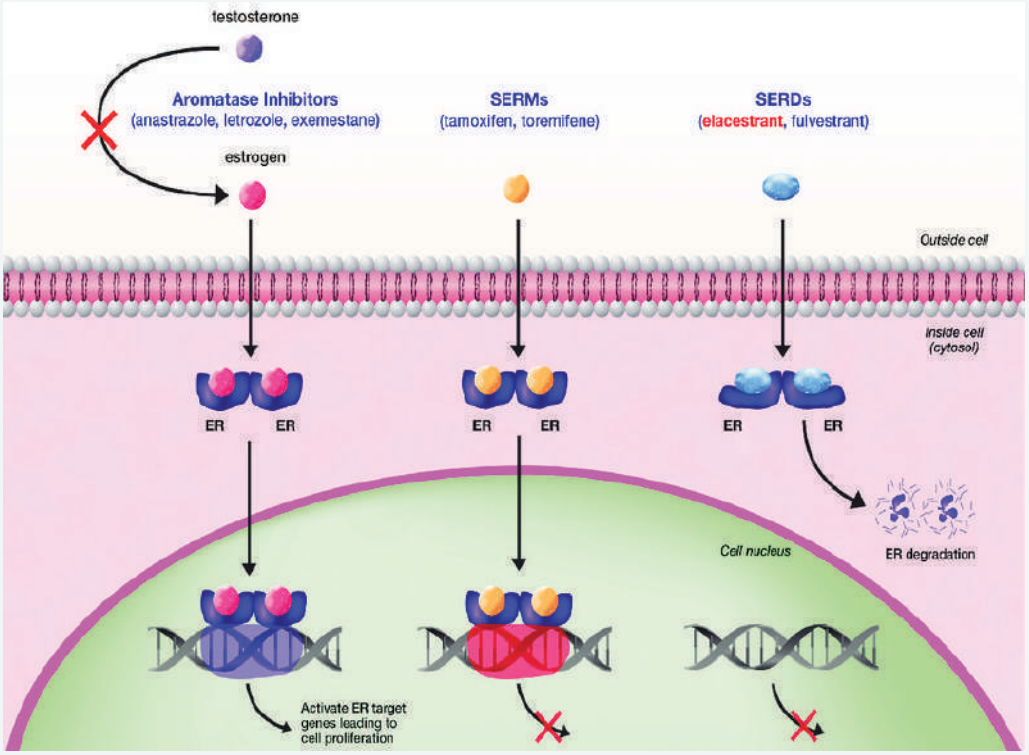


Fig 1: Mechanism of action -Aromatase inhibitors, SERMs and SERDs

Rise of Oral SERDs

Development of oral SERDs accelerated post-2015, with nonsteroidal structures incorporating acrylic acid or basic amine side chains for optimal ER binding and degradation. **Five lead candidates—elacestrant, camizestrant (AZD9833), giredestrant (GDC-9545), imlunestrant (LY3484356), and amcenestrant (SAR439859)**—have advanced through trials, showing superior preclinical activity over fulvestrant in wild-type and ESR1-mutant models. These agents reduce ER levels by 80-98% and suppress proliferation markers like Ki67 more effectively, even in CDK4/6 inhibitor-pretreated cells. By March 2026, elacestrant and imlunestrant are FDA-approved for ESR1-mutated, ER+/HER2- advanced breast cancer post-endocrine therapy, while others await decisions.

Tackling Resistance

Endocrine resistance arises via ESR1 mutations (Y537S, D538G), ER/crosstalk (PI3K, MAPK), or loss of ER expression. Oral SERDs restore sensitivity by degrading mutant ER, reducing variant allele fractions in ctDNA, and synergizing with targeted therapies. Unlike aromatase inhibitor, they block ligand-independent activity; preclinical data show tumor regressions in fulvestrant-resistant patient-derived xenografts. In ESR1-mutated subsets, oral SERDs outperform fulvestrant by 30-50% in PFS hazard ratios due to higher bioavailability.

Expanding to Early Disease

Adjuvant trials like lidERA (giredestrant) and CAMBRIA-2 (camizestrant, 5,500 patients over 7 years) target high-risk early ER+/HER2- cases to prevent recurrence, where 30% relapse on standard endocrine therapy. Neoadjuvant window studies (SERENA-3, coopERA) confirm biological efficacy, paving for frontline use. Ongoing phase IIIs (SERENA-4, persevERA) test combinations with CDK4/6i in treatment-naïve advanced disease.

Conclusion

By 2026, oral SERDs could become first-line standards, sequenced post-CDK4/6i or adjuvant, delaying chemotherapy. Biomarkers like ESR1 ctDNA will guide selection; combinations with PI3K/mTOR inhibitors address multifactorial resistance. Roche's giredestrant NDA (post-CDK4/6i with everolimus) eyes December approval. With 70% of breast cancers ER+, these agents could halve recurrence risks long-term. Challenges will remain in optimal dosing, rare hepatotoxicity, and head-to-head trials vs. emerging PROTACs/SERCAs. Ultimately, oral SERDs herald a patient-centric era in endocrine therapy, enhancing outcomes while minimizing burden.

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Dr N. Shobana
Senior Resident, Dept of Pharmacology,
Sri Venkateswaraa Medical College Hospital & Research Institute, Chennai

Dr E. Gayathri
Associate Professor, Department of Pharmacology,
Sri Venkateswaraa Medical College Hospital & Research Institute, Chennai

First ever treatment for Menkes disease
Copper histidinate

What is Menkes disease?

It is X-linked recessive connective tissue disease caused by impaired copper absorption and transport due to defective Menkes protein ATP7A. This leads to copper deficiency. Collagen synthesis and structure formation involves cross-linking. Which utilizes an enzyme called lysyl oxidase. For which copper is necessary cofactor. Deficiency of which leads to defective collagen formation, resulting in brittle hair, growth and developmental delay, hypotonia as well as **cerebral aneurysm**.

Parameter	Copper Histidinate (Zycubo)
Drug class	Trace element replacement therapy
Chemical nature	Copper–L-histidine complex
Rationale for use	Bypasses defective intestinal copper transport due to **ATP7A mutation**
Primary defect in Menkes	Impaired copper absorption and cellular transport (not dietary deficiency)
Route of administration	**Subcutaneous injection**
Why parenteral route?	Oral copper ineffective due to intestinal ATP7A defect
Bioavailability	High systemic availability via direct circulation entry
Blood–brainbarrier penetration	Limited but **possible if administered early (in neonatal period)**
Mechanism of action	Provides bioavailable copper for incorporation into copper-dependent enzymes
Key enzymes restored	Lysyl oxidase, cytochrome-c oxidase, dopamine β-hydroxylase, tyrosinase
Primary pharmacodynamic effect	Improved mitochondrial respiration, neurodevelopment, connective tissue integrity
Onset of benefit	Greatest when started **⩽30 days of life**
Disease-modifying effect	Yes (when initiated early)
Effect on neurological outcome	Stabilizes or improves neurodevelopment if started pre-symptomatically
Effect on survival	Significant survival benefit compare to historical controls
Metabolism	Copper incorporated into normal physiological copper pools
Elimination	Excess copper excreted mainly via **bile**
Dose-limiting toxicity	Copper overload → hepatic or renal toxicity
Monitoring required	Serum copper, ceruloplasmin, liver & renal function
Major adverse effects	Injection-site reactions, potential copper toxicity
Duration of therapy	**lifelong**
Regulatory status	**First FDA-approved Rx for Menkes disease** [on January 12, 2026]
Clinical limitation	Limited efficacy if started after significant neurodegeneration

Details on dosing and monitoring:

Parameter	Details
Route of administration	Subcutaneous injection
Common injection sites	Anterolateral thigh, abdomen, upper arm (rotate sites)
When to start	As early as possible, ideally ⩽30 days of life
Initial dose (neonates)	~250 µg elemental copper/day
Dosing frequency	Once daily
Dose adjustment	Weight-based, increased as child grows
Duration of therapy	Lifelong
Primary labs to monitor	Serum copper, ceruloplasmin
Secondary safety labs	Liver function tests (AST, ALT, ALP, bilirubin)
Renal monitoring	Serum creatinine, BUN
Target levels	Maintain low-normal serum copper & ceruloplasmin
Risk if under-dosed	Persistent copper deficiency, neurodegeneration
Risk if over-dosed	Copper accumulation → hepatic toxicity
Common adverse effects	Injection-site pain, erythema, swelling

Why this formulation works in Menkes disease?
The key idea is not the copper — it's the **carrier (histidine)**.

1. Histidine forms a stable, bioavailable copper complex which mimics physiological copper transport

- Copper histidinate = Cu^{2+} + L-histidine
- Histidine:
  - Chelates copper loosely (not too tight, not too free)
  - Prevents free copper toxicity
  - Keeps copper soluble and transportable
- So, Copper histidinate:
  - Circulates longer
  - Reduces first-pass hepatic binding [limits hepatotoxicity]
  - Improves delivery to extrahepatic tissues, including brain
  - Other copper salts release free copper ions, which:
  - Are rapidly bound by proteins
  - Are cleared by the liver,

Rarely circulate longer to utilise by brain and other organs

- Net effect in the CNS:
  - More copper reaches neurons
  - Copper-dependent enzymes are activated
  - Mitochondrial function improves
  - Neurodegeneration slows (if administered early)

Dr Krishna Patel
Assistant professor Department of Pharmacology,
GCS medical college.

Space Pharmacology and Human Health in Long-Duration Space Missions

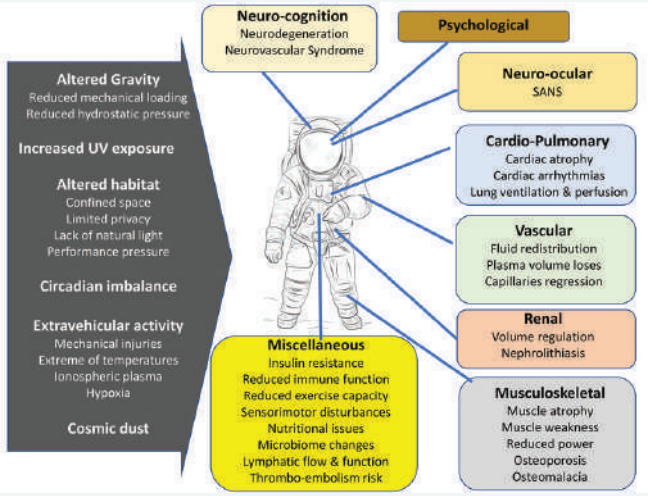
Human spaceflight is entering a new era. Increasing numbers of astronauts and private individuals are traveling to space, missions are becoming more frequent, and space agencies such as NASA are planning long-term human presence on the Moon and future crewed missions to Mars.

Space travel exposes astronauts to conditions very different from those on Earth, particularly **microgravity and increased cosmic radiation**. These environmental factors produce significant physiological changes affecting several organ systems. Understanding how the human body responds to these conditions is essential for planning safe long-duration missions, especially future missions to Mars that may last more than two years (1).

The expansion of human space exploration has also created new challenges for medicine. Most pharmacological knowledge has been developed through studies conducted under Earth's gravitational conditions. However, factors such as microgravity, radiation exposure, confinement, isolation, and disrupted circadian rhythms can alter the body's response to medications. As a result, two emerging fields—**space pharmacology and astro-pharmacy**—have developed to study how drugs behave in space and how medicines can be safely used during space missions (2).

Astronauts experience numerous physiological changes in microgravity. Microgravity lowers blood volume and alters cardiovascular function, affecting heart rate, blood pressure, and oxygen utilization. Studies have shown that maximal oxygen uptake can decrease by approximately 22% even during short space missions (3–5). Muscle loss occurs because the body no longer works against gravity. Muscle fibres undergo atrophy, protein synthesis decreases, and protein breakdown increases, leading to significant reductions in muscle mass and strength during long missions (6). Bone health is also affected because the skeleton is no longer exposed to normal mechanical loading. Calcium is rapidly released from bones, and astronauts may lose approximately 0.5–1.5% of bone mineral density each month (7–9). To counter these effects, astronauts rely on structured exercise programs and pharmacological interventions such as vitamin D supplementation and bisphosphonates (10).

These physiological alterations can significantly influence **drug absorption, distribution, metabolism, and excretion (ADME)**. In microgravity, gastrointestinal motility may be reduced, resulting in slower gastric emptying and altered drug absorption. Fluid shifts within the body can change plasma protein levels and modify the distribution of drugs, particularly those that are highly protein bound (11). Additionally, liver enzyme activity, including cytochrome P450 enzymes, may be affected by microgravity, potentially altering drug metabolism. Changes in kidney function can also influence drug elimination, leading to variations in drug concentration and therapeutic response (12).



Microgravity-induced fluid shifts also affect drug distribution. Body fluids tend to accumulate in the upper torso, producing the characteristic "moon-face" appearance observed in astronauts. These shifts may alter the **volume of distribution** of many medications, requiring adjustments in dosing strategies to maintain therapeutic effectiveness and minimize adverse effects.

Another important concern in space medicine is the **stability of pharmaceuticals**. Exposure to cosmic ionizing radiation, temperature fluctuations, and mechanical stresses during launch can degrade medications and reduce their potency. Studies conducted aboard the International Space Station have shown that certain medications degrade more rapidly in space than

expected. This raises concerns about maintaining adequate drug supplies during long-duration missions such as those planned for Mars (13).

Radiation exposure can cause pharmaceutical degradation through processes such as **radiolysis**, where radiation interacts with water molecules to produce reactive chemical species that can alter drug compounds. To address these challenges, researchers are investigating protective packaging materials, antioxidant formulations, and encapsulation techniques to enhance drug stability in the space environment (13).

Recent research has also suggested that some medications may provide protective effects against radiation. For example, Metformin, a widely used drug for type 2 diabetes, has shown potential radioprotective properties. Studies published in PLOS ONE demonstrated that metformin administration before exposure to simulated cosmic radiation reduced DNA damage and cellular injury in experimental models. This protective effect appears to be associated with activation of AMP-activated protein kinase (AMPK), which helps protect cells from radiation-induced oxidative stress.

Traditional dosage forms may be less practical in microgravity. Alternative approaches such as transdermal patches, autoinjectors, intranasal delivery systems, and nanocarrier-based drug formulations are being explored to ensure reliable drug administration during space missions (14).

Personalized medicine is another promising approach for space healthcare. By analysing genetic and epigenetic differences among astronauts, individualized treatment strategies can be developed to optimize drug dosing and therapeutic responses. In addition, artificial intelligence systems are increasingly being used to analyse data from wearable biosensors and onboard medical equipment, enabling real-time monitoring and medical decision-making during missions (15).

In the future, advances in personalized medicine, artificial intelligence, and biosensor technology will play a critical role in supporting astronaut health. The development of robust pharmaceutical systems and planetary healthcare infrastructure will be essential for enabling safe and sustainable human exploration of the Moon, Mars, and beyond.

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Dr. Mitra Bhattacharyya,
Assistant professor,
Department of pharmacology,
Nalbari medical college, Dakhingaon
Nalbari-781350.

From Tissue Stiffness to T-Cell Signalling: The New Era of Mechanopharmacology

Introduction

Pharmacology has traditionally grounded on biochemical interactions between drugs and receptors. However, recent research shows that **mechanical forces within cells and tissues also influence cellular signalling, drug response, and disease progression**. This concept has led to the emergence of **mechanopharmacology**, a field that studies how physical factors such as extracellular matrix (ECM) stiffness, cellular tension, and force-dependent receptor interactions regulate biological function. These biomechanical influences are increasingly recognised in ageing, fibrosis, cancer, and immunotherapy, suggesting that drug action depends not only on chemistry but also on the physical state of the cellular environment.

Tissue Stiffness and Ageing

Ageing leads to increased tissue stiffness from ECM remodelling, including excessive collagen, abnormal cross-linking, and loss of elastin—all of which reduce elasticity and impair organ function. In lungs, this promotes chronic respiratory disease; in ovaries, it disrupts follicular development and lowers oocyte quality. Biomechanical changes are active contributors to age-related diseases.

Mechanosensing Pathways

Cells detect mechanical signals via pathways like TGF-β, YAP/TAZ, Integrin-FAK, Wnt/β-catenin, RhoA/ROCK, and PI3K/Akt. These regulate fibrosis, inflammation, cell survival, and repair. In ageing, their persistent activation increases ECM deposition, perpetuating stiffness. Thus, targeting these pathways may restore tissue mechanics and improve outcomes.

Mechanopharmacology in Immunology: Force-Dependent T-Cell Signalling

T-cell receptor signalling depends on force-based interactions at the membrane, not just binding affinity.

Therapeutic Implications

Mechanopharmacological strategies aim to modify tissue mechanics, regulate mechanosensitive pathways, or prevent abnormal ECM remodelling.

Following targets are being explored to possibly reduce fibrosis and restore tissue flexibility in age related diseases.

- Inhibitors of integrins
- Lysyl-oxidase enzymes
- TRPV channels
- Piezo receptors
-

Recognizing the influence of mechanical forces further opens new directions for drug development:

- **Refining engineered T cells for immunotherapy** with improved specificity and reduced toxicity through understanding force-dependent receptor behaviour
- **Designing force-responsive ligands** that achieve optimal activity under physiological mechanical conditions rather than maximizing static affinity
- **Targeting mechanosensitive signalling networks**, including integrin-mediated pathways and cytoskeletal regulators
- **Incorporating biophysical screening tools**

Challenges and Future Directions

Despite promising advances, mechanopharmacology faces challenges. Mechanical properties differ between organs, making universal therapies difficult. Experimental models often fail to reproduce human tissue biomechanics, and drugs targeting mechanosensitive pathways require precise delivery to avoid adverse effects.

Future progress will depend on interdisciplinary research combining pharmacology, biomechanics, molecular biology, and bioengineering. Improved models of tissue stiffness and reliable biomarkers will be essential for clinical translation.

Conclusion

Mechanopharmacology represents a paradigm shift in our understanding of disease by integrating the physical and biochemical aspects of cellular function. By recognizing that cells respond not only to molecular signals but also to mechanical forces, this approach

opens new avenues for diagnosis and treatment. Effective therapy in the future may depend not only on targeting the right molecular pathway but also on restoring the appropriate physical environment in which cells function.

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Dr. S. Abirama Sundari MD
Senior Resident
Department of Pharmacology
Tagore Medical College and Hospital, Chennai.

Peptide Therapeutics: Emerging Opportunities and the Need for Evidence-Based Use

Peptide therapeutics have emerged as an important and rapidly evolving class of drugs in modern pharmacology. Advances in biotechnology, molecular biology, and drug delivery technologies have facilitated the development of peptide-based medicines targeting a wide range of diseases. Currently, more than 80 peptide drugs have been approved globally, and over 150 peptide molecules are undergoing clinical investigation, reflecting the growing importance of this class of therapeutics.[1] The increasing interest in peptide drugs is closely associated with the concept of precision medicine, where therapies are designed to target specific molecular pathways involved in disease.

Peptides are short chains of amino acids that function as endogenous signalling molecules regulating several physiological processes such as hormone secretion, metabolism, immune responses, and tissue repair. Because peptide drugs often mimic natural biological ligands, they can interact selectively with specific cellular receptors and trigger targeted pharmacological responses.[1] This receptor specificity distinguishes peptide therapeutics from many conventional small-molecule drugs, which may influence multiple physiological systems simultaneously.

One of the major advantages of peptide drugs is their high selectivity and potency, which may result in improved therapeutic efficacy and reduced off-target toxicity. However, peptide therapeutics also present certain pharmacokinetic challenges. Peptides are susceptible to enzymatic degradation in the gastrointestinal tract and bloodstream, leading to poor oral bioavailability and relatively short half-lives.[2] Consequently, many peptide drugs are administered through parenteral routes such as subcutaneous or intravenous injections. Advances in peptide engineering, including pegylation, lipidation, and sustained-release formulations, have improved stability and prolonged drug action.[2]

Peptide therapeutics have important clinical applications across several therapeutic areas. In metabolic disorders, glucagon-like peptide-1 (GLP-1) receptor agonists such as liraglutide and semaglutide have significantly improved the management of type 2 diabetes mellitus and obesity. These agents enhance glucose-dependent insulin secretion, suppress glucagon release, delay gastric emptying, and reduce appetite, thereby improving glycaemic control and promoting weight loss.[3]

In endocrinology, peptide analogues are widely used in the management of hormonal disorders. For example, octreotide, a somatostatin analogue, is used in acromegaly and neuroendocrine tumours.[2] Peptide-based therapies are also being explored in oncology, where engineered peptides can bind tumour-specific receptors and enable targeted drug delivery or diagnostic imaging. Peptide receptor radionuclide therapy using radiolabelled somatostatin analogues has demonstrated benefits in metastatic neuroendocrine tumours.[4]

Despite these promising developments, concerns have been raised regarding the increasing commercialization and misuse of peptide therapies, particularly in wellness, fitness, and anti-ageing sectors. Recent discussions in medical journalism, including a report published in *The Hindu*, have highlighted the

growing popularity of peptide products promoted for performance enhancement and anti-ageing benefits.[5] However, many such compounds lack adequate clinical evidence and remain in early stages of research.

Unregulated peptide products marketed online as "research chemicals" may contain impurities, incorrect dosing, or unverified formulations. Since many peptides influence endocrine and metabolic pathways, unsupervised use may lead to hormonal disturbances, metabolic complications, or cardiovascular risks.6 Therefore, peptide therapeutics should be used within the framework of evidence-based medicine and appropriate regulatory oversight.

In conclusion, peptide therapeutics represent an important advancement in modern pharmacology with expanding clinical applications. Continued research, rigorous clinical trials, and responsible prescribing practices will be essential to ensure their safe and effective integration into clinical practice.

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Dr.Deepak Daniel
Senior Resident,
Department of Pharmacology,
Govt.T.D Medical College,
Alappuzha

GLP-1 Receptor Agonists and Mental Health

Glucagon-like peptide-1 Receptor Agonists , widely used in the management of type 2 diabetes mellitus and obesity, have recently attracted attention for their potential neuropsychiatric effects. These agents act via receptors expressed not only in pancreatic β-cells but also in the brain, where they may influence Mood, appetite and reward pathways. A recent large-scale national cohort study published in The Lancet Psychiatry evaluated the association between GLP-1 Receptor Agonists use and **worsening mental illness** among individuals with pre-existing depression and anxiety in Sweden. The study analyzed data from nearly 95,000 individuals with comorbid diabetes and psychiatric disorders over more than a decade.

Key findings demonstrated that certain GLP-1 Receptor Agonists were associated with a **reduced risk of worsening mental illness**. Semaglutide use was associated with a significant reduction in overall worsening of mental health outcomes, including depression and anxiety.

Liraglutide also showed modest protective effects, whereas other agents such as exenatide and dulaglutide did not demonstrate similar benefits. Outcomes assessed included **psychiatric hospitalizations, self-harm events, suicide, and mental health-related sick leave.**

Possible mechanisms for these findings include improved glycaemic control and weight loss, which positively influence psychological well-being. Additionally, GLP-1 receptors in the brain may modulate neurotransmitter systems. Behavioral improvements such as enhanced self-image and quality of life may also contribute.

Despite encouraging findings, conflicting evidence exists, with some studies suggesting increased risks of depression and anxiety. Importantly, this study is observational, and causality cannot be established. Therefore, GLP-1 Receptor Agonists should not yet be considered treatments for psychiatric disorders.

The implications for India are significant given the rising burden of diabetes and mental health disorders. The potential dual benefit of metabolic control and mental health stabilization could be valuable. However, factors such as cost, healthcare access, sociocultural differences, and Limited pharmacovigilance data must be considered.

Future directions include the need for Indian cohort studies, randomized trials, and improved pharmacovigilance systems to evaluate psychiatric outcomes associated with GLP-1 Receptor Agonists.

In conclusion, GLP-1 Receptor Agonists appear not to worsen mental illness and may offer protective benefits in certain populations. Further research is needed to confirm these findings and guide clinical practice, particularly in the Indian context.

Dr. Parvathy PR
Assistant Professor
Department of Pharmacology
Believers Church Medical College, Thiruvalla, Kerala

Redefining the Standard of Care: A Review of the 2026 NICE Type 2 Diabetes mellitus Guidelines

Introduction

The management of Type 2 Diabetes (T2D) has traditionally focused on a **glucose-centric** model, where treatment escalated only after blood sugar levels (HbA1c) failed to reach specific targets. However, the February 2026 update to the NICE NG28 guidelines marks a paradigm shift toward a **cardio-renal protective** strategy. By prioritizing organ protection alongside glycemic control, these new recommendations aim to prevent approximately deaths due to heart attacks and strokes over the future.

The New First-Line Standard: Metformin and SGLT-2 Inhibitors

The most transformative change is the move away from Metformin monotherapy as the default starting point for all patients.

Dual Therapy from Diagnosis: For the first time, NICE recommends that most newly diagnosed patients should be offered a combination of **Metformin** and a **Sodium-Glucose co-transporter-2 (SGLT-2) inhibitor**.

Cardio-Renal Protection: Research confirms that SGLT-2 inhibitors do more than lower blood glucose; they actively protect the heart and kidneys. This is critical as cardiovascular disease remains the leading cause of mortality in T2D patients.

Alternative First Line: For patients who cannot tolerate Metformin, an SGLT-2 inhibitor is now recommended as a standalone first-choice treatment rather than a second-line option.

Expanded Access to GLP-1 RAs and Tirzepatide

The 2026 guidelines significantly broaden the eligibility criteria for newer classes of weight-management and glucose-lowering drugs, specifically GLP-1 receptor agonists (e.g., Semaglutide) and Tirzepatide.

Early-Onset Diabetes: Patients diagnosed before the age of 40 are now prioritized for these therapies due to their higher lifetime risk of complications.

Atherosclerotic Cardiovascular Disease (ASCVD): For patients with established heart disease, triple therapy (Metformin + SGLT-2i + GLP-1 RA) is now recommended earlier in the pathway.

Obesity-Specific Tracks: The guidance introduces a dedicated track for patients living with obesity, recommending these agents as a first additional therapy to address both metabolic and weight-related health goals.

Improving Adherence and Equity

Recognizing that treatment success depends on patient persistence, NICE has introduced two key administrative and clinical changes:

Modified-Release (MR) Metformin: The guidance now recommends starting with slow-release Metformin for most patients. Traditional standard-release Metformin often causes gastrointestinal distress, leading many to discontinue treatment; the MR version is better tolerated.

Addressing Health Inequalities: NICE analysis revealed that SGLT-2 inhibitors are historically under-prescribed to women, older adults, and Black patients. The new guidelines mandate that healthcare providers monitor prescribing data to close these gaps and ensure equitable access to life-saving medications.

Economic Impact and Sustainability

A pivotal factor in this update is the recent availability of **generic Dapagliflozin**. The savings are intended to be reinvested into frontline diabetes care, making the widespread use of these expensive newer drugs economically sustainable.

Conclusion

The 2026 NICE guidelines move T2D management into a new era of personalized, holistic care. By shifting focus from reactive glucose monitoring to proactive organ protection, the medical community can significantly reduce the burden of heart failure, kidney disease, and premature death. For medical professionals, the priority now shifts to early recognition, sequential initiation for tolerability, and a commitment to narrowing the equity gap in diabetes care.

Abbreviations:

ASCVD	Atherosclerotic Cardiovascular Disease
GLP-1 RA	Glucagon like peptide-1 receptor agonist
HbA1c	Glycosylated Haemoglobin
MR	Modified-Release
NICE	National Institute for Health and Care Excellence
SGLT-2i	Sodium-Glucose co-transporter-2 inhibitor.
T2D	Type 2 Diabetes mellitus

References:

1. https://www.nice.org.uk/news/articles/major-changes-to-type-2-diabetes-treatment-could-save-thousands-of-lives

Dr Swati Patil
MBBS, MD (Pharmacology)
Associate Professor,
Department of Pharmacology,
LTMMC & GH, Sion, Mumbai.

Dr Aishwarya Nikose
MBBS, MD (Pharmacology)
LTMMC & GH, Sion, Mumbai.

Steven Johnson Syndrome following Cotrimoxazole exposure in an individual with HIV: A case report

INTRODUCTION

Steven Johnson syndrome a potentially fatal, life-threatening T-cell mediated hypersensitivity reaction involving the skin, mucous membranes along with systemic manifestations, characterized by apoptosis of keratinocytes along with mucosal erosions or ulceration. It manifests as denudation, multiple erythematous lesions, painful erosions, macules or targetoid lesions with positive Nikolsky sign and symptoms- fever, malaise, headache, nausea, vomiting, cough,red eyes. Systemic involvement of the pulmonary, hepatic, renal, ocular, cardiovascular, gastrointestinal and immunological systems may occur.

Most common causative factors of SJS being drug reaction, infection, malignancy and radiation.

Drug induced SJS accounts for 80% of the cases. most common drugs associated with SJS are antibacterials, NSAIDS, anticonvulsants, allopurinol, anti-HIV drugs. It is common with patients having comorbid conditions predominantly, HIV. The incidence in them is 1-2/1000 individuals. It's more common in women. Genetic predisposition and certain HLA subtypes also play a role.

Case Report:

18-year-old male, known case of Tuberculosis, diagnosed with HIV 15 days back, came with complaints of a reddish rash on face spreading to ears, trunk and extremities with itching, burning sensation, ocular redness, fever, chills, intolerance to spicy food and difficulty in swallowing.

His treatment for TB involved a combination of Isoniazid, Rifampicin, Pyrazinamide and Ethambutol since 1 month. Tenofovir, Lamivudine and Dolutegravir with Cotrimoxazole combination since 15 days for HIV.

General examination: BP: 110/70 mmHg, Pulse: 98 beats/min, SpO_2: 98%.

Lab investigations: CD4 count - 496 cells/µL, +ve Mantoux test. Sputum AFB and CBNAAT -ve. Relevant Blood parameters: ESR - 20mm/hour, CRP: 96.8 mg/L. SCORTEN-Severity of illness score is 0, suggestive of 3.2% mortality.

Dermatological examination:

Face, extremities: Multiple, bilateral, erythematous, non-blanchable papules.

Trunk: Multiple, erythematous, blanchable papules coalescing to form plaques.

Mucosa: Oral: Congested with multiple erosions and few whitish plaques.

Ocular: Congested

Diagnosis of Drug induced Stevens Johnson Syndrome was established. Management involved discontinuation of ART and ATT. IV Piperacillin-tazobactam to prevent secondary bacterial infection, Tab Acyclovir prophylactically for herpetic involvement, IV steroids to suppress immune activation, antihistaminic drugs. Local application of steroid and antibacterial/ antifungal agent, white petroleum jelly on the lesions to promote epidermal healing. Benzocaine gel for oral lesions. Antibiotic and Carboxymethylcellulose eye drops were used to prevent secondary bacterial infection and dry eye. Improvement with crusting of lesions 3-4 days after stopping ART and starting relevant therapy. A further plan to reintroduce ART and AKT is under way.

DISCUSSION:

Drug induced SJS in an 18-year-old male undergoing treatment with ATT and ART + cotrimoxazole highlights the association between sulfa drugs and development of SJS and further adds to our knowledge about adverse drug reactions associated with sulfa drugs in PL-HIV.

Proposed mechanism for SJS in PL-HIV - ↓ CD4 cell count and ↑ action of cytotoxic CD8 T-cells. Altered drug metabolism, polypharmacy, expression of FasL on the cytotoxic cells, presence of Granulysin in cytotoxic granules, ↑ cytokines, TNF alpha mediated death receptor pathway are some of the proposed theories. Antibacterial drugs with sulfa moiety namely

Cotrimoxazole, dapsone are considered most notorious drugs involved in pathophysiology of SJS.

Polypharmacy plays a major challenge for causality assessment of a drug reaction. In order to establish causality in case of multiple drug treatments for SJS, ALDEN score (Algorithm for drug causality in Epidermal Necrolysis) was designed. ALDEN score for this case concluded the highest score of +6 for Cotrimoxazole indicating a Very Probable relationship of SJS with the drug. Both WHO-UMC and Naranjo Scale categorized the drug reaction as Possible.The severity and mortality of SJS is evaluated based on the SCORTEN score. Our case, scored 0, indicating a 3.2% mortality risk.

Early withdrawal of the offending agent and supportive management is important in treatment of SJS. Patient counselling regarding possibility of drug reactions, pathophysiology of disease, importance of reintroduction of ART and ATT for improving quality of life and strict adherence to treatment is important.

CONCLUSION

This report adds to our knowledge of hypersensitivity reactions with sulfa drugs- Cotrimoxazole, being the most notorious for drug induced SJS and must be used cautiously in patients. Hypersensitivity reactions range from mild rash to fatal SJS. In PL-HIV, physicians must stay cautious with selection of drugs. Early withdrawal of offending agent and prompt treatment remains mainstay of management. Pharmacovigilance is important to increase awareness of adverse drug profiles.

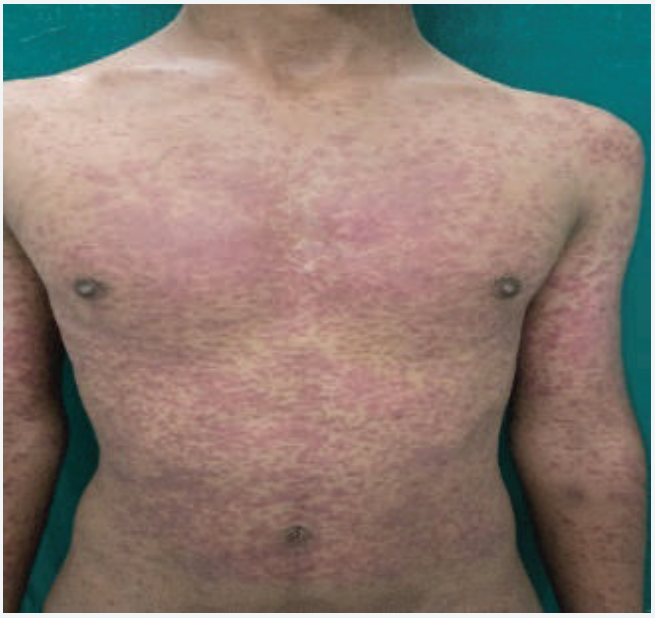

Fig 1: Erythematous papules on trunk

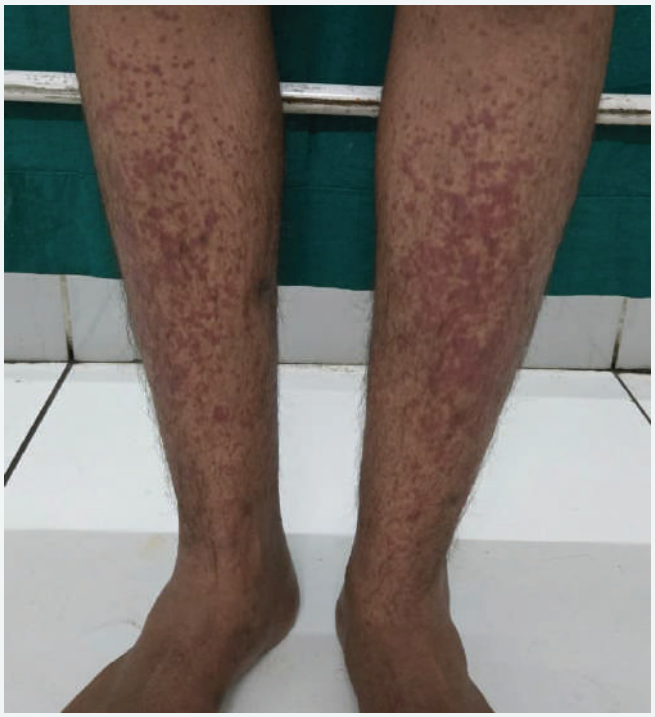

Fig 2: Erythematous papules on B/L extremities

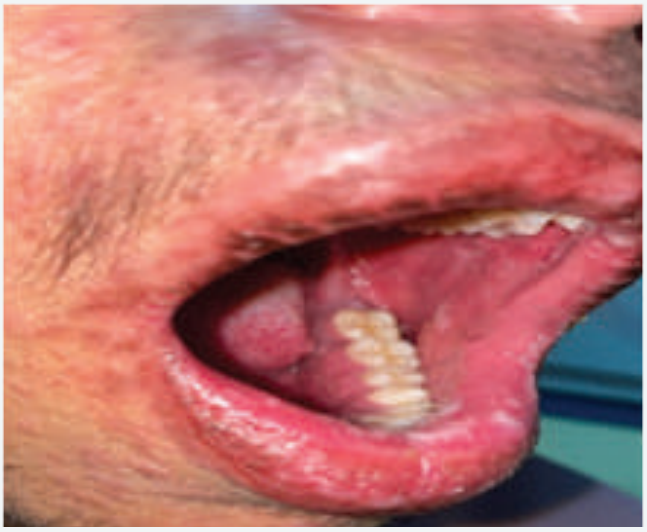

Fig 3: Congested oral mucosa with multiple erosions and few whitish plaques

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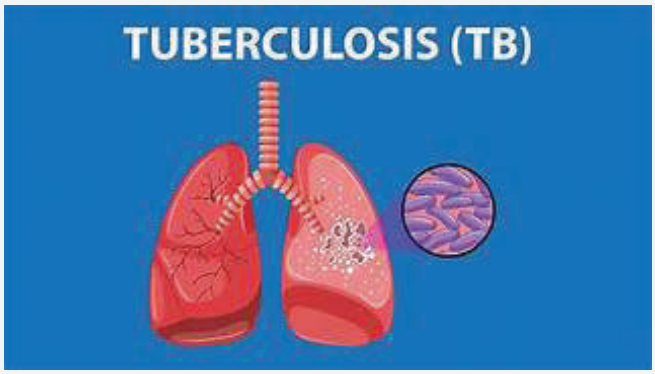
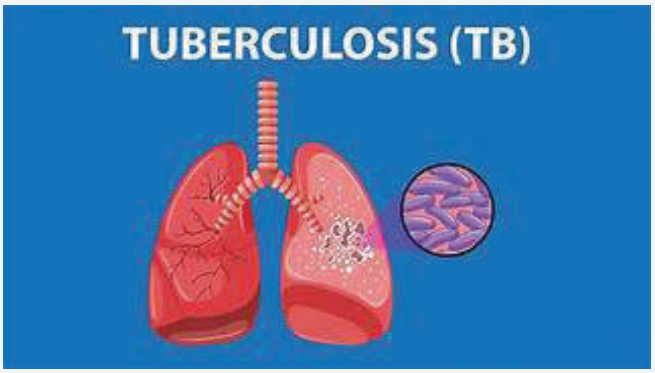
Dr. Vrushali Sawant
Junior Resident
BJGMC. Pune

SPECIAL SEGMENT ON THEME : TUBERCULOSIS

- **National and Global Tuberculosis Control Strategies: Progress, Challenges, and the Road Ahead**
- **BPaLM Regimen: A New Era in Multidrug-Resistant Tuberculosis Treatment**
- **Newer Tuberculosis Treatment Guidelines**



National and Global Tuberculosis Control Strategies: Progress, Challenges, and the Road Ahead



Progress, Challenges, and the Road Ahead

1. Introduction

Tuberculosis (TB) remains one of the world's deadliest infectious diseases. According to the WHO Global Tuberculosis Report 2023, there were 7.5 million new TB cases in 2022—the highest recorded since monitoring began—with 1.3 million deaths. The burden is concentrated in eight high-incidence countries, with India alone accounting for about 27% of global cases. Despite long-standing control efforts, TB continues to be a major public health challenge, requiring sustained, coordinated, and adaptive responses at national and global levels.

2. Global TB Control: The WHO End TB Strategy

The WHO End TB Strategy (2015–2030) provides the framework for TB elimination, aiming for a 90% reduction in TB deaths and an 80% decrease in TB incidence by 2030 relative to 2015. Its three pillars—patient-centred care and prevention, supportive policies, and intensified research and innovation—guide global efforts. Political momentum increased following the UN High-Level Meetings on TB in 2018 and 2023, during which member states committed to expanding treatment access to 40 million individuals between 2023 and 2027. The 2023 Political Declaration highlighted universal health coverage, greater financing, and enhanced access to diagnostics and novel therapies as essential components of TB control. However, the COVID-19 pandemic disrupted TB services worldwide, reversing earlier progress by reducing case notifications between 2020 and 2021.

3. India's National TB Elimination Programme (NTEP)

India's target of eliminating TB by 2025—five years ahead of global goals—is operationalized through the National TB Elimination Programme (NTEP), previously the RNTCP. The National Strategic Plan (NSP) 2017–2025 outlines measures such as the Ni-kshay portal for digital case management, and Ni-kshay Poshan Yojana, which offers ₱500 monthly nutritional support to patients. Expanded access to universal drug susceptibility testing, including widespread use of Xpert MTB/RIF assays, has strengthened diagnostic capacity. Newer drugs like Bedaquiline and Delamanid have been integrated into drug-resistant TB treatment, supported by active pharmacovigilance. Treatment adherence has been enhanced through initiatives such as Jan Aushadhi, 99DOTS, and strengthened private sector involvement via mandatory notification, the PPIA model, and incentive-linked participation.

4. Persistent Challenges

Significant challenges persist. Roughly 27% of TB cases remain undiagnosed or unreported each year, contributing to the "missing millions." Stigma, financial hardship—often exceeding half a household's annual income—and limited diagnostic access in remote regions hinder timely detection. Drug-resistant TB requires prolonged, complex, and costly treatment, placing additional pressure on health systems. Co-morbidities such as HIV, diabetes, and undernutrition further complicate management and increase vulnerability.

5. The Road Ahead

Accelerating progress demands a multifaceted approach. Improving laboratory capacity for molecular diagnostics, including expanded use of next-generation sequencing, is essential. Social protection to address poverty, food insecurity, and inadequate housing must complement medical interventions. Community-based care and health-worker engagement can enhance early detection and treatment adherence. Investment in vaccine development—such as the promising M72/AS01E candidate—offers long-term hope. Sustained

domestic and global financing remains critical to achieving elimination goals.

Conclusion

TB control reflects the strength and equity of health systems. Although the WHO End TB Strategy and India's NTEP offer strong foundations, faster progress is needed to reach elimination targets. Integrating political commitment, scientific advancement, community participation, and equitable financing is vital for moving toward a TB-free world.

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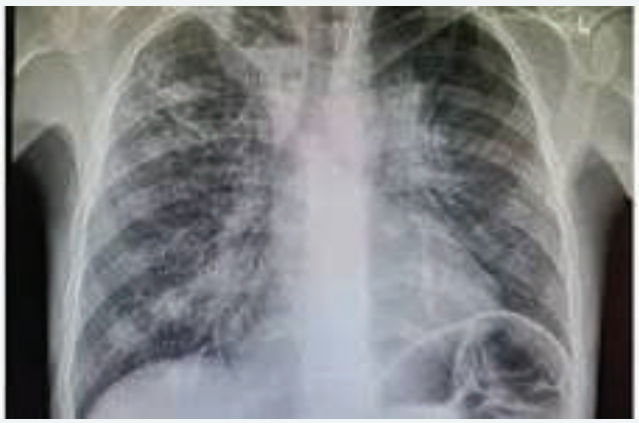
Dr. Sameer Uttamrao Khasbage
Assistant Professor
Department of Pharmacology and Therapeutics
All India Institute of Medical Sciences (AIIMS), Raipur.

BPaLM Regimen: A New Era in Multidrug-Resistant Tuberculosis Treatment



Introduction

Tuberculosis (TB) continues to be a major global public health challenge, with multidrug-resistant tuberculosis (MDR-TB) posing a serious threat to effective disease control. MDR-TB is defined as resistance to at least rifampicin and isoniazid, the two most potent first-line anti-tubercular drugs. Conventional MDR-TB treatment regimens are lengthy and complex, often requiring 18–24 months of therapy with injectable agents associated with toxicity and poor adherence. These limitations have driven the need for shorter, safer, and more effective treatment strategies. The BPaLM regimen represents one of the most significant recent advances in tuberculosis pharmacotherapy and marks a paradigm shift toward shorter, all-oral regimens. [1,6]

Key Points

- Multidrug-resistant tuberculosis (MDR-TB) remains a major challenge in global TB control.
- Traditional MDR-TB regimens required 18–24 months of therapy and were associated with significant toxicity.
- The BPaLM regimen is a short-course (6-month), all-oral treatment for drug-resistant TB.
- It includes Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin.
- Clinical studies demonstrate higher treatment success rates and improved tolerability.

Limitations of Conventional MDR-TB Therapy

Traditional treatment regimens for MDR-TB have several limitations. The prolonged duration of therapy, often up to two years, imposes a burden on patients and healthcare systems. Earlier regimens relied on injectable drugs such as aminoglycosides, which were associated with severe adverse effects, including ototoxicity and nephrotoxicity. Furthermore, complex multidrug regimens frequently resulted in poor adherence, contributing to treatment failure and amplification of drug resistance. These challenges necessitated the development of shorter, safer, and more patient-friendly treatment strategies. [2]

The BPaLM Regimen

The BPaLM regimen is a novel all-oral treatment strategy recommended for patients with rifampicin-resistant or multidrug-resistant tuberculosis. It consists of four drugs: Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin. The regimen is administered for approximately six months and is recommended by the World Health Organization as an effective alternative to longer MDR-TB regimens. [2]

Each drug acts through a distinct mechanism against Mycobacterium tuberculosis. Bedaquiline inhibits ATP synthase, disrupting bacterial energy production. Pretomanid interferes with mycolic acid synthesis and bacterial respiration. Linezolid inhibits protein synthesis by binding to the 50S ribosomal subunit, while moxifloxacin inhibits DNA gyrase, thereby preventing DNA replication. The combination of drugs with complementary mechanisms enhances bactericidal activity and reduces the likelihood of resistance development. [3]

Clinical evidence supporting the BPaLM regimen has emerged from recent trials, particularly the TB-PRACTECAL study, which demonstrated that a six-month BPaLM-based regimen achieved higher treatment success rates and fewer serious adverse events compared with conventional longer regimens.[4]

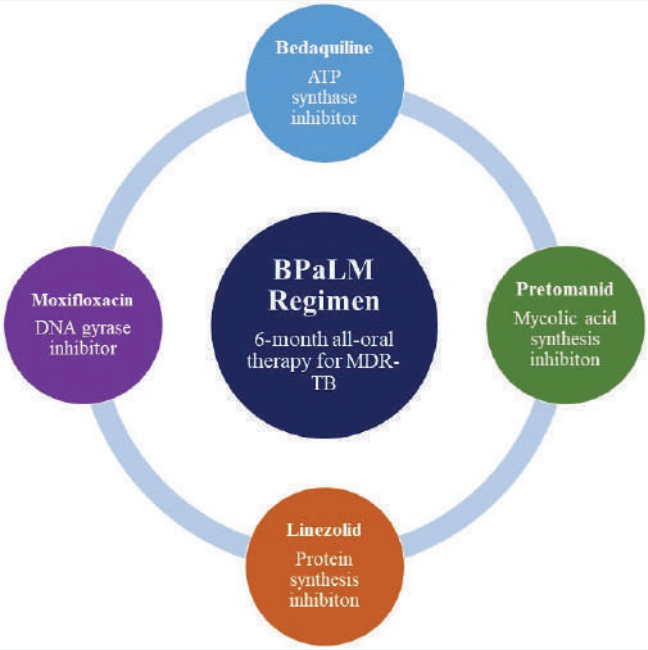


Figure 1: Components and mechanisms of action of drugs included in the BPaLM regimen for multidrug-resistant tuberculosis.

Table: Mechanism of Action of Drugs in the BPaLM Regimen

Drug	Mechanism of Action
Bedaquiline	Inhibits mycobacterial ATP synthase, disrupting energy production
Pretomanid	Inhibits mycolic acid synthesis and impairs bacterial respiration
Linezolid	Inhibits protein synthesis by binding to the 50S ribosomal subunit
Moxifloxacin	Inhibits DNA gyrase, thereby preventing bacterial DNA replication

Advantages of the BPaLM Regimen

The BPaLM regimen offers several advantages over conventional MDR-TB therapy. The most notable benefit is the shorter treatment duration of approximately six months. The regimen is fully oral and eliminates the need for injectable drugs, thereby reducing treatment-related complications and improving patient comfort. Additionally, studies report treatment success rates approaching 85–90%, which are substantially higher than those observed with earlier MDR-TB regimens. Improved tolerability and simplified therapy are likely to enhance adherence and facilitate implementation in national tuberculosis control programs. [2,5]

Conclusion

The BPaLM regimen represents a major advancement in the pharmacological management of multidrug-resistant tuberculosis. By combining potent anti-tubercular agents in a shorter, all-oral regimen, it offers improved efficacy, safety, and patient convenience. Wider implementation, along with continued research and pharmacovigilance, will play a crucial role in strengthening global efforts toward tuberculosis control and eventual elimination.

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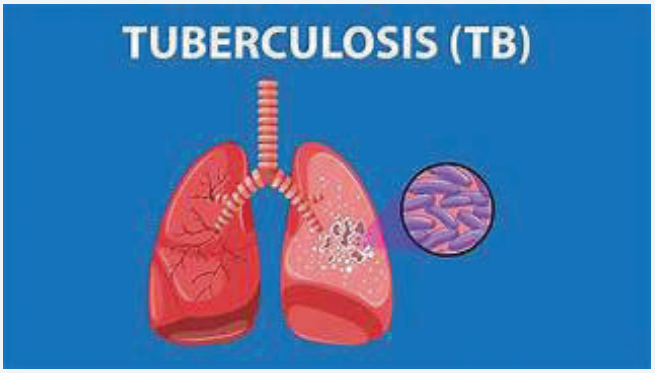
Dr. Rashika Kapoor
Postgraduate Resident,
Department of Pharmacology
Jawaharlal Nehru Medical College

Newer Tuberculosis Treatment Guidelines



INTRODUCTION

Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, remains a major global health challenge. One-third of the world's population carries latent infection, and 1.4 million deaths occurred in 2015. In India, 25.52 lakh TB patients were diagnosed in 2023, with 24.38 lakh (95.5%) initiated on treatment. Pulmonary TB is the most common form, treated with the standard first-line regimen of Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), and Ethambutol (E). Early diagnosis and timely therapy remain essential. Multidrug-resistant TB (MDR-TB) results from resistance to both Isoniazid and Rifampicin. Extensively drug-resistant TB (XDR-TB) adds resistance to fluoroquinolones and at least one Group A drug (Bedaquiline or Linezolid). India has seen a 20% reduction in MDR/RR-TB estimates from 2015 to 2023, with improved treatment success rising from 49% (2017) to 75% (2021) due to newer regimens.

NATIONAL TB GUIDELINES FOR DRUG-RESISTANT TB

1. New Recommended Regimens

a) 6-Month All-Oral Regimen (BPaLM)

WHO recommends a 6-month all-oral BPaLM regimen for patients >14 years with MDR/RR-TB without fluoroquinolone resistance. It combines Bedaquiline (B), Pretomanid (Pa), Linezolid (L), and Moxifloxacin (M), replacing older 9–24-month regimens. These drugs are more effective, less toxic, fully oral, and improve adherence. Directly observed treatment is recommended at least 6 days a week.

Mechanisms:

- Bedaquiline inhibits ATP synthase
- Pretomanid disrupts mycobacterial cell wall
- Linezolid blocks protein synthesis\
- Moxifloxacin inhibits DNA replication

BPaL is used for fluoroquinolone-resistant MDR-TB or pre-XDR TB.

b) Modified 9–11-Month Regimens

Used when BPaLM/BPaL cannot be given and fluoroquinolone resistance is excluded. Includes: Bedaquiline (B), Linezolid (L), Levofloxacin (Lfx), Pyrazinamide (Z), Ethambutol (E), and Clofazimine (Cfz). Variants include:

1. BLfxCfz-Z-H-E-Pto
2. BLfxCfz-Z-H-E-L

Intensive Phase (4–6 months): B + Lfx + Cfz + Z + H + E + Eto or Pto
Continuation Phase (5 months): Lfx + Cfz + Z + E

c) Longer Oral Regimen (18–20 months)

Indicated when shorter regimens are unsuitable due to extensive disease, intolerance, or complex resistance. Drugs include Bedaquiline, Moxifloxacin/Levofloxacin, Linezolid, Clofazimine, Cycloserine, Delamanid, or other second-line agents.

2. Diagnosis & Drug-Resistance Testing

- New diagnostic classes for initial TB detection and rifampicin resistance
- Concurrent respiratory and non-respiratory testing for all age groups
- Updated guidance on interferon-gamma release assays
- Next-generation sequencing for drug-resistance profiling

3. TB & Undernutrition Guidelines

WHO recommends:

- Routine nutritional assessment and counselling
- Nutritional support for undernourished TB patients

- Food assistance in food-insecure households
- Integration of social determinants into TB care

4. Strategic Focus to End TB

Priorities include:

- Shorter and safer regimens
- Rapid and accurate drug-resistance diagnosis
- Addressing comorbidities (undernutrition, HIV)
- People-centred care and support strategies

Latest WHO dosing recommendations include BPaLM (6-month), 9–11-month BLfxCfz-based regimens, and 18–24-month BDLLfxCfz combinations.

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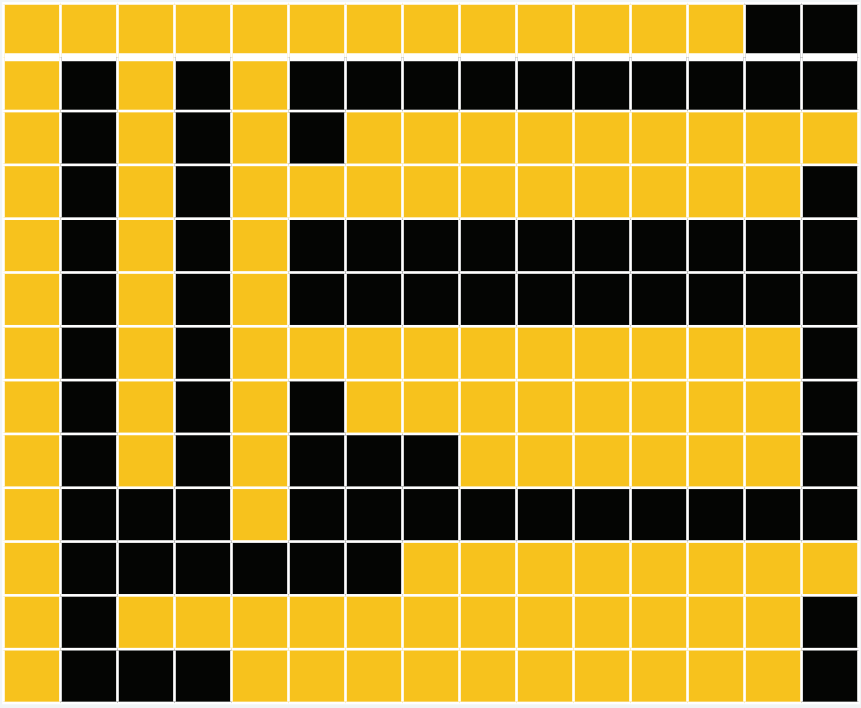
Dr. Jasleen Kaur Narula
Professor
Department of Pharmacology
ESI Medical College Ludhiana

Crossword: Skeletal Muscle Relaxants

COOL CORNER

Crossword Clues:	
Horizontal Row	Vertical Column
I. Drug Eliminated by Hoffmon's elimination III. Centrally Acting Muscle Relaxants used as counter irritants in Ointments for muscle pain IV. Another Drug Eliminated by Hoffmon's elimination VII. Directly Acting Muscle Relaxant VIII. Selective GABA B Rec agonist used as Centrally Acting Muscle relaxant IX. Active Principle of South American Tribal Pision XI. Benzodiazepine most commonly used as Muscle Relaxant XII. Neuromuscular blocking Agent with maximum histamine releasing potential XIII. Shortest Acting Non Depolarizing (Competitive) Blocker	**I.** Centrally acting Muscle relaxant with anti anxiety and hypnotic Action **III.** Novel reversing agent for Non-depolarising Muscle Blockers Like Vecuronium **V.** Central $\alpha 2$ Agonist



Dr Siddharth Banode
Professor and Head
Dept of Pharmacology
Government Medical College Satna (MP)

Cross Word: Key

C	I	S	A	T	R	A	C	U	R	I	U	M	■	■
H	■	U	■	I	■	■	■	■	■	■	■	■	■	■
L	■	G	■	Z	■	M	E	P	H	E	N	S	I	N
O	■	A	■	A	T	R	A	C	U	R	I	U	M	■
R	■	M	■	N	■	■	■	■	■	■	■	■	■	■
M	■	A	■	I	■	■	■	■	■	■	■	■	■	■
E	■	D	■	D	A	N	T	R	O	L	E	N	E	■
Z	■	E	■	I	■	B	A	C	L	O	F	E	N	■
A	■	X	■	N	■	■	■	C	U	R	A	R	E	■
N	■	■	■	E	■	■	■	■	■	■	■	■	■	■
O	■	■	■	■	■	■	D	I	A	Z	E	P	A	M
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"TB One-Word Blitz"

Questions:

1. ATP synthase inhibitor
2. Nitroimidazole drug
3. Protein synthesis inhibitor, bind 50S, Cause anaemia
4. Bedaquiline target gene
5. NO-mediated killing
6. Efflux regulator gene
7. An enzyme-inducing drug reduces Bedaquiline levels
8. Killing pattern of Bedaquiline
9. 6-month all-oral XDR-TB regimen
10. ZeNix Trial dose-adjusted drug
11. Dormicide in XDR-TB regimen
12. Audiocide-driven avoidance
13. Triple-drug XDR-TB Validation trial
14. Linezolid de-escalation evidence trial
15. Rv0678 mutation- associated drug
16. hERG/*IKr* channel blockade drug
17. Myelotoxic drug in DR-TB regimen
18. TB tracking system in India
19. Digital adherence tool (DAT)
20. WHO TB elimination strategy

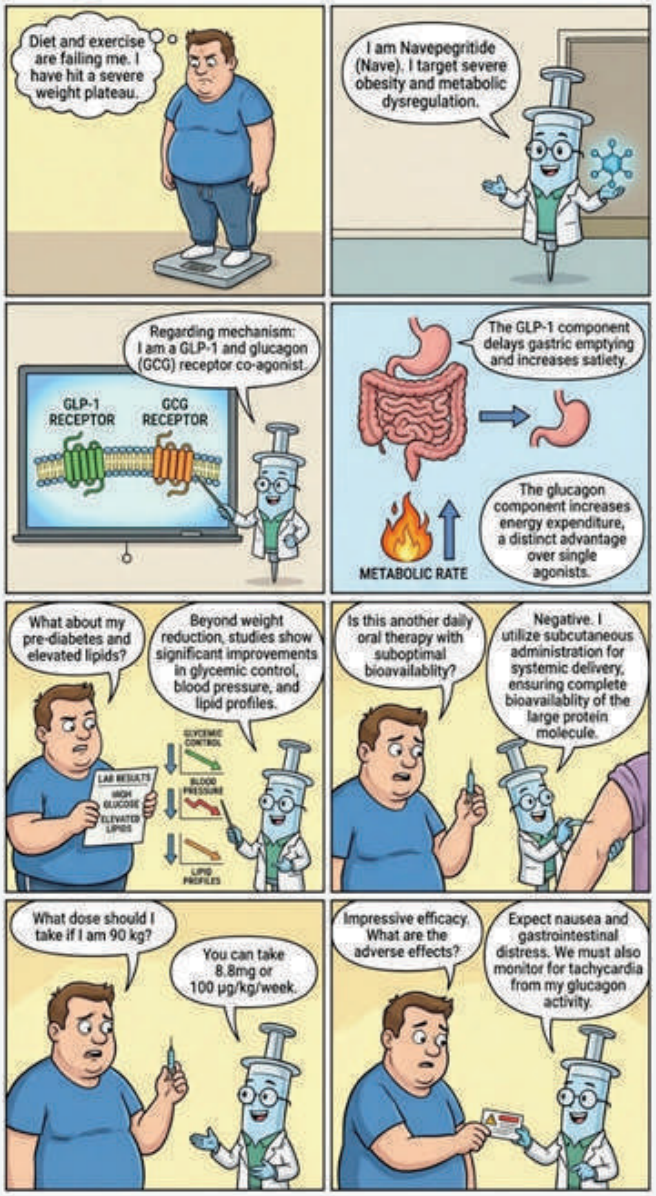
COOL CORNER

Dr.Aruna Priyadharshini.M
Final-year Postgraduate,
Department of Pharmacology,
Tagore Medical College & Hospital,
Chennai.

Dr. Devikala.A
Assistant Professor,
Department of Pharmacology,
Tagore Medical College & Hospital,
Chennai.

Milsaperidone:
FDA approval granted on February 20, 2026.

Navepegritide: Investigational peptide based therapy.



Maanasaa I

MBBS, Second Year, 2024 Batch
Tagore Medical College and Hospital, Rathinamangalam
Guide: Dr. Tabreez Ahamed - Assistant Professor of Pharmacology
Head of Department: Dr. Punnagai. K

Keerththan P M

Answer key: One word blitz

1. Bedaquiline
2. Pretomanid
3. Linezolid
4. atpE
5. Pretomanid
6. Rv0678
7. Rifampicin
8. Concentration-dependent
9. BPaL Regimen
10. Linezolid
11. Pretomanid
12. Ototoxicity
13. Nix-TB trial
14. ZeNix trial
15. Clofazimine
16. Bedaquiline
17. Linezolid
18. Nikshay
19. 99DOTS
20. End TB

COOL CORNER

Extract:

Dr Aradhna Sharma
Associate Professor
Department of Pharmacology
SLBS Govt. Medical College and Hospital
Nerchowk HP

What is EXTRACT

Extract are the collections of some important points taken from the discussion in National MD Pharmacology group. NMDP is a group of eminent pharmacologists from all over the country. The head of departments of pharmacology, deans, directors of institutions and people with significant contribution in the field of pharmacology are members of NMDP family. National association of Pharmacology and Therapeutics is promoted by NMDP group.

#The Vicious Cycle of Drug Mistrust

The article "The Vicious Cycle of Drug Mistrust" illustrates how fear, misinformation and cost concerns create a cycle affecting both patients and physicians. This mutual mistrust leads to treatment interruption, disease deterioration and higher hospitalization costs. Breaking this cycle requires transparent communication, evidence-based prescribing, affordability and strengthening trust in quality assured generic medicines.

#India ranks 8th globally in WHO pharmacovigilance contributions

The 10th edition of the Indian Pharmacopoeia (IP 2026), released by Union Health Minister J. P. Nadda includes 121 new monographs, expanded coverage of key medicines and blood component standards. India rose to 8th globally in WHO pharmacovigilance contributions which was also highlighted.

#Palliative Care Pharmacology in MBBS Curriculum

Although palliative care is included in Universal Health Coverage initiatives and CBME curriculum in India, but its structured pharmacological aspects are limited in UG teaching. Most palliative care drugs are discussed in pharmacology textbooks in a fragmented manner rather than as a dedicated topic. Introducing a specific chapter on palliative care pharmacology can help sensitize medical students to rational drug use for symptom relief, including opioids, antiemetics, and anxiolytics.

#Revisiting Cutoff Scores in NEET-PG

Pharmacologists observed that while this measure may enhance seat occupancy but also simultaneously highlights the critical need to uphold academic standards and ensure the quality of postgraduate medical training.

#Revised CONSORT Guidelines

Revised CONSORT enhances transparency, completeness and reproducibility of clinical research. It introduces additional checklist items emphasizing open science practices, including trial registration, protocol accessibility, data sharing and disclosure of funding and conflicts of interest.

#Reassessing the Benefit–Risk balance of aspirin in elderly

Pharmacologists discussed about the current recommendations to avoid routine aspirin use in older adults without cardiovascular disease, while its role remains beneficial for secondary prevention under careful clinical supervision.

#Diflunisal: A Unique Salicylate in Pharmacotherapy

Pharmacologists emphasized that in addition to analgesic and anti-inflammatory properties of Diflunisal, it has also shown therapeutic potential in Transthyretin Amyloidosis by stabilizing transthyretin and slowing amyloid deposition.

#Tinkle Digest: A Creative Approach to AMR Awareness

Pharmacologists noted it as a creative medium for promoting awareness about Antimicrobial Resistance (AMR) among young readers. Using engaging stories and illustrations, it effectively conveys the importance of responsible antibiotic use, good hygiene practices and infection prevention.

#Recent CDSCO Guidelines: Strengthening Drug Regulation in India

Amendments to New Drugs and Clinical Trials Rules (2026) streamline approvals, reduce timelines, stricter quality control and enhanced transparency. Emphasis on mandatory testing of raw materials, improved labelling norms, and risk-based regulation of medical devices reflects a shift toward patient safety, regulatory efficiency and global harmonization.

#Latest PGMSR -2023

PGMSR-2023 amended as on 20.2.2026 includes institutions offering both UG and PG courses must simultaneously fulfil UG-MSR and PGMSR requirements. Revised norms emphasize adequate infrastructure, equipment, and hospital facilities, including sufficient clinical material.

#Mandatory Attendance Norms for Faculty and Residents

As per UG-MSR 2023 [Para 3.2], it is mandatory for faculty and resident doctors to maintain at least 75% attendance of total working days, excluding vacations.

#Portable Raman Spectroscopy with Machine Learning

Pharmacologists discussed the role of portable Raman Spectroscopy for enhancing drug quality surveillance and field-based screening. It offers a rapid, non-destructive approach to distinguish expired from unexpired drugs and holds promise for combating counterfeit and degraded pharmaceuticals.

#Adult Immunization 2026 update: A Step Towards Preventive Pharmacology

For pharmacologists, these updates reinforce the importance of rational vaccine use, pharmacovigilance, and patient education. Key updates include expanded recommendations for vaccines such as influenza, pneumococcal, herpes zoster, HPV, and hepatitis B. The guidelines also introduce risk-based stratification and need for adult vaccination records. **Mammalian Heart**

#Perfusion in MD Pharmacology Training

Pharmacologists raised ethical concerns regarding animal use, along with the emergence of advanced alternatives such as simulation-based learning and in vitro models. Thus, the mammalian heart perfusion assembly remains relevant, not as a standalone method, but as part of a blended learning strategy in pharmacology education.

Glimpse of PK-EDGE National workshop on clinical pharmacokinetics

The Department of Pharmacology, SRMC & RI, (DU), successfully conducted the PK-EDGE National Workshop on Clinical Pharmacokinetics on 22–23 January 2026 under the aegis of the National Association of Pharmacology and Therapeutics (NPT) at Sri Ramachandra Medical College, Chennai, Tamil Nadu. The programme was inaugurated by Dr. Uma Sekar - Vice-Chancellor, SRIHER (DU) , Dr.K.Balaji Singh - Dean–SRMC & RI , Dr. K. Bhuvaneshwari, Vice President–NPT and Professor & Head, Department of Pharmacology, PSG Institute of Medical Sciences & Research, Coimbatore who served as the Chief Guest and highlighted the vision and mission of NPT , and the esteemed speaker Dr.Vipul Chaudhari - Member, Academic Board–NPT & Professor and Head , Dept of Pharmacology , GCS Medical College Hospital and Research Centre, Ahmedabad.

The organizing team expresses profound gratitude to the NPT leadership—Dr. Ganesh Dakhale, President; Dr. P. K. Sharma, General Secretary; Dr. C. M. Kamaal, National Coordinator; Major Dr. Jeetendra Singh, Head of the Academic Board; and Dr. Padmaja Udayakumar, Former President, NPT—for their continued guidance, mentorship, and unwavering support.

The workshop featured highly engaging and clinically oriented sessions led by Dr. Vipul Chaudhari, the esteemed speaker, whose exemplary teaching and academic leadership were instrumental to the programme's success. A special session on PK/PD software applications was delivered by Dr. Ilanthamizhan, Assistant Professor, Department of Pharmacology, SRMC & RI. The programme also included an interactive quiz, with medals and academic resources awarded to the best performers.

The workshop witnessed enthusiastic participation from approximately 60 external delegates, including faculty members, senior residents, and postgraduate students from premier institutions across the country, along with 17 in-house postgraduates, and received an overwhelmingly positive response.


SRI RAMACHANDRA
"PK - EDGE"


DEPARTMENT OF PHARMACOLOGY
SRMC & RI, SRIHER(DU)
Cordially invites you to
"PK - EDGE"
NATIONAL WORKSHOP ON CLINICAL PHARMACOKINETICS
"From Concepts to Confident Decisions"
Under the aegis of
National Association of Pharmacology & Therapeutics (NPT)
Chief Guest
Dr. K BHUVANESWARI
Eminent Speaker
Dr. VIPUL CHAUDHARI

NATIONAL ASSOCIATION OF PHARMACOLOGY AND THERAPEUTICS

Promoting Pharmacology and Therapeutics for a better tomorrow

About the organization

A national organization of medical doctors specialized in pharmacology /clinical pharmacology and therapeutics. Envisaged to provide strong leadership to promote pharmacology and therapeutics for a better tomorrow. The association is fostered by NMDP (National MD Pharmacology), a prestigious group of eminent pharmacologists.

Aims and objectives

Empowering medical doctors specialized in Pharmacology/Clinical Pharmacology and Therapeutics.

Promoting academic and clinical research in Pharmacology/Clinical Pharmacology and Therapeutics.

Enhancing the standard of teaching/training in Pharmacology/Clinical Pharmacology and Therapeutics

Promoting Pharmacology/Clinical Pharmacology and Therapeutics for the benefit of patients and society.

BENEFITS OF LIFE MEMBERS

Receive notifications on of the organization

Keep yourself updated in the world of pharmacology and therapeutics .

Get connected with fellow pharmacologists of the country.

Contest for various posts in the organization.

Receive of the permanent membership e-certificate through email, enhance your profile by writing MNPT

Participate in general body meetings (GBM) to speak and to vote.

Participate in conferences/seminars/workshops/symposiums/training sessions at subscribed charges.

Receive an e-copy of the official publications (i.e. News letter, Journal, academics, research material etc.

NATIONAL ASSOCIATION OF PHARMACOLOGY AND THERAPEUTICS

Promoting Pharmacology and Therapeutics for a better tomorrow

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Rx FACTOR

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NATIONAL ASSOCIATION OF PHARMACOLOGY AND THERAPEUTICS

Reg No 58-10-03-2021 PAN No: AADTN6634Q

REGISTERED OFFICE:

ALMERAJ Hospital Deepshikha Gas agency street, Bajoria Road

Saharanpur , Uttar Pradesh 247001, Ph 9528540756

REGIONAL OFFICE:

Department of Pharmacology,

Father Muller Medical College Kakanady , Mangalore, Karnataka