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A pharmaceutical magazine

SHADOW CULTIVATE

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CHIEF EDITOR

Dr. Rajiv Jash

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Pradipta Bera and Amisha Agarwal



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PHARMA**



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PREFACE

We are delighted to present the inaugural volume of Shadow Cultivate, a vibrant and multifaceted academic magazine published under the aegis of Sanaka Educational Trust's Group of Institutions, and curated under the insightful leadership of Chief Editor Dr. Rajiv Jash. This publication is more than a compilation of articles and artworks—it is a collective journey of thought, creativity, inquiry, and expression that brings together scientific intellect, literary soul, and civic consciousness into a single cohesive platform. The vision behind Shadow Cultivate stems from the desire to break disciplinary silos and to encourage students, scholars, artists, and educators from all streams to participate in an open dialogue that both reflects and shapes the academic spirit of our time. This magazine is not just a reflection of our institutional excellence but a mirror of our students' voices—of their curiosity, concerns, creativity, and courage. This issue is thoughtfully divided into three major sections: Scientific Advancements, Art & Literature, and Current Affairs. Each segment opens a window into a different realm of human understanding while remaining rooted in the larger ethos of education, inquiry, and cultural expression. The Scientific Advancements section covers emerging and impactful areas such as modern drug delivery techniques, drug discovery and many more. These articles, meticulously researched and articulated, reflect the scientific temperament of the young contributors and provide valuable insights into fields that are shaping our future. In Art & Literature, we have curated a soulful selection of poems, paintings, short stories, and reflective pieces—both in English and regional languages—that reflect the emotional, cultural, and spiritual landscape of today's youth. Whether it is the empowering image of the divine feminine in visual art, the moving poetry that explores love, identity, or nature, or prose pieces that narrate stories of pain, escape, hope, and resilience, these entries reveal the depths of student thought and artistic potential. This section brings sharp focus to the political, social, and cultural conversations that matter that empower young minds to look beyond the classroom and engage meaningfully with the world around them. This magazine is the result of months of hard work, collaboration, and unwavering enthusiasm. We express our heartfelt gratitude to all the student authors, artists, editorial team members, and faculty mentors who have contributed their time, talent, and passion to bring this issue to life. Each submission was carefully reviewed and thoughtfully presented, ensuring a high standard of academic and creative quality throughout. We would also like to thank the Sanaka Educational Trust's Group of Institutions for their constant encouragement and support. Under the dynamic guidance of Dr. Rajiv Jash, this magazine has found its rhythm and voice—elevating the collective spirit of our institution and enriching its intellectual culture. As you turn these pages, we invite you to engage—not just as a reader but as a fellow cultivator of ideas. We hope that Shadow Cultivate Vol. 3 inspires critical thought, stirs your imagination, and awakens a deeper connection to the world we live in. May this be the beginning of an ongoing dialogue between disciplines, languages, generations, and minds.

Let this be not just a magazine, but a movement of minds—a shared space where science meets poetry, art meets activism, and thought meets transformation.

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Shadow Cultivate Vol. 3

Sanaka Educational Trust's Group of Institutions

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DIRECTOR'S NOTE



It is with great pride and pleasure that I extend my warmest regards through this special note as we unveil Shadow Cultivate, an intellectual and creative endeavour initiated under the banner of Sanaka Educational Trust's Group of Institutions. More than just a magazine, Shadow Cultivate stands as a dynamic forum that captures the academic, artistic, and innovative expressions of our students and faculty. It bridges disciplines, ideas, and imaginations—where science meets art, and thought meets action. This edition reflects the diversity and depth of our institution, with contributions spanning scientific advancements, literary works, socio-political commentaries, and current affairs. At the heart of this vibrant collective is the Department of Pharmacy, a pillar of academic excellence within our institution. The articles and research insights from this department illustrate not just the intellectual potential of our students, but also their readiness to address the challenges of modern healthcare with integrity, innovation, and empathy. Pharmacy as a profession is rapidly evolving in the 21st century. It is no longer limited to dispensing medicine; it has expanded into areas such as drug discovery, nanotechnology, pharmacovigilance, regenerative medicine, and personalized therapeutics. Our Department of Pharmacy recognizes this shift and is committed to preparing students for this broader, interdisciplinary future. The work showcased in this magazine—on topics like green chemistry, nanotechnology in neurology, sustainable drug design, and smart drug delivery systems—demonstrates a forward-thinking mindset. It is especially heartening to see students not only engaging in rigorous scientific inquiry but also reflecting on the ethical and environmental dimensions of their work. This balance of scientific rigor and social responsibility is what we aim to instill through our academic programs. Shadow Cultivate also serves as a mirror to the cultural and emotional richness of our campus. Poems, paintings, and prose featured in this volume remind us that science and art are not opposites but allies in the pursuit of truth and beauty. The inclusion of multilingual literary expressions and artwork ensures that every student voice—regardless of discipline or background—is heard and celebrated. As Director, I believe that this spirit of openness, diversity, and interdisciplinary dialogue is essential to nurturing the next generation of responsible global citizens. I congratulate all contributors, editors, and coordinators who have worked tirelessly to bring this vision to life. Your dedication is visible in every page and every word. May this magazine continue to grow as a testament to the values we cherish—excellence in education, innovation in research, and compassion in service. I urge all readers—students, faculty, and visitors—to engage deeply with this volume, and to carry forward the ideas and inspirations it offers. Let us cultivate not only knowledge, but also the wisdom to use it for the betterment of humanity

FROM THE PRINCIPAL'S DESK



It is with great pride and a profound sense of purpose that I, on behalf of the Department of Pharmacy, Sanaka Educational Trust's Group of Institutions, share this message to honor Shadow Cultivate—a magazine that truly embodies the harmony of academics, culture, and intellect within our institution. This publication has served as a vibrant platform for diverse voices and ideas, creating a meaningful bridge between science and the humanities—an ideal our department deeply upholds and nurtures.

The Department of Pharmacy has always been dedicated to shaping students into holistic professionals—individuals who possess not only technical expertise but also ethical values, social awareness, and cultural sensitivity. In this light, Shadow Cultivate stands as a perfect reflection of the multidisciplinary nature of modern pharmacy education. The insightful contributions of our students in this edition highlight their engagement with contemporary global challenges and their participation in an evolving academic environment. Their ability to merge scientific reasoning with creative expression—through poetry, prose, and art—is truly inspiring and reaffirms our belief that scientific excellence must coexist with emotional intelligence and creativity.

As the head of the department, it fills me with pride to witness our students evolving into future pharmacists, well-prepared to meet the complex and ever-changing demands of healthcare, technology, and patient-centric innovation. At Sanaka Educational Trust's Group of Institutions, we remain committed to fostering a learning ecosystem that extends beyond classrooms and laboratories. With state-of-the-art facilities, committed faculty, and a student-centered philosophy, we strive to ensure our learners are not only employable but also research-driven and socially responsible.

The enthusiasm and initiative shown by our students in contributing to Shadow Cultivate stand as strong evidence of this culture of academic freedom and encouragement. I extend heartfelt appreciation to the editorial board, faculty mentors, and every contributor whose efforts made this publication possible. Their collaboration truly represents the spirit of unity and shared purpose that defines our department and institution.

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1

**Scientific
Advancements****Prodrug
Strategies to
Improve
Bioavailability**

Ruchira dey, Robina Khatun

Bioavailability refers to the proportion of an administered drug that reaches systemic circulation in an active form and is available at the site of action. Poor bioavailability remains a significant barrier in drug development, particularly for oral formulations. One innovative approach to overcoming these challenges is the use of *prodrug strategies*. A prodrug is an inactive or less active derivative of a parent drug molecule that undergoes enzymatic or chemical transformation in the body to release the active drug. This approach is specifically designed to optimize the pharmacokinetic properties of a drug, including its solubility, permeability, stability, and absorption. Many drugs suffer from limitations such as poor aqueous solubility, limited permeability through biological membranes, rapid metabolism, or degradation in the gastrointestinal (GI) tract. Prodrug strategies are used to mask

these unfavorable properties temporarily, thus enhancing the drug's ability to reach systemic circulation effectively. For instance, ester prodrugs are widely used to improve lipophilicity, enabling better membrane permeability and absorption. Once absorbed, these prodrugs are hydrolyzed by esterases to release the active parent drug. Hydrophilic prodrugs can also be employed to improve the solubility of poorly water-soluble drugs. These prodrugs often incorporate polar functional groups or amino acid conjugates to increase aqueous solubility, allowing easier formulation and better absorption in the GI tract. An example is fosphenytoin, a phosphate ester prodrug of phenytoin, which is more water-soluble and suitable for intravenous administration. Some drugs are extensively metabolized during first-pass metabolism, reducing their effective concentration in the bloodstream. Prodrug approaches can circumvent this by altering the site of drug absorption or by masking metabolic hot spots. For instance, valacyclovir is a prodrug of acyclovir designed to be absorbed through peptide transporters in the gut, thus avoiding degradation and enhancing bioavailability compared to the parent drug. Transporter-targeted prodrug strategies have gained interest recently. These prodrugs are designed to utilize specific transporters in the intestine, such as PEPT1, to facilitate drug uptake. By attaching promoieties that mimic natural substrates of transporters, the prodrug is actively transported across the intestinal wall, ensuring higher absorption rates. Additionally, prodrugs can improve the stability of the drug in harsh physiological environments. Acid-labile drugs, which degrade in the stomach, can be protected using prodrug

strategies that release the active compound only after passing into the more neutral pH environment of the intestine. In conclusion, prodrug strategies represent a versatile and powerful approach to enhance the bioavailability of drugs. By modifying the physicochemical and pharmacokinetic properties of drug molecules, prodrugs help overcome barriers related to solubility, permeability, metabolism, and stability. Successful prodrug design requires a deep understanding of drug metabolism, enzyme activity, and transport mechanisms to ensure the release of the active drug at the desired site and rate. This strategy continues to play a critical role in the development of effective and patient-friendly pharmaceutical formulations.

2

Scientific Advancements

Green Chemistry Approaches in Pharmaceutical Synthesis

Arindam Bag, Abhimannu Shome

Green chemistry, also known as sustainable chemistry, is an innovative field that seeks to design chemical processes and products in ways that reduce or eliminate the use and generation of hazardous substances. In the pharmaceutical industry, green chemistry plays a vital role in minimizing environmental impact, improving safety, reducing costs, and increasing overall efficiency in drug development and synthesis. As pharmaceutical synthesis traditionally involves large amounts of solvents, reagents, and waste, implementing green chemistry principles is both an ethical and strategic necessity. One of the core approaches in green chemistry is the use of atom economy, which emphasizes maximizing the incorporation of all starting materials into the final product. By designing reactions that minimize by-products and reduce the number of synthetic steps, pharmaceutical

companies can enhance yield and reduce waste. Catalysis is another key strategy—using catalytic rather than stoichiometric reagents can significantly lower energy requirements and waste generation. Transition metal catalysts, biocatalysts (enzymes), and organocatalysts are widely used in green synthesis to achieve high selectivity and efficiency. The replacement of hazardous solvents is a major target of green chemistry. Solvents contribute significantly to the environmental footprint of pharmaceutical manufacturing. Green solvents, such as water, ethanol, ethyl lactate, and supercritical carbon dioxide, are being used to replace volatile organic compounds (VOCs) and chlorinated solvents. Solventless reactions and microwave-assisted synthesis are also being explored to eliminate the need for solvents altogether. Biocatalysis is gaining traction in pharmaceutical synthesis due to its specificity, mild reaction conditions, and environmental friendliness. Enzymatic reactions can be used to achieve stereoselective transformations, which are crucial for synthesizing chiral drugs. For example, lipases and oxidoreductases are widely employed in the synthesis of enantiomerically pure active pharmaceutical ingredients (APIs). Flow chemistry or continuous flow synthesis is another green approach that offers better control over reaction parameters, enhances safety, and minimizes the risk of scale-up failures. This technique enables reactions to proceed under more controlled conditions, often leading to higher yields, less waste, and better heat and mass transfer compared to traditional batch processes. Waste minimization is central to green chemistry. The E-factor (Environmental factor), which quantifies

the amount of waste generated per unit of product, is used to assess the environmental efficiency of chemical processes. Pharmaceutical industries are increasingly adopting greener synthesis routes to reduce their E-factors, thereby achieving cleaner production. Moreover, the selection of renewable feedstocks and the design of safer chemicals are being integrated into the early stages of drug design. These strategies not only reduce dependency on fossil fuels but also ensure that the final products are less toxic to humans and the environment. In conclusion, green chemistry approaches in pharmaceutical synthesis are transforming the way drugs are manufactured. By embracing principles such as atom economy, catalysis, green solvents, biocatalysis, and waste minimization, the pharmaceutical industry can achieve more sustainable, cost-effective, and safer production. As environmental regulations tighten and societal demand for eco-friendly products grows, green chemistry will continue to be a driving force in the future of pharmaceutical innovation.

3

Scientific Advancements

Targeting GPCRs in Drug Discovery

Amisha Agarwal, Priyanka Gupta

G protein-coupled receptors (GPCRs) are among the most important and extensively studied targets in modern drug discovery. These membrane-bound receptors play a vital role in cell communication by transmitting extracellular signals into intracellular responses through the activation of G proteins. Due to their involvement in numerous physiological processes, including vision, taste, smell, neurotransmission, immune responses, and cardiovascular regulation, GPCRs are implicated in a wide range of diseases. As a result, they have emerged as attractive targets for therapeutic intervention. GPCRs constitute the largest family of membrane receptors, with over 800 members identified in the human genome. They share a common structure of seven transmembrane alpha-helices and interact with ligands such as hormones, neurotransmitters, lipids, and peptides. Upon ligand binding, GPCRs undergo a conformational change that activates intracellular G proteins, which in turn modulate various signaling cascades. This makes them critical regulators of

numerous biological functions. Approximately one-third of all FDA-approved drugs target GPCRs, demonstrating their immense pharmacological relevance. These drugs are used to treat a wide array of conditions, including hypertension (e.g., beta-blockers targeting β -adrenergic receptors), mental disorders (e.g., antipsychotics targeting dopamine receptors), asthma (e.g., β 2-agonists), and gastrointestinal disorders (e.g., antagonists of histamine H2 receptors). Despite this, a significant number of GPCRs remain "orphan receptors" with unidentified ligands and functions, offering untapped opportunities for novel drug development. Drug discovery efforts targeting GPCRs have advanced significantly due to improvements in structural biology, computational modeling, and high-throughput screening techniques. The determination of high-resolution GPCR structures using X-ray crystallography and cryo-electron microscopy has allowed for rational drug design based on the receptor's active and inactive conformations. This structural insight enables the development of highly selective ligands with improved efficacy and reduced side effects. One of the major advances in GPCR drug discovery is the concept of **biased agonism** or **functional selectivity**. Traditional agonists activate all downstream signaling pathways of a GPCR, which may lead to unwanted side effects. Biased agonists, on the other hand, selectively activate beneficial signaling pathways while avoiding the harmful ones. This targeted approach has great potential for improving drug safety and efficacy. For example, biased agonists of the μ -opioid receptor are being explored to

provide analgesia with reduced risk of respiratory depression and addiction. Allosteric modulators represent another promising approach. Unlike orthosteric ligands that bind to the primary active site, allosteric modulators bind to distinct sites on the receptor and modulate its activity indirectly. These modulators offer greater receptor subtype selectivity and can fine-tune receptor responses, which is particularly useful for closely related receptor subtypes. In conclusion, targeting GPCRs in drug discovery continues to be a highly productive and evolving field. With their central role in physiology and pathology, GPCRs offer immense potential for therapeutic innovation. Advances in structural biology, computational tools, and an improved understanding of receptor signaling dynamics are driving the development of next-generation drugs that are more selective, effective, and safer. The exploration of orphan GPCRs and novel signaling mechanisms will further expand the scope of GPCR-targeted therapies in the years to come.

4

Scientific Advancements

Lipid-Based Drug Delivery Systems

Khetra Mohan Kumar, Sandip Karmakar

Lipid-based drug delivery systems (LBDDS) have emerged as a promising strategy to enhance the bioavailability, stability, and therapeutic efficacy of poorly water-soluble drugs. These systems utilize various lipid materials—including oils, surfactants, phospholipids, and solid lipids—to encapsulate or solubilize drugs and improve their delivery to specific sites in the body. Many new chemical entities (NCEs) developed today exhibit poor aqueous solubility, leading to low absorption and limited therapeutic effectiveness when administered orally. Lipid-based formulations address these challenges by enhancing solubility, protecting drugs from degradation in the gastrointestinal (GI) tract, promoting lymphatic transport, and bypassing first-pass metabolism. Common lipid-based drug delivery systems include emulsions, microemulsions, self-emulsifying drug delivery systems (SEDDS), liposomes, solid lipid nanoparticles (SLNs), and nanostructured lipid carriers (NLCs). Liposomes are vesicular systems composed of phospholipid bilayers that

can encapsulate both hydrophilic and lipophilic drugs, offering targeted delivery and reduced toxicity. They are widely used in cancer therapy, vaccine delivery, and antifungal treatments. Solid lipid nanoparticles and NLCs are solid matrix systems at body temperature and provide controlled drug release, enhanced stability, and biocompatibility. SEDDS and SNEDDS (self-nanoemulsifying drug delivery systems) are isotropic mixtures of oils and surfactants that spontaneously form fine oil-in-water emulsions upon contact with GI fluids, leading to increased surface area and improved drug dissolution. These systems are particularly advantageous for oral delivery, enhancing the absorption of lipophilic drugs through both passive diffusion and lymphatic transport. Lipid-based carriers can also interact with intestinal lipid transport pathways, facilitating drug uptake by M cells or chylomicron pathways and improving systemic bioavailability. Moreover, they can inhibit efflux transporters like P-glycoprotein and metabolic enzymes, thereby increasing drug residence time and reducing degradation. Formulation of LBDDS requires careful selection of lipids, surfactants, and co-solvents based on the physicochemical properties of the drug, as well as considerations of compatibility, digestibility, and regulatory acceptability. Additionally, lipid formulations can be tailored for various routes of administration, including oral, parenteral, topical, ophthalmic, and pulmonary. Lipid-based formulations have already led to the successful commercialization of several drugs, such as cyclosporine (Neoral®), saquinavir (Fortovase®), and amphotericin B liposomal formulation (Ambisome®).

However, challenges such as physical instability, lipid oxidation, and large-scale manufacturing complexity still exist. Advances in nanotechnology, analytical tools, and formulation science continue to drive innovation in this field. Overall, lipid-based drug delivery systems offer versatile and effective solutions for improving the pharmacokinetic and therapeutic profiles of challenging drug molecules. With increasing demand for personalized and targeted therapies, LBDDS are likely to play a significant role in the future of pharmaceutical development, enabling the delivery of not only conventional small-molecule drugs but also biologics, vaccines, and nucleic acid-based therapeutics with enhanced precision and effectiveness.

5 *Scientific Advancements*

Transdermal Drug Delivery Systems: Recent Advances

Md Sahil Ahmad Sepay, Ruchira Das

Transdermal drug delivery systems (TDDS) represent a sophisticated method of administering medications through the skin for systemic therapeutic effects. These systems offer several advantages over traditional routes, including avoidance of first-pass metabolism, improved patient compliance, sustained and controlled drug release, and reduction of gastrointestinal side effects. Over the years, significant advancements have been made in TDDS to overcome the skin's natural barrier—the stratum corneum—which limits the penetration of many therapeutic agents. Recent innovations have focused on enhancing skin permeability, increasing drug loading capacity, and enabling the delivery of a wider range of drugs, including macromolecules such as peptides, proteins, and nucleic acids. One major area of advancement is the development of microneedle arrays, which create microchannels in the skin to

facilitate drug transport without reaching pain receptors, thus offering a painless and minimally invasive delivery method. These microneedles can be solid, coated, dissolving, or hollow, and are made from biocompatible polymers or metals. They are especially promising for the transdermal delivery of vaccines, insulin, and biologics, with ongoing clinical trials exploring their use for COVID-19 vaccines and hormone therapy. Nanocarrier-based systems—including liposomes, niosomes, ethosomes, and solid lipid nanoparticles—have also revolutionized TDDS by improving drug solubility, stability, and skin penetration. These vesicular systems encapsulate both hydrophilic and lipophilic drugs, protecting them from degradation and promoting controlled release. Ethosomes, which contain a high concentration of ethanol, disrupt the lipid bilayer of the stratum corneum and allow deeper drug penetration. Transfersomes, another flexible vesicle type, can squeeze through skin pores much smaller than their own diameter due to their deformable structure. Another significant innovation is the use of chemical penetration enhancers and iontophoresis. Chemical enhancers alter the skin's lipid structure to allow drugs to permeate more easily, while iontophoresis uses a low electrical current to drive charged drug molecules through the skin. Both methods have shown promise in enhancing the delivery of larger and more polar drugs that typically cannot penetrate the skin effectively. Hydrogel-based patches are also gaining attention due to their high water content, biocompatibility, and ability to provide sustained drug release. These hydrogels can be engineered to respond to stimuli such as pH,

temperature, or enzymes, enabling smart transdermal systems that release drugs in response to physiological conditions. Such systems are under investigation for managing diabetes, pain, and hormone disorders. In addition, wearable and electronic transdermal devices, such as smart patches with integrated sensors, have opened up new possibilities in personalized medicine. These devices not only deliver drugs but also monitor patient vitals and drug levels in real-time, adjusting dosage accordingly. In conclusion, recent advances in transdermal drug delivery systems have significantly expanded their potential beyond conventional small molecules. Through microneedles, nanotechnology, chemical enhancers, and smart materials, TDDS are now capable of delivering a broad spectrum of drugs safely and effectively. As research continues, these systems are expected to play a pivotal role in the future of non-invasive, patient-friendly drug delivery, particularly in chronic disease management and personalized therapy.

6 *Scientific Advancements*

Population Pharmacokinetics in Personalized Therapy

Prasenjit Mahato, Rajesh Ghosh

Population pharmacokinetics (PopPK) is a scientific approach that analyzes drug concentration data from various individuals within a target population to understand variability in drug absorption, distribution, metabolism, and excretion (ADME). By identifying the factors contributing to this variability—such as age, body weight, sex, disease state, genetic background, and co-medications—PopPK plays a critical role in the development and implementation of personalized therapy. This method enables clinicians and researchers to tailor drug dosing regimens to individual patient characteristics, thereby maximizing therapeutic efficacy while minimizing the risk of adverse effects. Unlike traditional pharmacokinetics, which studies drug behavior in small, homogeneous groups, population pharmacokinetics uses data from diverse patient populations, often collected during clinical trials or routine

clinical practice. Nonlinear mixed-effects modeling (e.g., using software like NONMEM or Monolix) is commonly employed in PopPK to estimate population-level parameters and identify covariates that influence pharmacokinetic variability. These models can be used to predict drug concentrations in individuals, optimize dosing strategies, and support dose adjustments in special populations, such as pediatric, elderly, or renally impaired patients. One of the key advantages of PopPK is its ability to inform **model-informed precision dosing (MIPD)**. MIPD uses PopPK models to individualize drug therapy by combining population-level knowledge with patient-specific data, such as drug concentration measurements and clinical markers. For example, in oncology, where narrow therapeutic windows are common, PopPK models are used to personalize chemotherapy dosing, improving efficacy and reducing toxicity. Similarly, in infectious diseases, PopPK-guided dosing of antibiotics like vancomycin or aminoglycosides ensures that therapeutic drug levels are achieved, especially in critically ill or renally compromised patients. Another important application of PopPK is in **therapeutic drug monitoring (TDM)**, where drug levels are measured and interpreted using population-based models. This is especially useful for drugs with high inter-individual variability and narrow therapeutic indices, such as immunosuppressants (e.g., tacrolimus), antiepileptics (e.g., phenytoin), and anticoagulants. PopPK models allow for a more informed interpretation of TDM results, improving dose adjustment decisions. PopPK also plays a significant role in **drug development and regulatory**

approval. Pharmaceutical companies use population models to simulate clinical trial outcomes, assess the impact of covariates on drug exposure, and justify dosing recommendations across subpopulations. Regulatory agencies, including the FDA and EMA, increasingly encourage or require PopPK analyses in new drug applications, recognizing their value in identifying optimal dosing strategies and informing product labeling. Despite its benefits, PopPK faces challenges, including the need for high-quality data, model validation, and integration into clinical workflows. However, with the advancement of computational tools, electronic health records, and real-time monitoring technologies, the incorporation of PopPK into clinical practice is becoming more feasible. In conclusion, population pharmacokinetics is a cornerstone of personalized therapy, enabling individualized dosing based on quantitative models of drug behavior across diverse populations. By accounting for variability among patients and guiding dose optimization, PopPK enhances the safety, efficacy, and precision of drug therapy, representing a vital component in the future of personalized medicine.

7 *Scientific Advancements*

Biosimilars: Regulatory and Scientific Challenges

Soubhik Mudli, Tulshi Chakrabarty

Biosimilars are biologic medical products that are highly similar to an already approved reference biologic (originator) in terms of quality, safety, and efficacy. They offer a promising avenue for reducing healthcare costs and increasing patient access to life-saving biologic therapies, especially in areas such as oncology, autoimmune diseases, and endocrinology. However, the development and approval of biosimilars come with significant regulatory and scientific challenges, due to the complex nature of biologics, which are large, structurally intricate molecules produced using living systems. One of the major scientific challenges in biosimilar development is demonstrating similarity to the reference product. Unlike small-molecule generics, which are chemically synthesized and easily replicated, biologics are produced through intricate processes involving living cells, which are inherently variable. Even slight changes in manufacturing conditions can impact the structure, glycosylation patterns, and biological activity of the protein.

Therefore, biosimilar manufacturers must perform extensive analytical characterization using advanced techniques like mass spectrometry, bioassays, and chromatography to ensure that the biosimilar matches the reference product in terms of primary structure, higher-order structure, and biological function. Another critical challenge is the regulatory requirement for a stepwise approach to biosimilar approval. This includes comparative analytical studies, followed by nonclinical (in vitro and in vivo) evaluations, and then clinical studies to assess pharmacokinetics (PK), pharmacodynamics (PD), immunogenicity, safety, and efficacy. Regulatory agencies such as the U.S. FDA, European Medicines Agency (EMA), and India's CDSCO have developed specific pathways for biosimilar approval. However, differences in regulatory frameworks across regions can pose barriers to global biosimilar development and marketing. The assessment of immunogenicity—the potential of a biosimilar to trigger an immune response—is another major scientific hurdle. Even minor differences in protein structure, aggregates, or impurities can influence immunogenicity, leading to reduced efficacy or adverse effects. Thus, robust clinical trials are required to compare the immunogenic profiles of biosimilars and reference products over a long duration, which adds to development time and cost. Furthermore, regulatory authorities often require extrapolation of indications, allowing a biosimilar approved for one indication to be used for others for which the reference product is approved, without conducting separate trials. While this approach reduces clinical testing burdens,

it raises scientific and ethical concerns, especially if the mechanism of action varies across diseases or if patient populations differ significantly. Post-marketing surveillance and pharmacovigilance are also critical in biosimilar regulation. Since clinical trials may not detect rare or long-term adverse effects, ongoing monitoring after market entry is essential to ensure continued safety and efficacy. Manufacturers must implement risk management plans and collect real-world evidence to address any emerging safety signals. In conclusion, while biosimilars hold great potential for improving healthcare affordability and accessibility, their development and approval are fraught with scientific and regulatory complexities. Addressing challenges related to molecular similarity, immunogenicity, regulatory harmonization, and post-marketing safety is essential for the successful integration of biosimilars into clinical practice. Ongoing collaboration between regulatory agencies, industry, and healthcare providers will be key to overcoming these hurdles and realizing the full potential of biosimilar therapies.

8 *Art & Literature* Paintings



Chromatic Roses

~Pratyushi De

"Chromatic Roses" is a vivid artwork depicting two roses in a spectrum of bold, radiant colours. The dynamic strokes and surreal palette bring a dreamlike energy to this floral expression.

RAM

~Ankan Paul

The image depicts a meditative figure of Hanuman, a revered monkey god in Hindu mythology, seated in a lotus position.



9 Art & Literature

Prose & Poetry

স্বপ্নের দামে বিক্রি

~ Arnab Dey

পণ নয় উপহার, পণ নয় ভালোবাসা,
পণ মানেই অবহেলা, আর নারী নিগ্রহের ভাষা।
স্বপ্ন নিয়ে বউ আসে, আঁচলে সুখের ছবি,
কিন্তু স্বশুরবাড়ির দরবারে সে শুধু এক পণ দেবে কি না—এই দাবি।

গয়না, টাকা, গাড়ি—চাহিদা যেন ফুরায় না,
মেয়ের বাবার নিঃশ্বাসও থেমে যায় কথায়-কথায় বলা না।
অধিকার নয়, সম্মান নয়,
এই পণের দাবিতে সম্পর্কের রংও বদলে যায়।

জীবন্ত মানুষটাকে জ্বালানো হয় আগুনে,
অথচ সমাজ চুপ—আলোর বদলে আঁধারে ডুবে।
বলো, এই কি সভ্যতা? এই কি উন্নয়ন?
যেখানে নারীর জীবন নষ্ট হয় পণের চরণে?

না, এবার থামো—ভাঙো এই অভিশপ্ত চক্র,
নারীর জন্য গড়ো এমন সমাজ—যেখানে ভালোবাসা সঠিক মাপকাঠি।

পুরুষতন্ত্রের নতুন সংজ্ঞা

~Rupsa Dutta Roy

পুরুষ মানেই রাগ? পুরুষ মানেই শক্তি?
পুরুষ কি কাঁদে না? তার কি নেই দুর্বলতা-বোধের ভ্রান্তি?
চোখের জল লুকিয়ে রাখা,

হাসির মুখে শত অভিমান ঢেকে রাখা—
এই কি তবে পুরুষতন্ত্রের মানচিত্র?

না, এবার ভাঙে সে দেয়াল,
যেখানে পুরুষ মানেই রোবট—নেই আবেগ, নেই চালচল।
সে-ও মানুষ, তারও তো মন,
যেখানে জাগে ভালোবাসা, স্বপ্ন, আর ক্ষত-বেদনার অনুরণন।

সে শুধু রক্ষক নয়, হতে পারে সহচর,
যে স্ত্রীর পাশে হাঁটে, সন্তানকে কোলে নিয়ে গড়ে ঘর।
সে কাঁদলেও পুরুষ, সে ভালোবাসলেও সাহসী,
সে রান্নাঘরে থাকলেও তার পরিচয় কম নয় কিছুতেই।

চোখে জল থাকুক, মুখে থাকুক হাসি,
পুরুষ মানে শুধু কঠিন নয়, সে প্রেমিক, সে বন্ধু, সে সহচরও যে স্নেহাশী।
বুকের ভিতর যে ভালবাসা, যে চেপে রাখা অশ্রু—
সেগুলিই তো মানবতা, সত্যিকারের শক্তির রূপ।

পুরুষ মানে সহানুভূতি, মানে শ্রদ্ধা আর সহনশীলতা,
আজকের সমাজ চায় এমন পুরুষ—যার নেই পিতৃতন্ত্রের মাথা উঁচু অহংকার।
নতুন সংজ্ঞায় রচিত হোক পুরুষতন্ত্রের পরিচয়,
যেখানে শক্তির সঙ্গে থাকে হৃদয়ের অনুপ্রবেশ।

The Ripple Effect

~ Supriya Ghosh

It was a quiet Sunday morning when Ananya scrolled through her phone with a half-finished cup of tea. The headline flashed in bold:

“Local Man Arrested in School Scam: Millions Misused”

And just below it, a familiar photo—her childhood friend, Arijit Sen. Shock hit her like a wave. Arijit, the one who had started a school for underprivileged children in the village, accused of fraud? Ananya reread the article three times, but the image and name left no doubt. Within minutes, the news went viral in their district. WhatsApp groups buzzed, Facebook comments raged, and YouTube channels launched "exclusive" exposés. Arijit's school gates were vandalized by angry locals, donors pulled back funding, and parents withdrew their children. Three days later, Arijit's face was no longer in the news. Another scandal had taken its place. But the damage was already done. Ananya, a journalism student, couldn't stay silent. She decided to investigate.

She visited the school. The campus was eerily silent, blackened slogans on the wall reading, "Thief in the Name of Teacher!" A security guard hesitantly let her in. Inside, she met Meena, a teacher who had worked with Arijit for five years. With trembling hands, Meena showed her a file—audit reports, student attendance, donation receipts—all in order. "He used every paisa for the children," she whispered. "One angry politician, one false tip-off, and the media ran with it. No one even waited for proof. Ananya returned to her hostel, shaken. She spent nights comparing reports, talking to students, even contacting the local police. A week later, she published her own article on a student journalism site:

"Innocent Until Proven Guilty: How One Headline Destroyed a Man's Dream"

It caught attention. Regional news picked it up. Questions were raised. A month later, the police released a statement: "No substantial evidence against Arijit Sen. Case closed." But the school had lost its students, and Arijit, his spirit. When Ananya finally met him, he looked like a man who had aged decades in weeks. "They judged me without a trial," he said quietly. "All it took was one headline."

Echoes of a Railway Station

~ Ayan Hazra

The whistle screamed, the wheels would roll,
As tales began from platform's soul.
A dusty bench, a chaiwala's call,
Where time once paused, and dreams stood tall.

The scent of coal, the clang of track,
Took me to days I can't get back.
Papa's hand, so warm, so tight,
In sleepy eyes, the world felt right.

The porter's cry, the newspaper's flap,
The rustle of mom's tiffin-wrapped snack.
The hawker's voice, "Singara! Jalebi!"
Still echo in my memory, maybe.

Train names sang like lullabies,
"Gitanjali," "Shatabdi," under open skies.
We'd chase the pigeons, count the bogies,
Draw moustaches on glossy movies.

The yellow board with black bold lines,
A name in Hindi, English signs.
Some cried, some waved, some didn't speak—
So many lives in moments brief.

And oh, the thrill of window seats,
Banana peels and biscuit treats.
The wind that played with untied hair,
A freedom found just floating there.

Now I stand with grown-up shoes,
A phone, a map, and adult blues.
But inside me, that child still clings,
To train songs and platform swings.

O Indian Rail, you carried more
Than passengers through sliding doors.
You took a child through space and time—
And left him poems, pure and prime.

The Mirror in the Market

~ Moumita Sahoo

Every morning, the Burrabazar market came alive with clinking coins, shouting vendors, and swaying saris under a hot sun. Amid the chaos stood Tara—bold lipstick, kohl-lined eyes, and a silk saree brighter than the sunrise. Her laugh echoed between stalls, but behind it lay a silence no one heard. To most, she was just "that hijra" who sold bangles and bindis. People avoided eye contact, threw coins without touching her hand, and whispered as she walked by. But no one knew Tara's story. Once upon a time, Tara was known as Tarun. A quiet child from a conservative Bengali household, he loved dancing, imitating heroines from movies, and helping his mother drape her saree. When Tarun turned 13, his father caught him wearing lipstick in front of a mirror. The mirror cracked that day—along with Tarun's childhood. What followed were beatings, shame, temple visits, and threats of boarding school. Tarun ran away. He was only 15 when he found shelter with a group of transgender people at Sealdah station. They gave him a new name: Tara. A new identity. A place where she could wear lipstick without fear. Years passed. Tara learned to dance, to smile, and to survive. She sold bangles in the market to earn a living, but what she sold more than anything was strength—the kind the world rarely noticed. One afternoon, something unusual happened. A little girl named Pari tugged at her mother's hand and pointed at Tara's bangle stall. "Ma, she's so pretty!" The mother tensed, trying to pull the child away. But Tara knelt down, offering a bright red bangle. "Would you like to try this, shona?" Pari giggled and slipped it on. Her mother stood frozen. "You don't have to be afraid," Tara said softly. "I won't harm your child's mind. But society already might." The mother didn't reply. But the next week, she came back—with two more women. Quietly, they bought bangles. No questions. No judgment. Just a transaction. But for Tara, it was more. Word spread slowly. Some people still crossed the street to avoid her. Some still muttered slurs. But others began to see her not as a shame, not as a

curse—but as a human being. One day, a local college student approached Tara with a notebook. “Didi, I’m writing about gender identity for our magazine. May I interview you?” Tara smiled, eyes glistening. “Only if you promise not to turn me into a headline. I’m not a tragedy. I’m a person.”

10

Current affairs

India's Stand on Climate Finance and Emission Cuts

Riya Pal (1st year)

India's role in global climate policy has become increasingly influential, especially in light of its ambitious developmental goals and growing international responsibilities. At the COP28 Summit held in Dubai in 2023, India reiterated its commitment to balancing environmental responsibility with the needs of its large and developing population. Climate finance and emission cuts were central to India's interventions, and the country's nuanced approach received global attention. India has maintained that climate finance is a cornerstone for any meaningful progress in global emission reductions. Speaking at the summit, Environment Minister Bhupender Yadav emphasized the importance of developed countries honoring their pledge of providing \$100 billion annually to support developing nations. India has consistently argued that without adequate financial and technological support, developing countries cannot transition to greener

economies. India also stressed the principle of "common but differentiated responsibilities and respective capabilities" (CBDR-RC), emphasizing that developed nations have historically contributed the most to greenhouse gas emissions and must, therefore, bear a larger burden in combating climate change. India's stand is that while it is willing to contribute, it cannot compromise its developmental needs. India's own climate action goals are laid out in its updated Nationally Determined Contributions (NDCs) under the Paris Agreement. These include a target to reduce the emissions intensity of its GDP by 45% from 2005 levels by 2030, and to achieve about 50% cumulative electric power capacity from non-fossil fuel-based energy resources. India has also committed to achieving net-zero carbon emissions by 2070. On the ground, India has made significant progress in expanding its renewable energy capacity. As of 2023, the country had already surpassed 120 GW of solar and wind energy installations, and major initiatives like the Green Hydrogen Mission and the National Electric Mobility Mission are accelerating clean energy adoption. The Indian government is also promoting energy-efficient practices through schemes like UJALA and the Perform, Achieve and Trade (PAT) program. Moreover, India's leadership in international collaborations like the International Solar Alliance (ISA) and Coalition for Disaster Resilient Infrastructure (CDRI) showcases its commitment to global cooperation on climate issues. Despite these achievements, India faces challenges, particularly in transitioning coal-based sectors and ensuring a just transition for affected workers and communities.

Nevertheless, the government is working on policy frameworks to integrate green jobs and sustainable livelihoods into its climate strategy. In summary, India's stand on climate finance and emission cuts reflects a pragmatic and balanced approach. It seeks fairness in global climate action, financial and technological support for developing nations, and a strong domestic policy push towards renewable energy and sustainability. As climate impacts intensify worldwide, India's leadership and advocacy for equitable climate action are becoming increasingly vital on the world stage.

11

Current affairs

ISRO's Chandrayaan-3 Moon Mission (2023) – Successful Soft Landing and Global Acclaim

Rajeeul Islam (4th year)

India's space exploration journey achieved a historic milestone with the successful soft landing of Chandrayaan-3 on the Moon's south pole on August 23, 2023. This feat made India the first country to land on the lunar south pole and the fourth nation globally to achieve a successful soft landing on the Moon, following the United States, the former Soviet Union, and China. The achievement brought immense national pride and international recognition to the Indian Space Research Organisation (ISRO). Chandrayaan-3 was launched on July 14, 2023, from the Satish Dhawan Space Centre using the GSLV Mark III rocket. The mission included a lander named Vikram and a rover named Pragyan. Unlike its predecessor, Chandrayaan-2, which failed to land safely in 2019, Chandrayaan-3 focused solely on

the landing module and excluded an orbiter. Drawing from past lessons, ISRO engineers redesigned landing algorithms and conducted rigorous simulations to ensure success. The Vikram lander executed a textbook landing near the lunar south pole, a region of great scientific interest due to its permanently shadowed craters, which are believed to contain water ice. The presence of water ice could be crucial for future lunar habitation and exploration. Once deployed, the Pragyan rover explored the surface for 14 days, analyzing soil composition and sending valuable data back to Earth. The mission was lauded globally. International space agencies, including NASA and ESA, congratulated ISRO for its remarkable achievement. The precision and efficiency of the mission, accomplished on a relatively modest budget of around ₹615 crore (~\$75 million), earned India admiration for its cost-effective and innovative approach to space exploration. Chandrayaan-3 also reignited interest in STEM education across India. Students and scientists alike followed the mission closely, and the successful landing was broadcast live, creating a moment of unity and scientific pride across the country. The mission has become a symbol of Indian technological prowess and inspired a new generation of young minds to dream big. India's success with Chandrayaan-3 strengthens its space diplomacy and positions ISRO as a reliable partner in international collaborations. The mission's data will contribute to global lunar science, and ISRO plans to share some findings with other space agencies. Looking ahead, India has ambitious plans including the Gaganyaan human spaceflight program and future interplanetary missions like Shukrayaan (to Venus) and a potential Mars orbiter 2. In conclusion, Chandrayaan-3's successful soft landing is not just a triumph for ISRO but a landmark achievement for the entire nation. It underscores India's capability in deep space missions and its commitment to

exploring the final frontier through innovation, determination, and scientific excellence. The Moon may have been touched by many, but with Chandrayaan-3, India left a lasting footprint on its southern shadows.

12

Current affairs

Neeraj Chopra's Golden Streak & India in Athletics –National Pride in Track and Field

Maheswar Barik (4th year)

Neeraj Chopra has become a name synonymous with excellence in Indian athletics. His remarkable performance streak, especially between 2021 and 2023, has propelled Indian sports to global recognition. In 2023, Chopra continued to shine, winning multiple international competitions, including the World Athletics Championships, where he clinched gold in the men's javelin throw, becoming the first Indian athlete to do so. Chopra's achievements are not just personal milestones; they symbolize a new era in Indian sports, especially in track and field events, which have historically been overshadowed by cricket. His discipline, commitment, and consistent performance have inspired millions of aspiring athletes in the country. Besides his athletic prowess, Chopra is known for his humility and sportsmanship, qualities that resonate deeply with Indian values. His interaction with fellow competitors and fans shows a mature and grounded personality, making him an ideal role model.

India's athletics scene has seen a resurgence, thanks in part to Chopra's influence. More Indian athletes like Avinash Sable, Hima Das, and Murali Sreeshankar have begun making their mark on the international stage. These successes are supported by government initiatives like Khelo India and the Target Olympic Podium Scheme (TOPS), aimed at nurturing talent at the grassroots level. Chopra's consistent victories have attracted significant media attention and increased funding and sponsorship for track and field sports. Young athletes, once limited by poor infrastructure and inadequate training, are now receiving global-level exposure, thanks to the changing ecosystem. In a nation where cricket has long dominated public consciousness, Chopra's accomplishments have contributed to a much-needed diversification of sporting interests. Schools and colleges are now more enthusiastic about promoting athletics, and regional sports academies are being revitalized. The future of Indian athletics looks promising. With global exposure, scientific training methods, and the motivational spark provided by Neeraj Chopra and his contemporaries, India could see a surge in podium finishes in the coming international events, including the Paris 2024 Olympics. In conclusion, Neeraj Chopra's golden streak is more than a personal triumph—it is a symbol of India's rising stature in global athletics. It marks a shift in perception, where Indian athletes are now seen as serious contenders rather than underdogs. His journey underscores the importance of perseverance, support systems, and national pride, making him a beacon of inspiration for generations to come.

13

Current affairs

Russia-Ukraine War (Ongoing) – India’s Diplomatic Balancing Act and Global Implications

Chiranjit Mahato (3rd year)

The Russia-Ukraine war, which began in February 2022, has significantly altered the global geopolitical landscape. As the conflict entered 2023, the international community faced the complex task of navigating through political alliances, humanitarian concerns, and economic disruptions. India, with its strategic ties to both Russia and the West, has played a delicate balancing act. India’s stance has been one of neutrality and diplomacy. While abstaining from voting against Russia at the United Nations, India consistently called for dialogue, cessation of hostilities, and respect for international law. Prime Minister Narendra Modi’s statement to President Putin—“This is not the era of war”—resonated globally and was even quoted in G20 and UN documents. India’s position has been driven by several strategic interests. Russia remains a key defense partner, accounting for nearly 60% of India’s military imports. At the same time, India’s growing

economic and technological ties with the U.S. and the European Union necessitate maintaining cordial relations with the West. The conflict also had significant economic implications for India. Rising oil and gas prices, disrupted supply chains, and increased fertilizer costs posed challenges. However, India leveraged its strategic autonomy to secure discounted oil deals from Russia, ensuring energy security amid global price surges. On the humanitarian front, India launched Operation Ganga to evacuate thousands of Indian students stranded in Ukraine. The mission was lauded for its efficiency and compassion, further reinforcing India’s commitment to protecting its citizens abroad. India’s role as the G20 President in 2023 offered a diplomatic platform to advocate for global cooperation amidst geopolitical tensions. India emphasized the need for inclusive and human-centric global policies, using its presidency to focus on sustainable development, digital transformation, and peacebuilding. In summary, India’s approach to the Russia-Ukraine war demonstrates a mature, strategic, and humanitarian-driven diplomacy. It highlights the country’s evolving role as a global mediator and advocate for multipolarity and peaceful resolution of conflicts.

14

Current affairs

Ban on TikTok & Chinese Apps Continues – Data Sovereignty Debates

Suman Nayak (3rd year)

India's decision to ban TikTok and several other Chinese apps in 2020 was a watershed moment in the discourse surrounding digital sovereignty and national security. As of 2023, the ban continues, highlighting the government's steadfast commitment to safeguarding user data and promoting indigenous alternatives. Over 250 Chinese apps have been banned under Section 69A of the Information Technology Act, citing threats to national security and data privacy. This move came in the wake of border tensions between India and China, particularly the Galwan Valley clash. The ban was framed not only as a geopolitical response but also as a crucial step in regulating the digital space. Apps such as TikTok, WeChat, UC Browser, and others were accused of harvesting vast amounts of user data and transmitting it to servers located outside India, potentially compromising national interests. The prolonged enforcement of the ban has sparked debates on digital independence, internet freedom, and censorship. Critics argue that banning apps

stifles innovation and limits user choice. However, proponents see it as a necessary intervention in an era where data is the new oil. In response to the vacuum created by the banned apps, Indian developers have stepped up, leading to a surge in the development of homegrown platforms like Chingari, Roposo, and Moj. These alternatives have received government backing through initiatives like the Aatmanirbhar Bharat App Innovation Challenge, encouraging local talent to create global-standard applications. The ban has also reignited discussions on data localization, cybersecurity, and the need for a robust data protection law in India. With the introduction of the Digital Personal Data Protection Act in 2023, the legal framework has begun to align with these concerns. The Act mandates companies to store sensitive user data within Indian borders and provides clear guidelines on user consent and grievance redressal. From a global standpoint, India's actions have set a precedent. Several other nations have since reevaluated their digital dependency on foreign platforms. The Indian government's emphasis on 'Digital Swarajya' reflects a broader vision of self-reliance not only in physical goods but also in the virtual world. In conclusion, the continued ban on TikTok and Chinese apps is not just a reactionary policy but a cornerstone in India's journey toward digital sovereignty. It signals the importance of cybersecurity, data privacy, and the strategic role of technology in geopolitics. As India continues to digitize rapidly, these decisions will shape the future of its tech landscape.

15

Current affairs

Coding and AI in School Curriculum – CBSE & NCERT Reforms

Pritam Barik (2nd year)

The landscape of Indian education is undergoing a revolutionary change with the integration of coding and Artificial Intelligence (AI) into the school curriculum. In line with the National Education Policy (NEP) 2020, the Central Board of Secondary Education (CBSE) and National Council of Educational Research and Training (NCERT) have introduced these subjects from as early as Class 6 to equip students with future-ready skills. Starting in 2021 and strengthened further through 2023, the inclusion of coding and AI reflects the country's growing emphasis on STEM (Science, Technology, Engineering, and Mathematics) education. The idea is to cultivate analytical thinking, problem-solving abilities, and digital fluency among students from a young age. CBSE has collaborated with tech giants like IBM, Intel, and Microsoft to design student-friendly, interactive modules. The syllabus includes basic programming concepts, ethical AI usage, machine learning fundamentals, and hands-on projects.

These changes ensure students aren't merely consumers of technology but creators. Python, Scratch, and AI tools are being introduced in a gamified format to maintain interest while fostering creativity. This curriculum reform is also aimed at bridging the digital divide. Training sessions for teachers have been rolled out nationwide to ensure effective implementation. Coding clubs, AI-based competitions, and innovation labs are being promoted under schemes like the Atal Innovation Mission. Moreover, this shift is designed to align with India's broader vision of becoming a global technology hub. By nurturing a generation adept in coding and AI, India is laying the groundwork for leadership in emerging fields such as robotics, automation, and data science. Critics, however, caution against overburdening students and stress the need for balanced learning. The reforms are expected to evolve, incorporating feedback from schools and educators to ensure inclusivity and flexibility. In summary, the inclusion of coding and AI in school curricula marks a transformative step in Indian education. It symbolizes a proactive approach to future challenges and opportunities, ensuring that India's youth are not only literate but technologically empowered.

16

Current affairs

Menstrual Leave Policy in Workplaces – Zomato & Kerala Govt Leads

Subhadip Hazra (2nd year)

The conversation around menstrual health and workplace equality took a significant leap forward with the introduction of menstrual leave policies in India. In 2020, Zomato became one of the first major Indian companies to announce up to 10 days of menstrual leave annually for its female and transgender employees. By 2023, this initiative had sparked widespread discussion and emulation across sectors. Kerala became the first state government to implement menstrual leave for students in 2023. Cochin University of Science and Technology (CUSAT) led the way, followed by other educational institutions, acknowledging the need to address menstrual discomfort without academic penalty. These developments represent a progressive shift in public health policy and gender-sensitive work environments. Menstrual leave acknowledges the biological realities faced by many and aims to destigmatize periods. For decades, menstruation has been shrouded in taboo, often leading to discomfort and absenteeism among

working women and students. Supporters argue that menstrual leave boosts morale, improves productivity, and fosters inclusivity. It encourages open conversations about menstrual health, which is crucial for breaking societal taboos. Critics, however, worry that such policies may reinforce gender stereotypes or affect hiring decisions, making implementation a delicate balancing act. Legal backing for menstrual leave is still evolving in India. The Menstrual Benefit Bill, first proposed in 2017, remains under consideration in Parliament. However, the initiatives by Zomato, Kerala, and a few other progressive institutions indicate a growing recognition of gender-specific needs in the workplace and educational settings. Global precedents also support this move. Countries like Japan, South Korea, and Spain have already implemented menstrual leave laws, offering valuable lessons for India. In conclusion, menstrual leave policies in India are paving the way for a more empathetic and equitable society. They reflect a growing awareness of women's health issues and signal a transformative step towards workplace equality. As more organizations and institutions adopt such measures, it may finally normalize menstruation as a legitimate conversation in public and professional spaces.

(B.Pharm/D.Pharm) and PG (M.Pharm) Exams and cut-offs

Level	Exam Name	Category	Cutoff 2023
UG	NEET-UG	UR / EWS	50th percentile: 137–720
		OBC/SC/ST	40th percentile: 107–136
PG	GPAT	General (UR)	Marks: 160 ; Percentile: ~96.18
		EWS	Percentile: ~90.16
		OBC-NCL	Marks: 128 ; Percentile: ~90.57
		SC	Marks: 100 ; Percentile: ~77.10
		ST	Marks: 75 ; Percentile: ~57.74
	CUET-PG / State-PGCET	Varies by university/state	Typically 60–70 percentile (in CUET-PG); university-specific for PGCETs (e.g. Kurukshetra Pharmaceuticals ~52%, Pharm. Chemistry ~68%)

A Heartfelt Thank You — From Shadow Cultivate

To the ones who weave dreams through ink and soul,

Your words gave silence a voice,

made broken thoughts whole.

In every verse, your light has brightly shone ~

With deepest respect,

Shadow Cultivate thanks each one.