

A pharmaceutical magazine

SHADOW

CULTIVATE

SUMMER ISSUE

2025-26



SUN PHARMA

**Sanaka
Educational
Trust's Group of
Institutions**



Chief Editor
Dr. Rajiv Jash
Student Editor(s):
Ms. Pratyushi De
Ms. Rupsa Dutta Roy

PREFACE

We are delighted to present the 8th 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. 8 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.

The Editorial Team
Shadow Cultivate Vol. 8
Sanaka Educational Trust's Group of Institutions

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Volume 1 published: October 18th, 2022

Volume 2 published: April 17th, 2023

Volume 3 published: October 18th, 2023

Volume 4 published: April 18th, 2024

Volume 5 published: October 18th, 2024

Volume 6 published: April 17th, 2025

Volume 7 published: October 18th, 2025

Volume 8 published: April 17th, 2026

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MAGAZINE COMMITTEE

Chief editor



Dr. Rajiv Jash
Head of the department
Department of Pharmacy
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Student editors



Ms. Rupsa Dutta Roy (3rd year)
Department of Pharmacy
Sanaka Educational Trust's Group of
Institutions



Ms. Pratyushi De (4th year)
Department of Pharmacy
Sanaka Educational Trust's Group of
Institutions

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 honour 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

Drug Repurposing: Giving Old Drugs New Life

Sabuj Bhattacharjee, Debanjana Mondal

In the ever-evolving world of medicine, developing a new drug is an expensive, time-consuming, and highly challenging process. On average, it takes more than a decade and billions of dollars to bring a new medicine from the laboratory to the patient's bedside. Moreover, many promising drug candidates fail during clinical trials due to safety concerns or lack of effectiveness. To overcome these challenges, scientists have increasingly turned to an innovative strategy known as drug repurposing—the process of identifying new therapeutic uses for existing drugs. Drug repurposing, also called drug repositioning, involves using an approved or previously investigated drug to treat a disease other than the one for which it was originally developed. Since these drugs have already undergone extensive safety testing, researchers can bypass many early stages of drug development, significantly reducing both cost and development time. This approach has become an attractive solution for addressing unmet medical needs,

especially during public health emergencies and for rare diseases. The concept of drug repurposing is not entirely new. Many well-known medicines have found remarkable success in treating conditions beyond their original purpose. One of the most famous examples is Sildenafil, which was initially developed to treat angina (chest pain caused by reduced blood flow to the heart). Although it showed limited benefit for heart disease, researchers noticed an unexpected side effect that eventually led to its approval as a treatment for erectile dysfunction. Today, Sildenafil is also prescribed for pulmonary arterial hypertension, demonstrating how one drug can serve multiple therapeutic purposes. Another remarkable example is Thalidomide. Introduced in the 1950s as a sedative and treatment for morning sickness, it was later withdrawn because of severe birth defects. Years later, scientists discovered its potent immunomodulatory and anti-inflammatory properties. Under strict medical supervision, Thalidomide is now successfully used in the treatment of multiple myeloma and certain complications of leprosy, illustrating how careful scientific evaluation can transform a controversial drug into a valuable therapeutic agent. Drug repurposing offers several significant advantages. First, it shortens the drug development timeline because much of the safety, pharmacokinetic, and toxicity information is already available. Second, it substantially lowers research and development costs, making innovative therapies more accessible. Third, the success rate is generally higher than that of developing completely new drugs, as researchers already understand the drug's safety profile. Finally, repurposed drugs can rapidly reach patients during disease outbreaks or when urgent treatment options are required. Recent advances in computational biology, artificial intelligence (AI), genomics, and bioinformatics have further accelerated

drug repurposing efforts. AI-powered algorithms can analyze vast biomedical datasets to identify hidden relationships between drugs, genes, proteins, and diseases. Network pharmacology and molecular docking techniques help researchers predict how existing drugs may interact with new biological targets. These technologies have significantly expanded opportunities for discovering novel therapeutic applications. The COVID-19 pandemic highlighted the importance of drug repurposing in responding to global health crises. During the early stages of the pandemic, several existing antiviral, anti-inflammatory, and immunomodulatory drugs were rapidly evaluated for their potential against SARS-CoV-2. Although not all repurposed drugs proved effective, the strategy demonstrated how existing medicines can be investigated quickly when immediate therapeutic options are needed while new drugs and vaccines are under development. Despite its many benefits, drug repurposing also presents challenges. A drug effective for one disease may require different dosing, treatment duration, or formulation for another condition. Intellectual property issues and limited commercial incentives can discourage pharmaceutical companies from investing in repurposing studies, particularly for generic medicines. Furthermore, even though safety data already exist, rigorous clinical trials remain essential to establish efficacy and determine the appropriate treatment regimen for the new indication. For pharmacy students and future healthcare professionals, understanding drug repurposing is increasingly important. Pharmacists play a vital role in evaluating scientific evidence, ensuring rational drug use, monitoring adverse drug reactions, and educating patients about both approved and emerging therapies. As precision medicine continues to evolve, pharmacists will become key contributors to identifying and implementing innovative therapeutic strategies.

Drug repurposing represents a perfect blend of scientific creativity and practical healthcare innovation. Instead of starting from scratch, researchers are discovering new possibilities hidden within familiar medicines, offering hope for patients with difficult-to-treat diseases while reducing the time and cost associated with drug development. As technology continues to advance and our understanding of disease biology deepens, giving old drugs new life will remain one of the most promising approaches in modern pharmaceutical research, ultimately improving patient care and expanding treatment options across the globe.

2

Scientific Advancements

Polypharmacy in Elderly Patients: A Growing Challenge in Modern Healthcare

Anubhav Bhandari, Chiranjit Dey

As life expectancy continues to increase across the globe, the number of elderly individuals living with multiple chronic diseases has also risen significantly. Conditions such as hypertension, diabetes, arthritis, cardiovascular disorders, osteoporosis, and dementia often coexist in older adults, requiring long-term treatment with several medications. The concurrent use of five or more medications, commonly known as polypharmacy, has become a major healthcare concern. While multiple medicines may be necessary to manage complex medical conditions, inappropriate polypharmacy can expose elderly patients to serious health risks and reduce their overall quality of life. Aging brings about several physiological changes that alter the way the body absorbs, distributes, metabolizes, and eliminates drugs. Reduced kidney and liver function,

changes in body fat composition, and increased sensitivity to certain medications make older adults more vulnerable to adverse drug reactions. Consequently, a medicine that is safe for a younger person may produce unexpected or severe side effects in an elderly patient. This makes careful medication selection and regular review an essential part of geriatric healthcare. Polypharmacy may occur for several reasons. Many older adults receive treatment from different specialists, each prescribing medications for a specific condition. Sometimes, communication between healthcare providers is limited, leading to duplication of therapy or potentially harmful drug interactions. In addition, self-medication with over-the-counter medicines, herbal supplements, or dietary products further increases the number of medications consumed. Lack of regular medication review and the continuation of unnecessary prescriptions also contribute to inappropriate polypharmacy. The consequences of polypharmacy can be significant. One of the most common problems is the increased risk of adverse drug reactions, which account for a substantial number of hospital admissions among elderly patients. Drug-drug interactions may reduce the effectiveness of treatment or produce toxic effects. Excessive medication use can also lead to dizziness, confusion, impaired memory, and balance problems, increasing the likelihood of falls and fractures. Furthermore, taking multiple medicines several times a day often leads to poor medication adherence, where patients miss doses, take incorrect doses, or discontinue treatment altogether. Such medication errors may worsen disease control and increase healthcare costs. Healthcare professionals, especially pharmacists, play a crucial role in addressing the challenges of polypharmacy. Regular medication reviews help identify unnecessary or duplicate medications and evaluate the need for dose adjustments. The concept of

deprescribing—the planned and supervised reduction or discontinuation of medicines that are no longer beneficial—has gained considerable importance in geriatric care. Deprescribing should always be carried out carefully under the guidance of healthcare professionals to ensure patient safety. Several strategies can help minimize the risks associated with polypharmacy. Maintaining a complete and updated medication list, including prescription medicines, over-the-counter products, and herbal supplements, enables healthcare providers to make informed treatment decisions. Clinical tools such as the Beers Criteria and STOPP/START criteria assist clinicians in identifying potentially inappropriate medications for older adults. Simplifying medication schedules, using pill organizers, and educating patients and caregivers about proper medicine use can further improve adherence and reduce medication-related complications. Patient education is another vital component of successful medication management. Elderly patients should be encouraged to understand the purpose of each medicine, follow prescribed dosages, avoid self-medication without professional advice, and immediately report any unusual symptoms or side effects. Family members and caregivers should also be actively involved in monitoring medication use, especially for patients with memory impairment or cognitive decline. Advances in healthcare technology are also contributing to safer medication practices. Electronic prescribing systems, computerized drug interaction alerts, digital health records, and pharmacist-led medication therapy management programs help healthcare providers detect prescribing errors and optimize treatment plans. Artificial intelligence-based decision-support systems are emerging as valuable tools for identifying high-risk drug combinations and supporting personalized medication management in elderly patients.

In conclusion, polypharmacy is an increasingly important challenge in an aging society. Although multiple medications are often necessary to treat complex medical conditions, inappropriate polypharmacy can lead to serious adverse effects, reduced treatment adherence, and poorer health outcomes. A collaborative approach involving physicians, pharmacists, nurses, patients, and caregivers is essential to ensure the safe and effective use of medicines. By promoting rational prescribing, regular medication review, patient education, and responsible deprescribing practices, healthcare professionals can significantly improve the quality of life and overall well-being of elderly patients. As future pharmacists, pharmacy students have a vital role in promoting medication safety and contributing to patient-centered geriatric care.

3

Scientific Advancements

AI-Powered Drug Discovery: Opportunities and Challenges

Atanu Das, Sandip Karmakar

The pharmaceutical industry is undergoing a remarkable transformation with the integration of Artificial Intelligence (AI) into drug discovery and development. Traditionally, developing a new medicine is a lengthy, expensive, and complex process that may take more than a decade and cost billions of dollars. Despite these efforts, many potential drug candidates fail during clinical trials due to lack of efficacy or unexpected safety concerns. AI is emerging as a powerful solution to address these challenges by accelerating research, reducing costs, and improving the success rate of drug development. Artificial Intelligence refers to computer systems capable of performing tasks that typically require human intelligence, such as learning from data, recognizing patterns, making predictions, and solving problems. In pharmaceutical research, AI employs technologies such as machine learning, deep learning, and natural language processing to analyze vast amounts of biological, chemical, and clinical data. These technologies help researchers

identify promising drug candidates more efficiently than traditional methods. One of the most significant applications of AI is target identification. Before a drug can be developed, scientists must identify a biological target, such as a protein or gene, that plays a key role in a disease. AI algorithms can rapidly analyze genomic, proteomic, and biomedical databases to identify potential therapeutic targets that may otherwise remain undiscovered. This enables researchers to prioritize the most promising targets for further investigation. AI also plays an important role in drug molecule discovery and optimization. Conventional drug screening requires testing thousands or even millions of chemical compounds in the laboratory, making it both time-consuming and expensive. AI can virtually screen enormous chemical libraries within a short period, predict how molecules interact with biological targets, and suggest structural modifications to improve efficacy, selectivity, and safety. This significantly reduces the number of laboratory experiments required during the early stages of drug discovery. Another exciting application is drug repurposing, where existing medicines are evaluated for new therapeutic uses. Since these drugs already have established safety profiles, repurposing can dramatically reduce development time and cost. AI analyzes published literature, clinical records, and molecular data to identify unexpected relationships between approved drugs and different diseases. During the COVID-19 pandemic, AI-assisted drug repurposing became an important strategy for rapidly identifying potential treatment options. AI is also transforming clinical trials. Recruiting suitable participants, predicting treatment outcomes, and monitoring patient safety are among the most challenging aspects of clinical research. AI helps identify eligible participants based on electronic health records, predicts which patients are more likely to respond to treatment, and supports real-time

monitoring of adverse events. These capabilities improve trial efficiency while enhancing patient safety and reducing overall costs. Beyond research and clinical development, AI contributes to personalized medicine. Every patient responds differently to medications due to variations in genetics, lifestyle, and disease characteristics. AI can integrate genetic information, laboratory findings, and clinical history to recommend individualized treatment strategies, bringing healthcare closer to the goal of providing the right drug at the right dose for the right patient. Despite these remarkable opportunities, AI-powered drug discovery also faces several challenges. One major concern is the availability and quality of data. AI systems require large, accurate, and well-annotated datasets to produce reliable predictions. Incomplete, biased, or poor-quality data can lead to misleading results and reduce the effectiveness of AI models. Another important challenge is interpretability. Many advanced AI models function as "black boxes," producing predictions without clearly explaining the reasoning behind them. This lack of transparency makes it difficult for researchers and regulatory authorities to fully trust AI-generated recommendations, especially when patient safety is involved.

Ethical and regulatory issues also require careful consideration. The use of patient health records raises concerns about privacy, data security, and informed consent. Furthermore, regulatory agencies must establish clear guidelines for evaluating AI-assisted drug discovery methods to ensure their reliability, reproducibility, and safety before they become routine components of pharmaceutical development. AI should not be viewed as a replacement for scientists but rather as a powerful tool that complements human expertise. Experimental validation, clinical judgment, and ethical decision-making

remain essential throughout the drug development process. The future of pharmaceutical research will likely involve close collaboration between pharmacists, clinicians, biologists, chemists, and AI specialists working together to develop innovative therapies.



4

Scientific Advancements

Marine Natural Products as Sources of New Drugs

Krishnendu Raj, Tanzeem Nigar

The oceans cover more than 70% of the Earth's surface and are home to an extraordinary diversity of life. From microscopic bacteria to colorful corals, sponges, algae, and marine animals, these organisms produce a vast array of unique chemical compounds that help them survive in harsh and competitive environments. Over the past few decades, scientists have discovered that many of these natural substances possess remarkable medicinal properties, making the marine ecosystem one of the most promising sources for the development of new drugs. Marine natural products are bioactive compounds isolated from organisms living in oceans and seas. Unlike terrestrial plants and microorganisms, marine organisms experience extreme conditions such as high pressure, salinity, limited light, and fierce competition for survival. As a result, they synthesize chemically diverse molecules with unique structures that are rarely found on land. These compounds exhibit a wide range of biological

activities, including antibacterial, antiviral, antifungal, anticancer, anti-inflammatory, and neuroprotective effects. One of the most significant contributions of marine natural products has been in the field of cancer therapy. Several marine-derived compounds have successfully progressed from laboratory research to clinical use. For example, Cytarabine, originally inspired by compounds isolated from marine sponges, is widely used for the treatment of leukemia and lymphoma. Another important drug, Trabectedin, obtained from the sea squirt *Ecteinascidia turbinata*, is approved for treating soft tissue sarcoma and ovarian cancer. More recently, Eribulin, a synthetic analogue of a compound isolated from the marine sponge *Halichondria okadai*, has become an effective treatment for metastatic breast cancer. These success stories highlight the immense pharmaceutical potential hidden beneath the ocean's surface. Marine organisms are also valuable sources of antimicrobial agents. The rapid emergence of antibiotic-resistant bacteria has created an urgent need for new antibiotics. Marine bacteria, fungi, and algae produce numerous compounds capable of inhibiting pathogenic microorganisms. Researchers continue to explore marine ecosystems in search of novel antibiotics that may help combat multidrug-resistant infections and improve global public health. Another exciting area of marine drug discovery is the development of antiviral agents. Marine algae produce sulfated polysaccharides that have demonstrated activity against viruses such as influenza, herpes simplex virus, and even coronaviruses in laboratory studies. These natural molecules interfere with viral attachment and replication, offering promising leads for the development of future antiviral medications. Marine natural products are equally important in neuroscience. Certain toxins produced by cone snails have been transformed into valuable medicines. Ziconotide, a peptide derived from cone snail venom, is an

FDA-approved drug used for the treatment of severe chronic pain. Unlike opioids, it provides pain relief without causing addiction, making it an important alternative for patients with refractory pain. This example demonstrates how even highly toxic marine compounds can become life-saving medicines when properly studied and modified. The journey from the ocean to the pharmacy, however, is not simple. Drug discovery from marine organisms involves several stages, including sample collection, extraction, purification, structural characterization, biological screening, preclinical studies, and clinical trials. Advances in biotechnology, genomics, artificial intelligence, and synthetic biology have significantly accelerated this process. Scientists can now identify promising marine compounds more efficiently and even produce them through microbial fermentation or chemical synthesis, reducing dependence on harvesting rare marine organisms. Despite these advances, several challenges remain. Many marine organisms are difficult to cultivate, and the quantities of bioactive compounds they produce are often extremely small. Sustainable collection methods and marine conservation are therefore essential to ensure that valuable biodiversity is preserved for future generations. Climate change, ocean pollution, and habitat destruction also threaten marine ecosystems and the potential discovery of new medicines. The future of marine pharmacology is exceptionally promising. With continuous exploration of deep-sea environments and advances in marine biotechnology, researchers are expected to discover many more novel compounds capable of treating cancer, infectious diseases, neurological disorders, metabolic diseases, and inflammatory conditions. Collaboration among marine biologists, pharmacists, chemists, and clinicians will play a crucial role in transforming these natural

molecules into safe and effective medicines.

Conclusion

The oceans represent an enormous yet largely untapped pharmaceutical treasure. Marine natural products have already revolutionized the treatment of several life-threatening diseases, and countless more discoveries are waiting beneath the waves. By combining scientific innovation with environmental conservation, we can unlock the full therapeutic potential of marine biodiversity and pave the way for the medicines of tomorrow.

5

Scientific Advancements

Biodegradable Polymers in Drug Delivery

Suman Mali, Arkendu Chatterjee

The success of any medicine depends not only on the drug itself but also on how effectively it reaches the target site in the body. Conventional drug delivery methods often face challenges such as poor absorption, frequent dosing, unwanted side effects, and reduced patient compliance. To overcome these limitations, pharmaceutical scientists have developed advanced drug delivery systems, among which biodegradable polymers have emerged as one of the most promising innovations. Biodegradable polymers are materials that gradually break down into harmless substances through natural biological processes after performing their intended function. Unlike non-biodegradable materials that may accumulate in the body or the environment, these polymers decompose into products such as water, carbon dioxide, and naturally occurring metabolites. Their excellent safety profile, biocompatibility, and versatility have made them indispensable in modern pharmaceutical research and clinical practice. One of the greatest advantages of biodegradable polymers is their ability to provide controlled and sustained drug

release. Instead of releasing the entire dose immediately, these polymers allow the medicine to be released gradually over a predetermined period. This helps maintain therapeutic drug concentrations for longer durations, reduces the frequency of administration, and improves patient adherence to treatment. Such controlled-release systems are especially beneficial for managing chronic diseases like diabetes, cancer, arthritis, and cardiovascular disorders, where long-term medication is often required. Several biodegradable polymers are widely used in pharmaceutical formulations. Natural polymers such as chitosan, alginate, gelatin, and collagen are derived from biological sources and are known for their excellent biocompatibility and low toxicity. Synthetic biodegradable polymers, including poly(lactic acid) (PLA), poly(glycolic acid) (PGA), and poly(lactic-co-glycolic acid) (PLGA), are extensively employed because their degradation rate and mechanical properties can be precisely controlled. Among these, PLGA has gained special importance due to its approval for use in several marketed drug delivery systems. Biodegradable polymers have enabled the development of a wide variety of advanced dosage forms. These include microspheres, nanoparticles, hydrogels, implants, and drug-loaded scaffolds. Polymeric nanoparticles can carry drugs directly to diseased tissues, reducing damage to healthy organs and minimizing systemic side effects. Hydrogels, which can absorb large amounts of water, are widely used in wound dressings and tissue engineering because they provide a moist environment that promotes healing. Biodegradable implants offer prolonged drug release over weeks or even months, eliminating the need for repeated injections and improving patient convenience. Cancer therapy is one area where biodegradable polymers have shown remarkable potential. Traditional chemotherapy often affects both cancerous and healthy cells, resulting in severe

6 *Scientific Advancements*

Role of Chromatography in Drug Development

Argha Hens, Suman Kumari Shaw

The journey of a medicine from the research laboratory to the pharmacy shelf is a long and scientifically rigorous process. Every stage of drug development demands accuracy, reliability, and quality assurance to ensure that medicines are safe and effective for patients. Among the many analytical techniques used in pharmaceutical research, chromatography stands out as one of the most indispensable tools. It plays a crucial role in identifying, separating, purifying, and quantifying chemical compounds throughout the drug development process. Chromatography is an analytical technique used to separate the components of a mixture based on their different interactions between a stationary phase and a mobile phase. Since its introduction by the Russian botanist Mikhail Tsvet in the early twentieth century, chromatography has evolved into a sophisticated technology that is now fundamental to pharmaceutical sciences. Modern laboratories employ various chromatographic techniques, including Thin Layer Chromatography (TLC), High

Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Ion Exchange Chromatography (IEC), and Liquid Chromatography-Mass Spectrometry (LC-MS), each designed for specific analytical purposes. One of the earliest applications of chromatography in drug development is the identification of lead compounds. During the drug discovery phase, researchers screen thousands of natural and synthetic molecules to identify those with potential therapeutic activity. Chromatographic methods help isolate active compounds from complex mixtures, such as medicinal plant extracts or microbial cultures, enabling scientists to study their chemical structures and biological properties. This significantly accelerates the search for promising drug candidates. As drug development progresses, chromatography becomes essential for assessing the purity of pharmaceutical substances. Impurities, degradation products, or unwanted by-products can compromise the safety and efficacy of medicines. High Performance Liquid Chromatography (HPLC), often regarded as the gold standard in pharmaceutical analysis, provides highly accurate separation and quantification of these impurities. Regulatory authorities such as the International Council for Harmonisation (ICH) and national drug regulatory agencies require comprehensive impurity profiling before a drug can receive marketing approval. Chromatography also plays a vital role in formulation development. Pharmaceutical scientists must ensure that the active pharmaceutical ingredient (API) remains stable when combined with excipients during manufacturing and storage. Stability-indicating chromatographic methods are used to monitor chemical changes under different environmental conditions, including temperature, humidity, and light exposure. These studies help determine the shelf life of medicines and ensure consistent product quality throughout their intended storage

period. In pharmacokinetic and bioavailability studies, chromatography serves as a powerful analytical tool for measuring drug concentrations in biological fluids such as blood, plasma, urine, and saliva. Advanced techniques like Liquid Chromatography-Mass Spectrometry (LC-MS) provide exceptional sensitivity and specificity, allowing researchers to detect even trace amounts of drugs and their metabolites. These data are crucial for understanding how drugs are absorbed, distributed, metabolized, and eliminated from the body, ultimately guiding the selection of appropriate dosage regimens. Quality control is another critical area where chromatography has become indispensable. Every batch of pharmaceutical products must undergo rigorous testing before reaching patients. Chromatographic techniques verify the identity, potency, purity, and consistency of finished dosage forms, ensuring compliance with pharmacopeial standards and Good Manufacturing Practices (GMP). Regular chromatographic analysis helps detect manufacturing deviations early, thereby preventing substandard medicines from entering the market. The pharmaceutical industry is continuously embracing technological innovations that have enhanced chromatographic analysis. Ultra-High Performance Liquid Chromatography (UHPLC) offers faster analysis, improved resolution, and reduced solvent consumption compared to conventional HPLC. Coupling chromatography with advanced detectors such as mass spectrometry enables rapid identification of complex molecules with remarkable precision. Furthermore, automation, artificial intelligence, and digital data analysis are transforming chromatographic workflows, improving efficiency while minimizing human error. Despite its numerous advantages, chromatography also presents certain challenges. High-end chromatographic instruments require significant financial

investment, regular maintenance, and skilled personnel for operation and data interpretation. Nevertheless, the exceptional accuracy, reproducibility, and reliability offered by chromatographic methods far outweigh these limitations, making them indispensable in modern pharmaceutical research and manufacturing.

In conclusion, chromatography has revolutionized drug development by providing reliable methods for compound separation, identification, purification, and quality assessment. From the discovery of new therapeutic molecules to the quality assurance of finished pharmaceutical products, chromatography supports every stage of the pharmaceutical pipeline. As analytical technologies continue to advance, chromatography will remain a cornerstone of pharmaceutical innovation, helping scientists develop safer, more effective, and higher-quality medicines for improving global healthcare.

7 Art & Literature

Paintings



Whispers of Nature

~Simrin Nishat, 1st year

This painting captures the tranquil beauty of a forest at sunset, where the golden light reflects gently across a calm lake, creating a sense of peace and harmony. The tall trees frame the glowing horizon, symbolizing resilience, hope, and the timeless connection between nature and life. It invites viewers to pause, appreciate the serenity of the natural world, and find beauty in its quiet moments.

Rhythm of Tradition

~Rupsa Dutta, 3rd year

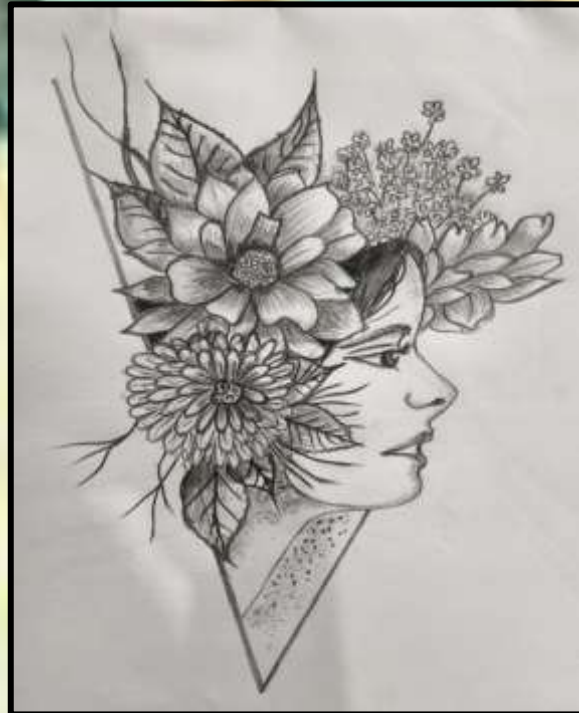
This vibrant painting beautifully portrays the grace and elegance of Indian classical dance through bold colors, expressive lines, and traditional motifs. The poised dancer symbolizes cultural heritage, artistic expression, and the timeless beauty of Indian traditions. It celebrates the harmony of movement, music, and devotion, inspiring viewers to appreciate the richness of our artistic legacy.



Blooming Within

~Sunami Sultana, 2nd year

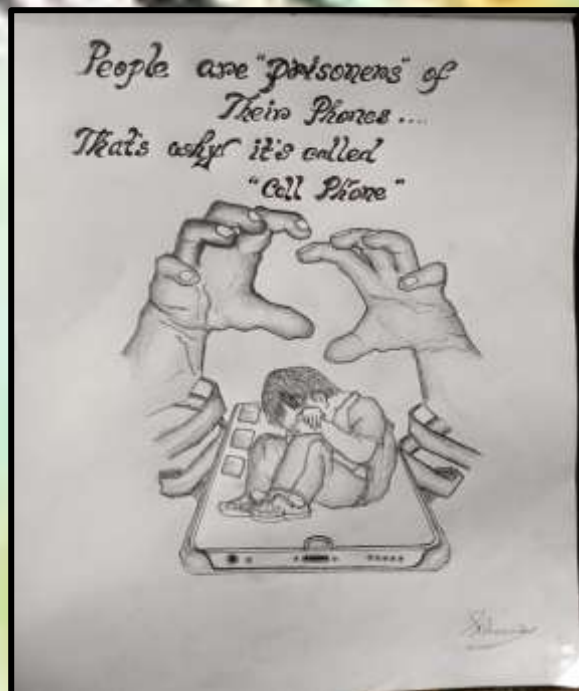
This elegant pencil sketch beautifully blends the profile of a human face with blooming flowers, symbolizing the harmony between nature and the human spirit. The intricate floral details represent growth, creativity, and inner beauty, while the minimalist composition conveys peace and resilience. The artwork reminds us that true beauty blossoms from within and flourishes through imagination and self-expression.



Trapped by the Screen

~Subham Bhowmik, 1st year

This thought-provoking pencil sketch highlights the growing impact of smartphone addiction in modern life. Depicting a child confined within a mobile phone and overshadowed by looming hands, the artwork symbolizes the loss of freedom, human connection, and emotional well-being in the digital age. It serves as a powerful reminder to use technology wisely and maintain a healthy balance between the virtual and real world.



The Cosmic Grief of Lord Shiva

~Bornika Chattaraj, Faculty

This artwork captures the profound grief of Lord Shiva as he cradles Goddess Sati after her self-sacrifice, symbolizing eternal love, loss, and transformation. The vibrant flames and bold contrasts evoke the cosmic sorrow that reshaped the universe according to Hindu mythology.



Rhythms of Bengal

~Debanjana Mondal, Faculty

Inspired by the timeless poetry of Rabindranath Tagore, this artwork beautifully blends the elegance of Bengali script with the divine charm of Lord Krishna playing the flute. The folk-art-inspired composition celebrates the harmony of literature, music, and spirituality, reflecting the rich cultural heritage of Bengal.

8 Art & Literature

Prose & Poetry

সমাজের আয়না

~Rahul Ghorui, 3rd year

সমাজটা যেন একটা আয়না, দেখে নাও ঠিকঠাক,
যেখানে ভালো-মন্দ মিশে, আঁকে নানা ছবির ফাঁক।

কেউ হাসে, কেউ কাঁদে, কেউ পায় না বাঁচার পথ,
কেউ সোনার থালায় খায়, কেউ পায় না একমুঠো খাদ্যরত।

অন্যায়, অবিচার বাড়ে, ন্যায় হারিয়ে যায়,
লোক দেখানো সভ্যতায়, মানবতা ঘুমায়।

ছোট শিশুর চোখে ভাসে, না-পাওয়ার ছবি,
নারীর কাঁধে বয়ে চলে, অসম বোঝার নৌকা কবি।

ভুলে গেলে চলবে না তো, সবাই এক সমাজের লোক,
ভাগ করে নাও ভালোবাসা, জ্বালাও ন্যায়ে শোক।

একসাথে বদলাবে দিন, ভাঙবে অন্যায়ের দেয়াল,
মানবতার মশাল হাতে, গড়ে তুলবো নবকাল।

The Story of Cinderella

~Rocky Ghosh, 1st Year

Once there lived a rich man whose wife was very sick. When she felt her end was drawing near, she called her only daughter, Cinderella, to come close to her bed and said, "Dear child, when I am gone, be good and pious, and God will always take care of you. I will look down

upon you from heaven and will be with you." Then she closed her eyes and died. The maiden went every day to her mother's grave and cried. After some time, her father decided to remarry so that someone could take care of Cinderella. Hence, Cinderella lived with her stepmother and two stepsisters. As Cinderella's father often travelled for work, her stepmother and stepsisters began treating her like a slave. They made her do all the household chores and never treated her as a member of the family. As a result, she felt very lonely. One day, a messenger announced that a grand Royal Ball would be held, and all the young ladies of the kingdom were invited. When the day of the ball arrived, Cinderella's stepmother and stepsisters dressed up and went to the palace, leaving Cinderella behind. Cinderella stood near the window and watched them go. Suddenly, a Fairy Godmother appeared before her and asked, "Why are you crying, my dear? Do you want to attend the Royal Ball?"

Cinderella replied, "Yes, but how can I go to the ball dressed in rags?"

The Fairy Godmother said, "Wipe your tears and bring me a pumpkin, six mice, and a bird." Then she waved her magic wand. Cinderella's old clothes changed into a beautiful gown, and a pair of sparkling glass slippers appeared on her feet. The pumpkin turned into a magnificent chariot, the mice became horses to pull it, and the bird became the coachman. Before Cinderella left, the Fairy Godmother warned her, "You must return before midnight, or the magic will end." Cinderella promised that she would return before midnight. Soon, Cinderella arrived at the Royal Ball. Everyone in the ballroom admired her beauty, especially the Prince, who could not take his eyes off her. Cinderella and the Prince danced together all evening. Suddenly, Cinderella remembered the Fairy Godmother's warning. She hurried to leave. As she ran down the palace steps, one of her glass slippers slipped off her foot. She had no time to pick it up because the Prince was following her. She quickly climbed into the chariot and disappeared. At the stroke of midnight, the magic ended, and the chariot turned back into a pumpkin. The Prince picked up the glass slipper and decided to search the kingdom for the girl whose foot it would fit. He and his men went from house to house, asking every young lady to try on the slipper, but it did not fit anyone. Finally, they arrived at Cinderella's house. Her two stepsisters eagerly tried on the slipper, but it did not fit either of them. Then Cinderella was asked to try it on. The slipper fitted her perfectly. The stepmother and stepsisters were amazed. The Prince happily took Cinderella back to the palace. The King and Queen were delighted to meet her, and they invited Cinderella's father to the royal wedding. At last, Cinderella and the Prince were married and lived happily ever after.

The Bench by the Bus Stop

~Srijita Panja, 1st Year

Every morning, Rina waited for the bus at the same stop near her house. The bus stop had a small blue bench with chipped paint and one loose leg. Most people avoided

sitting on it, but Rina liked it. From there, she could see the road, the tea stall, and the old neem tree across the street. Rina worked at a printing shop in the city. The job was not bad, but it was not her dream. She wanted to open a small bookstore one day, a quiet place with warm light and shelves full of stories. For now, she saved a little money every month and told herself, "One day." One Monday morning, Rina noticed an old man sitting on the bench. He wore a clean white shirt and held a cloth bag on his lap. His hair was thin. He smiled at her. "Good morning," he said. "Good morning," Rina replied and sat at the other end of the bench. From that day on, the old man came every morning. His name was Mr. Das. He was a retired school teacher. He did not take the bus. He just liked to sit there and watch people. "They are all stories," he said once, pointing at the crowd. "Each face has a story." Every morning they talked. Mr. Das told Rina about his students, about how he loved teaching children to read. Rina told him about the printing shop and her dream of owning a bookstore. "That is a good dream," Mr. Das said. "Books keep us alive in many ways." One rainy morning, the bus was late. The road was flooded, and people were angry and tired. Rina did not see Mr. Das that day. She felt strange, like something was missing. The next day, he did not come again. After a week, Rina asked the tea seller, "Have you seen the old man who sits on the bench?" The tea seller nodded. "Ah, the teacher. He is in the hospital. His heart is weak." Rina felt a tight pain in her chest. She did not know why, but she missed him deeply. That evening, after work, she went to the hospital with a small bag of oranges. Mr. Das was surprised and happy to see her. "You came," he said softly. "Of course," Rina said. "You are my bus stop friend." They talked for a while. Before she left, Mr. Das gave her the cloth bag he always carried. "Open it at home," he said. Inside the bag, Rina found three old books and an envelope. The envelope had her name on it. Inside was a letter. It said:

Dear Rina,

These books helped me through many years. Now they are for your future bookstore. Do not wait too long for your dream. Life is shorter than we think. Two months later, the blue bench was still there. But Rina was no longer waiting for the bus. She had left her job and started a small used-book stall near the bus stop. People stopped, looked, and smiled. And every time Rina saw someone sit on the old bench, she remembered Mr. Das and thought, "Yes, every face has a story."

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Current affairs

Guardians Within: How Scientists Discovered the Immune System's Self-Control

Rupsa Dutta Roy, 3rd year

In October 2025, the Nobel Prize in Physiology or Medicine was awarded to Mary E. Brunkow, Fred Ramsdell, and Shimon Sakaguchi for their groundbreaking discoveries explaining how the human immune system prevents itself from attacking the body's own tissues. Their research solved a long-standing mystery by revealing how immune cells distinguish between harmful pathogens and healthy body cells, significantly advancing the understanding of autoimmune diseases, cancer immunotherapy, and organ transplantation. The immune system, primarily through T lymphocytes, protects the body from bacteria, viruses, fungi, and other pathogens; however, if these cells fail to recognize self-tissues, they can trigger

autoimmune diseases. Earlier, scientists believed that harmful immune cells were eliminated during development in the thymus through central tolerance, but this theory could not fully explain autoimmune disorders. In the mid-1990s, Shimon Sakaguchi discovered regulatory T cells (Tregs), a specialized group of immune cells that suppress excessive immune responses and act as the body's internal "brakes," introducing the concept of peripheral immune tolerance. Building on this work, Mary E. Brunkow and Fred Ramsdell identified the FOXP3 gene in 2001, demonstrating that it controls the development and function of regulatory T cells. Mutations in FOXP3 were found to cause IPEX syndrome, a rare but severe autoimmune disorder, confirming the essential role of Tregs in maintaining immune balance. These discoveries revolutionized immunology by explaining why healthy individuals generally avoid autoimmune diseases despite possessing self-reactive immune cells. The findings have far-reaching medical applications, including the development of therapies that enhance regulatory T-cell activity to treat autoimmune diseases such as rheumatoid arthritis, type 1 diabetes, and lupus, strategies to reduce Treg activity in cancer to strengthen anti-tumor immunity, and improved approaches to organ transplantation by promoting immune tolerance and reducing transplant rejection. Overall, the 2025 Nobel Prize recognizes a landmark achievement in biomedical science, demonstrating how fundamental research into immune regulation continues to transform modern medicine and offers hope for more effective treatments for autoimmune disorders, cancer, and transplant rejection.

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Current affairs

Khavda Renewable Energy Park: India's Bold Step Toward Global Clean Energy Leadership

Raj Sekhar Dutt, 3rd year

As the world accelerates its transition toward sustainable energy, India has emerged as a global leader in renewable power generation, with the Khavda Renewable Energy Park in Gujarat standing as one of its most ambitious projects. Located in the Kutch district near the Rann of Kutch, close to the India–Pakistan border, the park spans approximately 538 square kilometres of barren land and is being developed as the world's largest renewable energy park. Khavda's geographical advantages, including abundant solar irradiation and strong, consistent wind speeds, make it an ideal location for hybrid renewable energy generation using both solar photovoltaic panels and wind turbines. The project is

planned to achieve a total installed capacity of 30 gigawatts (GW), enough to supply electricity to nearly 16–18 million households while significantly reducing carbon emissions and India's dependence on coal-based power. Construction began around 2022 with contributions from both public and private sector organizations, led by Adani Green Energy Limited alongside NTPC and Gujarat Industries Power Company Limited, and several gigawatts of capacity have already been commissioned, making it one of the fastest-growing renewable energy projects globally. Developing such a massive project in a desert environment has required the construction of extensive infrastructure, including roads, transmission corridors, substations, and worker facilities, while innovative technologies such as robotic waterless solar panel cleaning systems are being implemented to improve efficiency and conserve scarce water resources. Despite its remarkable progress, the project faces challenges such as extreme temperatures, dust storms, logistical difficulties due to its remote location, security concerns arising from its proximity to the international border, and issues related to labour welfare that emphasize the need for responsible project management. Overall, the Khavda Renewable Energy Park represents a strategic milestone in India's clean energy journey, supporting the national goal of achieving 500 GW of non-fossil fuel energy capacity by 2030, strengthening energy security, and serving as a global benchmark for how large-scale renewable energy projects can promote sustainable economic growth while addressing climate change.

11

Current affairs

Prayagraj Maha Kumbh 2025: A Grand Confluence of Faith, Culture, and Humanity

Ruchira Dey, 4th year

The Prayagraj Maha Kumbh 2025, held in Uttar Pradesh, was one of the largest religious gatherings in the world, attracting millions of pilgrims, saints, and tourists from across India and abroad. Organized at the sacred Triveni Sangam, the confluence of the Ganga, Yamuna, and the mythical Saraswati rivers, the event reflected India's rich spiritual heritage, cultural diversity, and enduring traditions. Celebrated once every twelve years, the Maha Kumbh is considered the most sacred of all Kumbh Melas. It symbolizes the eternal quest for spiritual purification, devotion, and unity, making it a unique event that brings together people from different regions, languages, and cultures. The origins of the Kumbh Mela are rooted in the ancient Hindu legend of Samudra Manthan (the churning of the ocean), during which drops of the nectar of immortality are believed to have fallen at four places—Prayagraj, Haridwar, Ujjain, and Nashik. Among these, Prayagraj is regarded as the holiest because of the Triveni Sangam. Devotees believe that taking a holy dip in these

sacred waters during the auspicious period washes away sins and brings spiritual liberation. Throughout the festival, millions gathered for ritual bathing on significant occasions such as Makar Sankranti, Mauni Amavasya, Basant Panchami, and Maha Shivaratri, creating an extraordinary atmosphere of faith and devotion. The successful organization of the Maha Kumbh 2025 showcased India's remarkable administrative capabilities. A vast temporary township was established with modern facilities, including roads, sanitation services, healthcare centres, drinking water, accommodation, and transportation. Advanced technologies such as drone surveillance, artificial intelligence-based crowd management, digital information systems, and mobile applications ensured the safety and convenience of visitors. Thousands of police personnel, medical teams, volunteers, and sanitation workers worked together to manage one of the largest peaceful gatherings in human history. Beyond its religious significance, the Maha Kumbh served as a vibrant platform for promoting India's cultural heritage. Visitors witnessed spiritual discourses, devotional music, yoga sessions, folk performances, and exhibitions featuring traditional art and handicrafts. The event also attracted international tourists, scholars, photographers, and media representatives, strengthening India's position as a global centre for spiritual tourism and cultural exchange. The festival generated substantial economic benefits by creating employment opportunities for local communities and boosting tourism, hospitality, transport, handicrafts, and small businesses. Environmental conservation was also prioritized through cleanliness drives, scientific waste management, reduced plastic usage, and awareness campaigns aimed at preserving the sacred rivers. The Prayagraj Maha Kumbh 2025 was much more than a religious festival; it was a celebration of faith, culture, unity, and human resilience.

It demonstrated how ancient traditions can harmoniously coexist with modern technology and sustainable practices. As one of the largest peaceful gatherings ever organized, the event strengthened India's cultural identity while conveying a universal message of harmony, devotion, and collective responsibility. The Maha Kumbh 2025 will be remembered as a historic milestone that showcased India's spiritual legacy and its ability to organize an event of extraordinary global significance.

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Current affairs

India's Historic Triumph: Winning the ICC Champions Trophy 2025

Swarnabha Bhowmik 2nd year

Cricket has always been more than just a sport in India—it is an emotion that unites millions of people across the country. On 9 March 2025, India added another glorious chapter to its cricketing history by winning the ICC Champions Trophy 2025, defeating New Zealand in a thrilling final held at the Dubai International Cricket Stadium. The victory marked India's third ICC Champions Trophy title, following its earlier successes in 2002 (shared with Sri Lanka) and 2013. The triumph showcased the team's consistency, determination, and ability to perform under pressure, reinforcing India's position as one of the world's leading cricketing nations. New Zealand, after winning the toss, opted to bat first and posted a competitive total of 251/7 in their allotted 50 overs. Daryl Mitchell played a composed innings, while Michael Bracewell contributed valuable runs towards the end. India's bowling attack displayed remarkable discipline throughout the innings, with spinners

Kuldeep Yadav and Varun Chakravarthi restricting the scoring rate and taking crucial wickets at important moments. Chasing 252, India got off to a confident start, led by captain Rohit Sharma, whose aggressive yet controlled innings of 76 runs laid a solid foundation. Despite a few middle-order setbacks, Shreyas Iyer, KL Rahul, and Hardik Pandya maintained their composure and guided the team towards victory. India successfully reached the target with four wickets in hand, sparking celebrations among cricket fans across the country. Captain Rohit Sharma was deservedly named the Player of the Match for his outstanding leadership and match-winning performance, while New Zealand's Rachin Ravindra received the Player of the Tournament award for his exceptional all-round contributions throughout the competition. The victory reflected the collective effort of the entire Indian squad, with every player contributing significantly during different stages of the tournament. It also highlighted the team's excellent planning, fitness, adaptability, and depth in both batting and bowling. Beyond the trophy, the win inspired millions of aspiring cricketers and reinforced values such as teamwork, perseverance, discipline, and resilience. The ICC Champions Trophy 2025 victory will be remembered as one of the finest achievements in Indian cricket, bringing immense pride to the nation and reminding the world of India's continued excellence on the international stage. As the team celebrated another prestigious ICC title, the triumph became a symbol of national unity and sporting excellence, inspiring future generations to pursue success with dedication and determination.

13

Current affairs

Aero India 2025: Showcasing India's Defence and Aerospace Excellence

Pijush Das 4th year

Aero India 2025 held from 10–14 February 2025 at the Yelahanka Air Force Station in Bengaluru, reaffirmed India's growing stature as a global hub for aerospace innovation and defence technology. Organized by the Ministry of Defence under the theme "The Runway to a Billion Opportunities," the biennial event brought together leading defence manufacturers, aerospace companies, military officials, policymakers, researchers, and industry experts from across the world. The exhibition served as a vital platform for demonstrating cutting-edge defence technologies, strengthening international partnerships, and promoting India's vision of self-reliance in defence manufacturing under the "Atmanirbhar Bharat" initiative. One of the major highlights of Aero India 2025 was the impressive display of advanced military aircraft, helicopters, drones, missile systems, and next-generation defence equipment. The event witnessed the participation of more than 900 exhibitors from India and abroad,

including prominent organizations such as Hindustan Aeronautics Limited (HAL), Defence Research and Development Organisation (DRDO), Bharat Electronics Limited (BEL), Boeing, Lockheed Martin, Dassault Aviation, Embraer, and Airbus. Spectacular aerial demonstrations by the Indian Air Force's Surya Kiran Aerobatic Team and advanced fighter aircraft captivated thousands of visitors. A significant attraction was the simultaneous presence of the American F-35 Lightning II and the Russian Su-57 stealth fighter, marking a rare opportunity to witness two of the world's most advanced fifth-generation combat aircraft at the same international air show. The exhibition also highlighted India's indigenous defence capabilities through the display of the Advanced Medium Combat Aircraft (AMCA) engineering model, the Tejas Light Combat Aircraft, unmanned aerial systems, advanced radar technologies, electronic warfare systems, and naval aviation platforms. These innovations demonstrated India's steady progress in developing modern defence technologies and reducing dependence on imported military equipment. Aero India 2025 further encouraged collaborations between Indian industries, start-ups, research institutions, and global defence companies through business meetings, technology exchanges, and investment discussions. Beyond showcasing military strength, Aero India 2025 emphasized innovation, research, and technological advancement in aerospace engineering. The event inspired students, young engineers, and researchers by exposing them to emerging technologies such as artificial intelligence, autonomous systems, advanced avionics, stealth technology, and next-generation aircraft design. It also highlighted the growing role of private industries and start-ups in India's rapidly expanding defence ecosystem.

In conclusion, Aero India 2025 was much more than an air show; it was a symbol of India's technological progress, strategic vision, and commitment to becoming a global leader in defence manufacturing. By promoting innovation, strengthening international cooperation, and showcasing indigenous capabilities, the event demonstrated how science, engineering, and national security can work together to build a stronger and more self-reliant India. For students and aspiring professionals, Aero India 2025 serves as an inspiring example of how technological excellence can contribute to national development and global peace.

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Current affairs

Major Global Developments in 2025: Donald Trump's Return and Indonesia's Entry into BRICS

Dwaipayan Hor, 4th year

The year 2025 marked two significant events that reshaped the global political and economic landscape. On 20 January 2025, Donald Trump was sworn in as the 47th President of the United States, marking a historic political comeback after previously serving as the 45th President. His return to the White House attracted worldwide attention and signaled the beginning of a new phase in American domestic and foreign policy. During his inaugural address, Trump emphasized strengthening the U.S. economy, tightening border security, increasing domestic manufacturing, and reinforcing the country's global influence. His administration also indicated a renewed focus on energy independence, trade reforms, and national security. As the United States remains one of the world's largest economies and a key player in international affairs, Trump's policies are expected to have far-reaching effects on global trade, diplomacy, climate

initiatives, and geopolitical relations. Countries around the world are closely observing how his leadership will shape international cooperation and economic stability over the coming years.

Another landmark event of 2025 was Indonesia's admission as a full member of BRICS, the influential economic bloc comprising Brazil, Russia, India, China, and South Africa. Indonesia became the first Southeast Asian nation to achieve full membership, significantly expanding BRICS' global reach and influence. As the world's fourth most populous country and one of the fastest-growing emerging economies, Indonesia brings substantial economic strength, abundant natural resources, and strategic geographical importance to the organization. Its membership reflects the growing importance of emerging economies in shaping global governance and promoting a more balanced international economic order. The expansion of BRICS also strengthens cooperation among developing nations in areas such as trade, investment, infrastructure development, digital technology, and sustainable growth. For India, Indonesia's inclusion presents new opportunities for regional collaboration, particularly in the Indo-Pacific region, while enhancing economic partnerships and diplomatic engagement.

Together, these two developments highlight the rapidly evolving dynamics of global politics and economics. Donald Trump's return to the U.S. presidency signals potential changes in international relations and American foreign policy, while Indonesia's entry into BRICS demonstrates the increasing influence of emerging economies in global decision-making. These events underscore a shifting world order in which both established powers and rising nations play crucial roles in addressing global challenges, promoting economic development, and shaping the future of international

cooperation. As 2025 unfolds, these milestones will continue to influence global diplomacy, trade, and strategic partnerships, making them among the most significant current affairs of the year.



Imagination is more important than knowledge
~ Albert Einstein

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