BRAINWARE UNIVERSITY

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Brainware Pharma Chronicles

ADVANCING PHARMACEUTICAL, EDUCATION, RESEARCH & INNOVATION

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Contents:

THE TEAM

Department of Pharmaceutical Technology
Brainware University

The Department of Pharmaceutical Technology, Brainware University, is driven by a dedicated team of experienced, passionate, and research-oriented faculty members committed to academic excellence, innovation, and holistic student development. The collective strength of the department lies in its diverse expertise across pharmaceutical sciences, regulatory affairs, research, community engagement, and professional education.

Through teaching, research, outreach activities, and industry collaboration, the faculty members continuously strive to nurture competent pharmacy professionals equipped to meet global healthcare challenges. This team stands united in its mission to promote knowledge, integrity, innovation, and service, contributing meaningfully to the growth of the pharmaceutical profession and the vision of Brainware University.

In the reverent memory of *the late.* Mahua Pal
Former Registrar, Brainware University

Ms Mahua Pal (1970–2025), Former Registrar of Brainware University

The Department of Pharmaceutical Technology, Brainware University, expresses its deepest sorrow on the untimely demise of Late **Ms Mahua Pal (1970–2025), Former Registrar of Brainware University.** Her dedicated service, administrative excellence, and compassionate approach left an indelible mark on the institution and its academic community. She will be remembered with profound respect and gratitude for her invaluable contributions.

We extend our heartfelt condolences to her family, friends, and colleagues, and pray that her noble soul rests in eternal peace.

With deep reverence and heartfelt respect, we dedicate **Volume 2, Issue 1** of **Brainware Pharma Chronicles** to the cherished memory of Late Ms Mahua Pal (1970–2025), former Registrar of Brainware University.

Ms Pal served the Brainware community with unwavering dedication, remarkable integrity, and a profound sense of duty that touched every corner of campus life. Her visionary leadership and compassionate guidance helped strengthen the structural and academic foundations of our institution, earning her admiration from faculty, staff, and students alike.

As Registrar, she was a cornerstone of administrative excellence, upholding the values of discipline, fairness, and commitment that define the spirit of Brainware University. Her countless contributions to institutional governance, academic record keeping, and collaborative initiatives have left a lasting legacy.

Throughout her more than three decades of service, Ms. Pal maintained an exemplary work ethic and a generous spirit, always ready to support the aspirations of young scholars and colleagues. Her presence enriched our academic journey and fostered a community grounded in respect and aspiration.

Though she is no longer with us, her influence continues in the hearts of every student, educator, and administrator who had the privilege of knowing her. Her memory remains a guiding light for the values we uphold in pharmaceutical education and beyond.

In this special issue of Brainware Pharma Chronicles, we honour her life, commemorate her service, and extend our deepest condolences to her family, friends, and the entire Brainware University community. May her noble soul rest in eternal peace.

Editorial Board Members

Publishing Committee Members

Dr. Prasenjit Mondal
Prof. & HOD. Department of Pharmaceutical Technology, Dean, School of Medical and Allied Health Sciences, Brainware University

Ms. Bandana Basu
(Librarian, Brainware University)

Biplab Kumar Chandra
(Librarian, Brainware University)

From the desk of Former Registrar

Artificial Intelligence (AI) integration in the University and the Department

Artificial Intelligence (AI) is rapidly reshaping the landscape of higher education, and at Brainware University, we view this transformation as an opportunity to enhance academic excellence, administrative efficiency, and student-centric learning. The thoughtful integration of AI across teaching, research, and governance processes is enabling us to become more responsive, data-driven, and future-ready, while upholding the core values of ethics, inclusivity, and academic integrity.

Within the domain of Pharmaceutical Education and Research, AI holds particular significance—from data analytics and drug discovery to personalised learning pathways and outcome-based academic planning. While regulatory frameworks guide our curricula, we actively encourage the use of AI-enabled tools to strengthen research, improve academic delivery, streamline student services, and support informed decision-making at all levels. I am confident that such responsible and purposeful adoption of AI will empower our faculty, motivate our students, and position Brainware University as a forward-looking institution committed to innovation with accountability.

I extend my best wishes to the editorial team of *Brainware Pharma Chronicles* for this edition and appreciate their efforts in documenting and disseminating our collective journey toward an AI-enabled academic ecosystem.

Ms Mahua Pal
(1970–2025),
Former Registrar
of Brainware University

From the desk of Editor-in-Chief

It is with profound respect and heartfelt remembrance that we dedicate Pharma Chronicles, Volume 2 Issue 1 to our beloved Late Ms. Mahua Pal, former Registrar, Brainware University. Her unwavering commitment, administrative excellence, and humane leadership were instrumental in shaping the academic culture of our University. She was a guiding force whose wisdom and encouragement continue to inspire the Brainware University fraternity.

This special issue is a humble tribute to her enduring legacy and values. Significantly, this volume also carries the last message of our late Registrar Madam, which stands as a timeless source of motivation and guidance for students, faculty members, and administrators alike. Her words continue to echo her vision, dedication, and deep concern for academic excellence and institutional growth.

The present issue of Pharma Chronicles is further enriched with scientific deliberations, contemporary research insights, innovative academic perspectives, and new academic content contributed by faculty members, researchers, and students. Each contribution reflects scholarly rigor and a progressive outlook in the field of pharmaceutical sciences.

I sincerely acknowledge and thank all contributors, reviewers, and members of the editorial team for their dedicated efforts in bringing out this meaningful issue. I am confident that this volume will serve as an informative and inspiring resource for our readers.

As we move forward, let us continue to uphold the ideals and values exemplified by Late Ms. Mahua Pal.

Editor-in-Chief
Pharma Chronicles
Prof. & HOD. Department of Pharmaceutical Technology
Dean, School of Medical and Allied Health Sciences
Brainware University

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Departmental Events & Activities

17 September 2025 | "Your Safety, Just a Click Away – Report to PvPI" (64thNational Pharmacovigilance Week 2025)

17 September 2025 marked the observance of **National Pharmacovigilance Week 2025** by the Department of Pharmaceutical Technology, Brainware University, under the theme **"Your Safety, Just a Click Away – Report to PvPI."** The programme was organized in alignment with the initiatives of the Pharmacovigilance Programme of India (PvPI) to strengthen awareness on adverse drug reaction (ADR) reporting and patient safety.

The event highlighted the vital role of pharmacovigilance in monitoring, detecting, assessing, and preventing adverse effects associated with medicines. The programme commenced with an inaugural address by the Head of the Department, emphasizing the importance of safe and rational use of medicines in healthcare practice. Expert lectures and interactive sessions provided valuable insights into ADR reporting systems and the functioning of ADR Monitoring Centres under PvPI.

The event was coordinated by Subarna Mahanti, Ria Dutta, and Bramhajit Chatterjee, whose dedicated efforts contributed to the effective execution of the programme. Overall, the celebration reinforced a culture of vigilance, ethical reporting, and continuous learning to promote the safe and effective use of medicines.

25 September 2025 | Seminar on the occasion of World Pharmacists Day 2025: "Think Health, Think Pharmacists"

25 September 2025 marked the celebration of **World Pharmacists Day 2025** by the Department of Pharmaceutical Technology, Brainware University, based on the global theme **"Think Health, Think Pharmacists."** The programme highlighted the critical role of pharmacists as healthcare professionals contributing to patient care, rational medicine use, and community health services.

The event began with a **keynote seminar delivered by Mr. Gobinda Maity,** who emphasized the expanding responsibilities of pharmacists in patient counseling, drug safety, public health programmes, and pharmaceutical innovation. His address encouraged students to look beyond traditional dispensing roles and to embrace broader professional responsibilities within the healthcare system.

An E-Poster Competition was organized as part of the celebration, where students actively participated by presenting creative posters aligned with the theme. Faculty members evaluated the presentations, and outstanding participants were recognized with certificates and tokens of appreciation.

The programme was coordinated by Poulami Sarkar and Satyam Mal, whose efforts ensured the smooth conduct and success of the event. Overall, the celebration inspired students to take pride in the pharmacy profession and reinforced the role of pharmacists as essential contributors to health promotion, disease prevention, and patient-centered care.

10 October 2025 | Seminar on the occasion of cGMP Day Celebration 2025

10 October 2025 marked the celebration of **cGMP Day 2025** by the Department of Pharmaceutical Technology, Brainware University, with the objective of strengthening awareness about Current Good Manufacturing Practices (cGMP) and their critical role in ensuring pharmaceutical product quality and patient safety. The seminar was organized at the UB-III Seminar Hall and witnessed active participation from students and faculty members of the department.

The programme began with a welcome address by the Head of the Department, highlighting the importance of quality systems, regulatory compliance, and accountability in pharmaceutical manufacturing. **The invited speaker, Mr. Kishore Majhi,** Quality Head, Stadmed Pvt. Ltd., delivered an insightful session focusing on key principles of cGMP, including documentation practices, validation procedures, equipment qualification, and personnel training. Real-world case studies were discussed to demonstrate how strict adherence to cGMP minimizes manufacturing errors and enhances product reliability.

An interactive question-and-answer session allowed students to clarify their queries and gain practical insights into implementing quality practices in the pharmaceutical industry. The event was coordinated by **Poulami Sarkar and Olivia Sen**, whose efforts ensured the smooth execution of the programme. Overall, the seminar effectively reinforced the significance of cGMP compliance and inspired students to uphold quality and integrity in their future professional roles.

5 September 2025 | Teachers' Day celebration

5 September 2025 was celebrated as **Teachers' Day** by the Department of Pharmaceutical Technology, Brainware University, in a warm and respectful atmosphere honoring the dedication and contributions of faculty members. The occasion provided an opportunity for students to express their gratitude and appreciation towards their teachers for their continuous guidance, mentorship, and support in academic and professional development.

The programme included heartfelt speeches by students, cultural performances, and interactive sessions that reflected the strong bond between teachers and learners. Faculty members shared their experiences and encouraged students to pursue excellence with discipline, integrity, and lifelong learning.

27 October 2025 | Fresher's Welcome 2025

27 October 2025 witnessed the celebration of **Freshers' Welcome 2025** organized by the Department of Pharmaceutical Technology, Brainware University, at the UB II Auditorium. The event was arranged to warmly welcome the newly inducted students of M. Pharm, B. Pharm, and D. Pharm into the academic community. Students from the 2nd, 3rd, and 4th years actively participated in planning and presenting the programme, creating a lively and inclusive atmosphere.

The programme commenced with a welcome song followed by cultural performances, including group dances and songs, showcasing the enthusiasm and creativity of senior students. The Head of the Department addressed the gathering, extending warm wishes to the freshers and encouraging them to pursue academic excellence while actively engaging in extracurricular activities.

The event was coordinated by Ms. Banani Mondal, Ms. Ananya Bhowmick, and Ms. Shayeri Chatterjee Ganguly, with valuable support from faculty members Mr. Sudip Saha, Mr. Arijit Seal, Ms. Olivia Sen, and Ms. Snigdha Chatterjee. The seamless coordination ensured the smooth execution of the programme.

20 November 2025 | 64th National Pharmacy Week (NPW) | Scientific Day Celebration 2025: "Pharmacists as Advocates of Vaccination" – Inter-College Scientific Model Exhibition & Seminar

20 November 2025 marked the celebration of **Scientific Day** under the theme **"Pharmacists as Advocates of Vaccination"**, organized as part of the **64th National Pharmacy Week (NPW) 2025** by the Department of Pharmaceutical Technology, Brainware University, in collaboration with the IPA, Bengal Branch. The programme featured an Inter-College Scientific Model Exhibition followed by a Theme-Based Technical Seminar, providing a dynamic platform for scientific innovation, academic exchange, and professional awareness.

The inter-college exhibition showcased **14 innovative scientific models** presented by students from leading pharmacy institutions across West Bengal. The exhibits were evaluated by eminent experts, ensuring a rigorous and transparent assessment process. Students of the Department of Pharmaceutical Technology, Brainware University, secured the 1st position, demonstrating exceptional scientific creativity and practical insight. BCDA College of Pharmacy & Technology and Eminent College of Pharmaceutical Technology secured the 2nd and 3rd positions, respectively. The achievement highlighted the research aptitude and innovative thinking of Brainware University students.

The technical seminar included expert lectures on vaccination advocacy, immunology, emerging vaccine technologies, and community health strategies, emphasizing the evolving role of pharmacists in public health.

The event was coordinated by **Dr. Sreejan Manna, Mrs. Paramita Ganguly, Mr. Sumon Giri, Ms. Zainab Irfan, Dr. Shayeri Chatterjee Ganguly, and Ms. Teasha Chakraborty**. Overall, the programme successfully promoted scientific excellence, inter-institutional collaboration, and student achievement, reinforcing the vital role of pharmacists in vaccination awareness and public health advancement.

20 November 2025 | Community Outreach Activity: Health Camp for Underprivileged Communities at Habra, North 24 Parganas

20 November 2025 witnessed a **Community Outreach Activity in the form of a Health Camp** organized by the Department of Pharmaceutical Technology, Brainware University, at

Sree Ramakrishna Prema Bihar, Hyderbelia, Prithiba, Habra, North 24 Parganas. The initiative was undertaken to serve underprivileged communities from nearby villages by providing essential primary healthcare services and free medicines.

The health camp aimed to promote preventive healthcare, create awareness on hygiene and healthy lifestyle practices, and strengthen the bond between the university and the local community. Faculty members supervised the programme, while students actively participated in organizing and managing the camp, gaining valuable exposure to public health responsibilities.

The event was coordinated by **Mr. Sudip Saha** and **Mr. Satyam Mal**, whose efforts ensured effective planning and execution. Overall, the health camp benefited more than 35 individuals and provided students with hands-on experience in patient interaction and community service. The initiative reinforced the vital role of pharmacists in public health promotion and fostered a strong sense of social responsibility among participants.

Departmental Achievements

Paper Publication Records

Total Departmental Publications from July 2025 to January 2026: 36

Teacher-Student Publication Impact factor (I.F. JCR. Clarivate) wise from July 2025 to January 2026

Title of paper	Name of the author/s	Name of journal	Impact Factor
Chitosan-based nanosensors in biomedical applications: A review	Sreejan Manna, Poulami Sarkar, Priya Das, Subhendu Samanta, Olivia Sen et al.	Carbohydrate Polymers	12.5
Unlocking the potential of lipid nanoparticles for enhanced glioma therapy: Recent advancements and future perspectives	Shiuli Bera, Shayeri Chatterjee Ganguly, Priya Manna, Moumita Kundu*	Colloids and Surfaces B: Biointerfaces	5.6
Recent advancements in aptamer-mediated theranostics in the management of hematological disorders	Shayeri Chatterjee Ganguly, Rahit Paul, Banani Mondal, Moumita Kundu*, Teasha Chakraborty	International Journal of Pharmaceutics	5.2

Unravelling the role of natural herbs for the management of diabetes mellitus	Zainab Irfan, Sumon Giri et al.	Diabetology & Metabolic Syndrome	3.9
Drug delivery and biomedical applications of tamarind seed xyloglucan and its derivatives: a review	Sreejan Manna et al.	Journal of Biomaterials Science, Polymer Edition	3.6
Emerging roles and therapeutic potential of non-coding RNA in osteosarcoma: a review	Srijita Chatterjee, Prasenjit Adhikary, Purna Chandra Pal et al.	Medical Oncology	3.5
Chemotherapeutic efficacy of dihydromyricetin ruthenium-p-cymene complex in lung cancer through modulation of the PI3K/β-catenin/AhR signaling cascade	Priya Manna et al.	Naunyn-Schmiedeberg's Archives of Pharmacology	3.1
A global bibliometric perspective on autophagy and tumor microenvironment in cancer research	Moumita Kundu et al.	Discover Oncology	2.9
Toxicological Evaluation of Polysaccharide-Based Multi-Particulate Oral Drug Delivery System	Prasenjit Mondal et al.	Journal of Pharmaceutical Innovation	2.7
Biosurfactant: green additives for the next generation pharmaceutical formulations	Ayon Dutta et al.	International Journal of Polymeric Materials and Polymeric Biomaterials	2.6
Recent trends in the therapeutic implications of multifaceted carrageenan nanocarriers	Olivia Sen, Arpita Biswas, Sreejan Manna et al.	International Journal of Polymeric Materials and Polymeric Biomaterials	2.6

Advances, Challenges, and Practical Solutions in HPLC and LC–MS Method Development for Pharmaceutical and Biological Samples	Bramhajit Chatterjee, Prasenjit Mondal*	Analytical and Bioanalytical Chemistry Research	1.4
Exploring the Therapeutic Potential of 1,3- Benzothiazole: A Unique Heterocyclic Framework	Arpita Biswas et al.	Jordan Journal of Chemistry	0.4

Edited Book Inauguration: Advancing Integrative Pharmaceutical Sciences

The Department of Pharmaceutical Technology, Brainware University, proudly inaugurated the edited book titled **"Synergies in Healing: The Convergence of Modern Pharmaceutical Sciences and Traditional Practices."** The volume comprises **34 insightful chapters**, presenting a comprehensive perspective on the integration of contemporary pharmaceutical sciences with traditional healing systems.The book was formally released by the **Editor-in-Chief**, along with the esteemed **co-editors** and the **Honourable Vice-Chancellor** of Brainware University. The inauguration marked a significant academic milestone, highlighting collaborative scholarship and interdisciplinary research within the pharmaceutical domain. The editors extended heartfelt congratulations to all contributing authors for their valuable contributions, which collectively aim to bridge modern scientific approaches with time-tested traditional practices. This

publication reflects the department's commitment to promoting integrative research, innovation, and knowledge dissemination, and it is expected to serve as a valuable resource for researchers, academicians, and students in the field of pharmaceutical sciences.

Faculty Achievements

Voices of Tomorrow: District Youth Parliament 2026 at Brainware University

Mr. Deb Kumar Chatterjee, Deputy Director & District Youth Officer, My Bharat, with University Officials and Judges at Brainware University for the District Level Youth Parliament 2026

The **District Youth Parliament 2026** at Brainware University transformed the campus into a vibrant forum of democratic dialogue, leadership, and youth empowerment. The event provided a platform for young participants to express ideas on nation-building, governance, and social change with confidence and clarity. The programme was graced by **Mr Agnimeel Das**, NSS Regional Directorate, Kolkata, whose inspiring presence set a purposeful tone for the day. **Mr. Deb Kumar Chatterjee**, Deputy Director & District Youth Officer, *My Bharat*, along with university officials and judges, guided and witnessed the thoughtful deliberations of the participants.Young delegates showcased analytical thinking and leadership skills through impactful speeches and debates, reflecting the responsibility and vision of future leaders. The event reaffirmed Brainware University's commitment to nurturing youth voices and democratic values, celebrating the spirit of leadership that will shape a stronger and brighter India.

A new initiative to 'Serve Bengal' in collaboration with the Indian Red Cross Society

Brainware University marked a significant step toward social responsibility with the launch of **'Serve Bengal'**, a purpose-driven initiative developed in collaboration with the **Indian Red Cross Society (West Bengal)**. The initiative was unveiled during a meaningful engagement at **Raj Bhavan**, symbolizing a strong commitment to service and humanitarian values.

The occasion was graced by **Hon'ble Chancellor Phalguni Mookhopadhayay**, **Registrar Mahua Pal**, and **Mr. Sandeep Kumar Singh**, Hon'ble Council General & General Secretary, Indian Red Cross Society (WB). Their presence underscored the importance of the collaboration and its vision for meaningful community impact.

'Serve Bengal' aims to nurture socially responsible youth leaders by instilling compassion, empathy, and a spirit of service. Guided by the experience and outreach of the Indian Red Cross Society, the initiative seeks to extend humanitarian efforts across Bengal, empowering students to actively contribute to society.

The launch of 'Serve Bengal' reflects Brainware University's philosophy of integrating education with empathy. It stands as a promising movement where young minds are encouraged to serve humanity, fostering positive change and collective responsibility for a better tomorrow.

Student Achievements

NPTEL Examination Success: A Milestone in academic excellence

The Department of Pharmaceutical Technology, Brainware University, extends heartiest congratulations to **Arunava Roy, Saikat Manna, Samiul Sk, Atanu Ghosh, and Aranya Dutta Banik** for successfully qualifying in the **NPTEL examination.** Their achievement reflects sincere dedication, academic discipline, and a strong commitment to continuous learning.

PBL Stars of the Session(2025-26-odd)

The Department of Pharmaceutical Technology, Brainware University, proudly celebrates student excellence in **Project-Based Learning**. The **1st Place** was awarded to **B.Pharm 3rd Semester** students for the project *"Comparative Analysis of the Antibacterial Activity of Different Brands of the Same Antibiotic,"* under the supervision of **Ms. Zainab Irfan**.

The **2nd Place** was secured by **B.Pharm 1st Semester** students for *"IoT-Based Modified BMI Scale for Rodents,"* guided by **Mr. Rajesh Kumar Mukherjee**.
The **3rd Place** was achieved by **B.Pharm 5th Semester** students for *"Development of Polymeric Microbeads Using Herbal Extract as Protectants,"* under the mentorship of **Dr. Saptarshi Samajdar**.

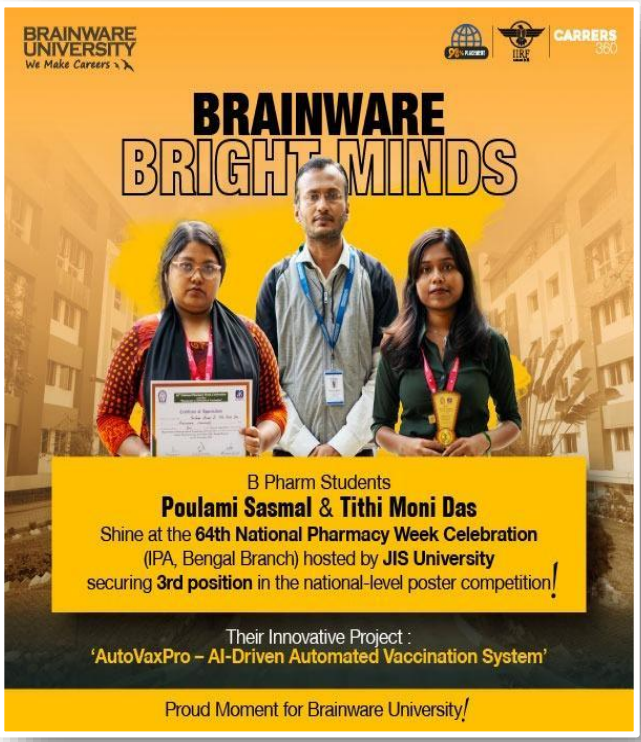
Celebrating Academic Discipline: Student Attendance Excellence

Sl. No.	Batch	Student Code	Student Name	Attendance (%)	Attendance (%)
1	B.Pharm 2024	BWU/BPH/24/004	ABIR HALDAR	93.03	93.03
2	B.Pharm 2024	BWU/BPH/24/032	KUNTAL NATH	95.68	95.68
3	D.Pharm 2024	BWU/DPH/24/013	SHUBHAM ROY	95.76	95.76
4	D.Pharm 2024	BWU/DPH/24/042	SUBHAJIT BARI	90.77	90.77
5	D.Pharm 2024	BWU/DPH/24/056	BAPPADITYA ROY	90.22	90.22
6	B.Pharm 2025	BWU/BPH/25/003	SAGNIK NASKAR	90.96	90.96
7	B.Pharm 2025	BWU/BPH/25/029	Ankan Das	94.33	94.33
8	B.Pharm 2025	BWU/BPH/25/036	Akshay Das	91.14	91.14
9	B.Pharm 2025	BWU/BPH/25/060	Santanu Das	96.88	96.88
10	B.Pharm 2025	BWU/BPH/25/061	Bishnupada Giri	90.31	90.31
11	D.Pharm 2025	BWU/DPH/23/003	Bhaskar Roy	91.78	91.78
12	D.Pharm 2025	BWU/DPH/25/003	Quazi Rahaman	93.57	93.57
13	D.Pharm 2025	BWU/DPH/25/014	Sriparna Shil	98.13	98.13
14	D.Pharm 2025	BWU/DPH/25/019	Sania Alam	94.31	94.31
15	D.Pharm 2025	BWU/DPH/25/021	Mintu Baksi	96.27	96.27
16	D.Pharm 2025	BWU/DPH/25/024	Amiya Bag	95.44	95.44
17	D.Pharm 2025	BWU/DPH/25/026	Bhumika Pramanik	98.13	98.13
18	D.Pharm 2025	BWU/DPH/25/027	Pritha Maity	90.31	91.55
19	D.Pharm 2025	BWU/DPH/25/045	Tanushree Maity	90.31	91.35

This illustration honors students of the Department of Pharmaceutical Technology whose consistent attendance reflects discipline, responsibility, and a strong commitment to academic excellence."

Illustration @ AI

Brainware Bright Minds: Student Achievement at National Pharmacy Week



The Department of Pharmaceutical Technology, Brainware University, proudly congratulates **Poulami Sasmal** and **Tithi Moni Das**, B.Pharm students, for securing the **3rd position** in the **National-Level Student Competition** held during the **64th National Pharmacy Week Celebration**, organized by the **IPA, Bengal Branch** and hosted by **JIS University**. This prestigious achievement highlights the students' dedication, creativity, and ability to apply academic knowledge to real-world healthcare challenges.

The recognition was awarded for their innovative project titled **"AutoVaxPro – AI-Driven Automated Vaccination System,"** which effectively demonstrated the integration of artificial intelligence with pharmaceutical and public health applications. The project showcased forward-thinking innovation, technological competence, and strong relevance to improving vaccination delivery and healthcare efficiency.

Their accomplishment reflects not only individual academic excellence but also the robust research-oriented learning environment fostered at Brainware University. This success stands as a proud milestone for the department and serves as a strong source of inspiration for fellow students to actively engage in innovation-driven learning, interdisciplinary research, and participation in national-level academic platforms.

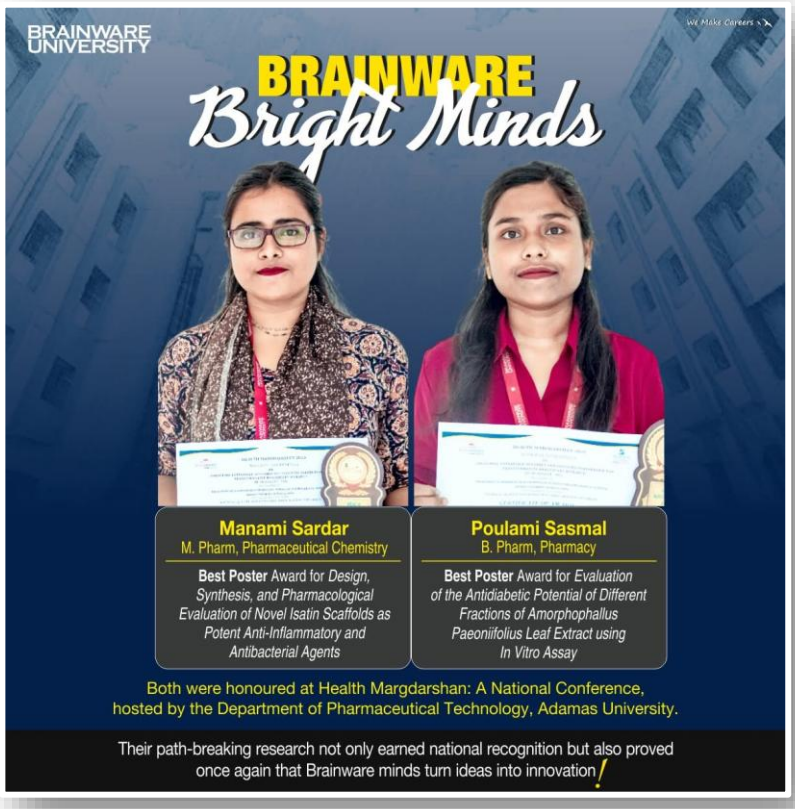
World Pharmacists Day: E-Poster Competition Winners

The Department of Pharmaceutical Technology, Brainware University, successfully organized an **E-Poster Competition** on the occasion of **World Pharmacists Day 2025** with the objective of encouraging creativity, scientific reasoning, and academic excellence among students. The event served as a dynamic platform for students to visually present innovative concepts, research ideas, and contemporary issues related to pharmaceutical sciences, thereby fostering analytical thinking and effective scientific communication.

The competition witnessed enthusiastic participation from students across various semesters, reflecting their keen interest and dedication toward academic enrichment. **Sanjana Singha (3rd Semester)** secured the **first position** for her exceptional presentation, followed by **Sumit Mallick (M.Pharm, Pharmaceutical Chemistry)** who achieved the **second position**. **Debayan Saha (3rd Semester)** earned the **third position**, while **Santanu Bera (1st Semester)** was awarded the **fourth position** for his commendable effort.

Overall, the E-Poster Competition not only enhanced students' understanding of pharmaceutical sciences but also promoted innovation, confidence, and presentation skills. The department extends heartfelt congratulations to all the winners and sincerely appreciates the active participation of students, which contributed significantly to the success of the event.

Student achievement at Health Margdarshan National Conference, Adamas University | 2025



The Department of Pharmaceutical Technology, Brainware University, proudly congratulates **Manami Sardar** (M.Pharm, Pharmaceutical Chemistry) and **Poulami Sasmal** (B.Pharm, Pharmacy) for their outstanding achievement in receiving the **Best Poster Awards** at *Health Margdarshan: A National Conference*, held at **Adamas University**. This prestigious recognition reflects the department's strong culture of research, innovation, and academic excellence.

Manami Sardar was honored for her in-depth research on the *design, synthesis, and pharmacological evaluation of novel isatin scaffolds*, highlighting their potential as effective anti-inflammatory and antibacterial agents. Her work demonstrated scientific rigor, innovative thinking, and relevance to current therapeutic challenges. **Poulami Sasmal** received the award for her insightful study on the *antidiabetic potential of different fractions of* **Amorphophallus paeoniifolius** *leaf extract using in vitro assays*, showcasing a strong integration of traditional knowledge with modern experimental approaches.

Inter-College Scientific Model Competition Winners – 64th National Pharmacy Week

The **Department of Pharmaceutical Technology**, in association with the **IPA Bengal Branch**, successfully organized the **Inter-College Scientific Model Competition** as a part of the **64th National Pharmacy Week (NPW)** celebrations. The event witnessed enthusiastic participation from various pharmacy colleges across West Bengal, where students showcased their innovation, scientific insight, and problem-solving abilities through well-conceived and impactful models. All participating teams were honoured with **medals and certificates** in appreciation of their efforts and commitment to scientific excellence. We extend our heartfelt gratitude to our esteemed evaluators—**Dr. Muktipada Rana, Dr. Subhas C. Mandal, and Dr. Deb Prasad Chattopadhyay**—for their valuable time, expert judgment, and constructive scientific assessment. The competition concluded with **1st Position** secured by the *Department of Pharmaceutical Technology, Brainware University*, followed by **2nd Position** by *BCDA College of Pharmacy & Technology, Hridaypur*, and **3rd Position** by *Eminent College of Pharmaceutical Technology, Barasat*. Congratulations to all the participants and winners for making the event a grand success and enriching the spirit of the **64th NPW celebration** through creativity, dedication, and academic excellence.

Departmental Best Practices

DIC achievement: Book Publication by DIC Chairperson and In-Charge

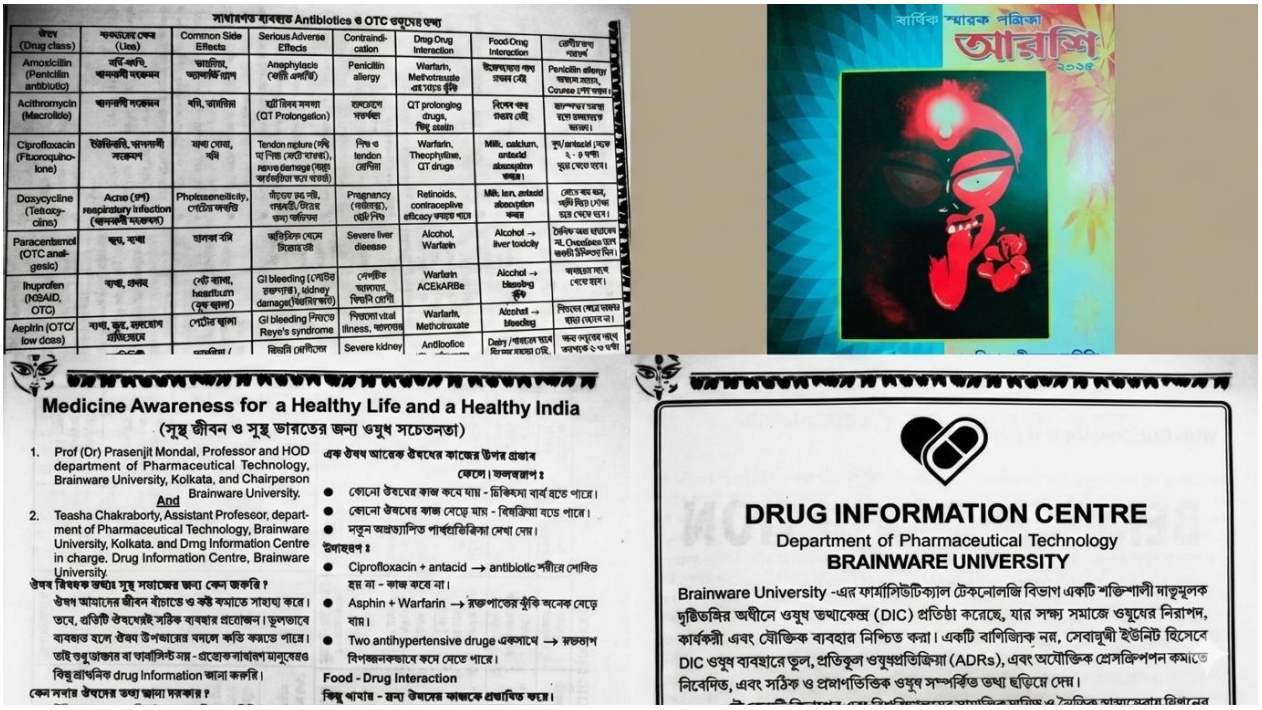
A proud moment for the Department of Pharmaceutical Technology, Brainware University, as a new book titled **"Drug Information Centre – Foundations, Functions, and Future Directions"** has been successfully published by the **DIC Chairperson, Dr. Prasenjit Mondal**, and the **DIC In-Charge, Ms. Teasha Chakraborty**.

The book provides a comprehensive overview of the foundations, operational roles, and future scope of **Drug Information Centres (DICs)** in healthcare systems. This publication marks a significant achievement for the department's Drug Information Centre, reflecting its commitment to academic leadership, evidence-based practice, and advancement of pharmaceutical education.

DIC awareness session on safe and rational use of medicines

The **Drug Information Centre** of the **Department of Pharmaceutical Technology, Brainware University,** organised an awareness session for **Nursing and GNM students** on the safe and rational use of medicines. The program highlighted how accurate drug information and evidence-based practice support **patient safety**, while stressing the **shared responsibility** of Nursing and Pharmacy professionals in preventing medication errors and improving outcomes.

Publishing informative articles in local magazines



The Department of Pharmaceutical Technology, Brainware University, through its **Drug Information Centre (DIC)**, actively contributes to community health education by publishing **informative articles in local magazines and newspapers**. These publications focus on promoting rational use of medicines, antibiotic awareness, safe use of over-the-counter drugs, food–drug and drug–drug interactions, and prevention of adverse drug reactions.

By presenting scientifically accurate information in **simple, locally understandable language**, the department ensures that essential healthcare knowledge reaches the general public effectively. Topics such as medicine safety, self-medication risks, and responsible antibiotic use are addressed to enhance public awareness and support healthier decision-making.

This outreach initiative reflects the department's commitment to **public health education, social responsibility, and preventive healthcare**, extending pharmaceutical expertise beyond academic boundaries. Publishing in local media strengthens the bridge between academia and society, empowering communities with knowledge and reinforcing the vital role of pharmacists in promoting safe and informed medicine use.

Winter Session Appreciation Awards 2026: honouring academic excellence

On 14 January 2026, Dr. Prasenjit Mondal, Head of the Department of Pharmaceutical Technology, Brainware University, felicitated faculty members with medals and mementos during the Winter Session Appreciation Awards. The ceremony recognized the faculty's outstanding contributions to research activities and scholarly publications, celebrating their dedication to academic excellence and knowledge advancement.

The session was solemnly dedicated to the cherished memory of Late Ms. Mahua Pal (1970–2025), Former Registrar, Brainware University, Kolkata. The tribute reflected deep respect and gratitude for her invaluable service and lasting contributions to the university. The event blended appreciation with remembrance, reinforcing the department's commitment to excellence, integrity, and academic legacy.

Special Achievements	Faculty Names
Highest Number of Publication	Dr. Shayeri Chatterjee Ganguly
Highest Publication as a first author	Ms. Piyali Khamkat
Publication with highest Impact factor	Dr. Sreejan Manna
Highest publication with impact factor	Dr. Moumita Kundu

The **HOD's Appreciation Awards** were conferred to recognize exceptional faculty achievements in research and scholarly publications, highlighting the department's strong commitment to academic excellence. Under the **Special Achievements** category, *Dr. Shayeri Chatterjee Ganguly* was honoured for achieving the **highest number of publications**, reflecting remarkable research productivity; *Dr. Piyali Khamkat* received appreciation for the **highest number of publications as first author**, demonstrating leadership and originality in research; *Dr. Sreejan Manna* was recognized for a **publication with the highest impact factor**, signifying high scientific quality and global relevance; and *Dr. Moumita Kundu* was awarded for the **highest number of publications in impact-factor journals**, showcasing consistency and excellence in impactful research. Collectively, these recognitions celebrate the faculty's dedication to advancing knowledge and strengthening the research culture of the department.

Industry exposure through industrial training programmes

The Department of Pharmaceutical Technology, Brainware University, places strong emphasis on industry-oriented learning by facilitating **industrial training programmes** for its students across reputed pharmaceutical organizations. As part of this initiative, students successfully underwent hands-on industrial training at leading pharmaceutical companies such as **Glenmark**, **Inventland Research Laboratories Private Limited**, **Pharma Deep Remedies**, and other established industry units.

During the training, students gained valuable practical exposure to real-time pharmaceutical operations, including manufacturing processes, quality control and quality assurance practices, regulatory compliance, documentation, and industrial safety standards. The experience enabled them to bridge the gap between theoretical knowledge acquired in classrooms and practical application in an industrial environment. Interaction with industry professionals further enhanced their understanding of current industry expectations, technological advancements, and professional ethics.

This industrial training programme significantly contributed to the development of technical skills, confidence, and professional competence among students, preparing them for future careers in the pharmaceutical industry. The initiative reflects the department's commitment to experiential learning, skill development, and producing industry-ready pharmacy professionals aligned with contemporary

Experiential learning in the Departmental Herbal Garden

The **Department of Pharmaceutical Technology, Brainware University**, promotes experiential learning by actively involving students in regular academic activities within the departmental **Herbal Garden**. This initiative provides hands-on exposure to medicinal plants, enabling students to study their identification, cultivation, and therapeutic significance.

By linking classroom learning with practical observation, the activity strengthens students' understanding of pharmacognosy, traditional medicine, and sustainable healthcare practices. The Herbal Garden functions as a living laboratory, fostering curiosity, environmental awareness, and practical skills, and reflects the department's commitment to holistic and application-oriented pharmaceutical education.

Driving Discovery: Launch of Departmental Research consultancy services for collaborative innovation

BRAINWARE UNIVERSITY

ব্রেনওয়ার বিশ্ববিদ্যালয়

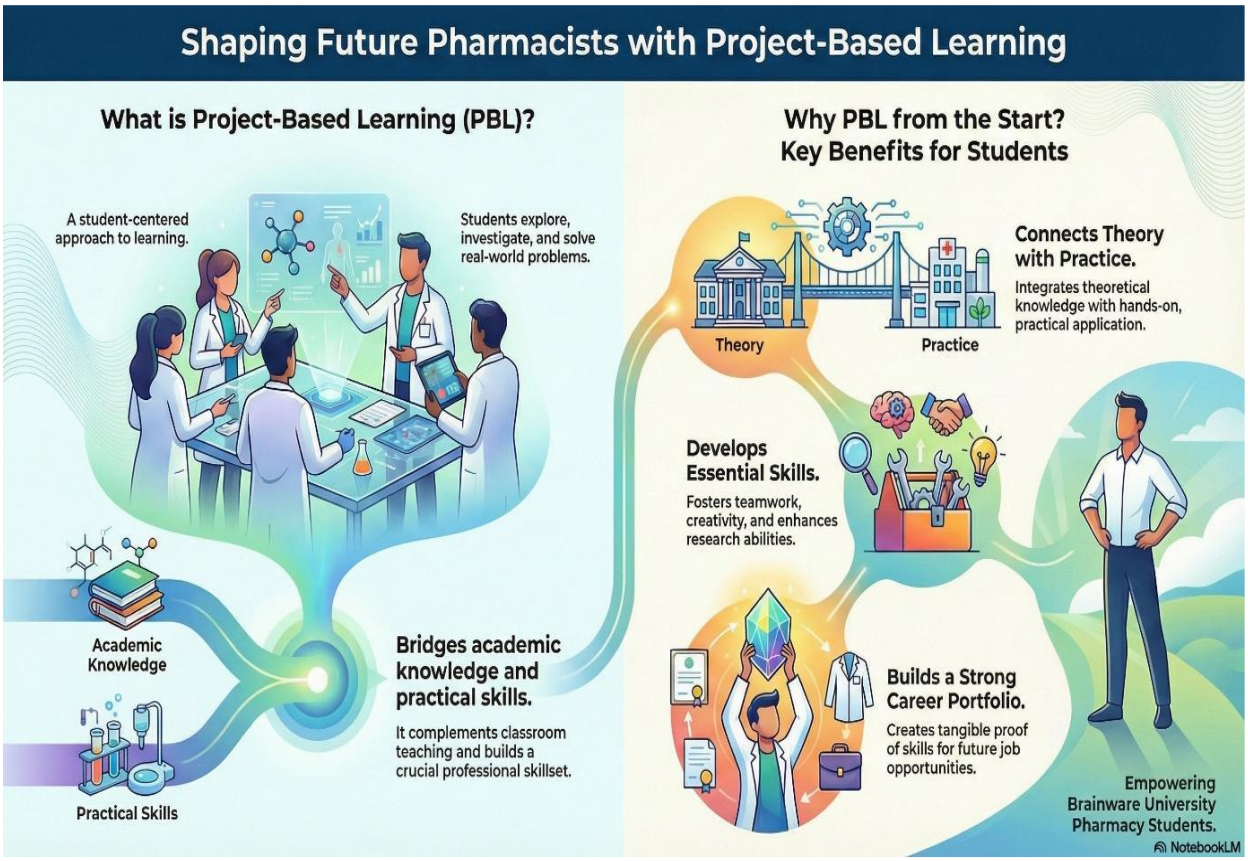
Department of Pharmaceutical Technology

PRECISION RESEARCH CONSULTING SERVICES

Sl. No.	Services	Price in INR (with GST)
1	Qualitative and Quantitative Phytochemical analysis by HPTLC Documentation System	1770/Sample *(Extracts and conditions of TLC need to be provided)
2	Antioxidant Assay (DPPH Assay and Hydrogen Peroxide Assay)	1180/Sample#
3	Antidiabetic Assay (α-Amylase assay)	2360/Sample#
4	Anti-inflammatory Assay (BSA and Egg albumin assay)	1180/Sample#
5	Anti Microbial Assay (For selected Bacteria *[E.coli, B.subtilis, B. cereus, P. aureginosa, S.typhi, S.aureus*] and Fungi[*C.albicans, A.niger*])	1180/Microbe/Sample#
6	Anthelminthic Assay	1770/Sample#
7	Proteolytic Assay	1180/Sample#
8	Determination of Particle Size upto µm range (Quasmo Microscope)	354/Sample#
9	Stability studies of formulations as per ICH Guidelines (Long term and Accelerated)	2360/month/Sample#
10	Extraction of herbal products using Microwave assisted extraction and Ultrasonic extraction with phytochemical screening	590/Extracts (MAE) 354/Extracts(USE)
11	Tablet Punching with evaluation (Thickness, Hardness, Friability, Weight Variation,Disintegration)	590/50 Tablets *(Drug and Excipients to be provided by the client)
12	Tablet Punching with evaluation (Thickness, Hardness, Friability, Weight Variation, Dissolution, Disintegration, Drug Content)	1770/50 Tablets *(Drug and Excipients to be provided by the client)
13	QSAR Model Development	590 per model
14	Molecular Docking, ADME, Toxicity Prediction	1180/5 compound *(PDB ID, Compounds in .cdx form needed to be provided)
15	Network Pharmacology	1180/10 compound (SMILES code needs to be provided)
16	Method Development as per ICH guidelines (HPLC and UV)	23600/sample *(API & marketed formulation need to be provided)
17	Method Development as per ICH guidelines (HPLC and UV) with Forced degradation studies	35400/sample *(API need to be provided)
18	Isolation of Pure natural products for provided extracts.	23600/sample#
19	Evaluation of crude drugs (Total Phenolics, Total Alkaloid, Total Flavonoids, Total Aldehydes, Ash value, Extractive value, Morphological and Microscopic Studies)	1180/Sample#
20	Synthesis of derivatives by microwave synthesizer	2360/sample *(Scheme to be provided) 5900/sample *(with Scheme)
We also invites students/Scholars for short term projects upto 30 days		**Pricing as per plan to be provided by the student/scholar**
#Solubility profile of the samples are need to be provided.		

The Department of Pharmaceutical Technology has launched its Precision Research Consulting Services, offering over 20 specialized analytical, formulation, and bioassay services to support collaborative innovation in academia and industry.

Starting from the 1st Semester 2025 – Learning by doing: launch of Project-Based Learning (PBL) from the first semester onward



Starting from the 1st Semester 2025, the **Department of Pharmaceutical Technology, Brainware University**, has adopted a progressive educational approach by introducing **Project-Based Learning (PBL)** for **B.Pharm and M.Pharm** programmes. This initiative is aligned with the vision of **NEP 2020**, emphasizing *learning by doing* to nurture innovation, critical inquiry, and meaningful academic impact. Through PBL, students actively engage with real-world pharmaceutical challenges, encouraging problem-solving skills, interdisciplinary thinking, and application-oriented learning beyond traditional classroom instruction.

In addition to PBL, the department has taken a forward-looking step by integrating **Artificial Intelligence (AI) tools** into academic and research activities. These tools are being effectively utilized in research design, data analysis, literature exploration, and scientific presentations, thereby enhancing research efficiency and analytical depth. This integration not only strengthens innovation-driven learning but also equips students and scholars with essential digital and technological competencies required in modern pharmaceutical sciences.

Collectively, these initiatives reflect the department's commitment to transforming pharmaceutical education by blending experiential learning with emerging technologies, preparing students to excel as future-ready professionals and researchers in a rapidly evolving healthcare landscape.

25.09.2025 – Fostering partnerships: Signing of new Memoranda of Understanding (MOUs) to expand academic & industry collaboration

On 25 September, the **Department of Pharmaceutical Technology, Brainware University**, marked a significant milestone by signing a **Memorandum of Understanding (MoU)** with **Subhami Biopharma Pvt. Ltd.** The MoU was formalized in the esteemed presence of **Founder Director Dr. Subhalakshmi Ghosh**, highlighting the importance of academia–industry collaboration in advancing pharmaceutical education and research.

This strategic partnership aims to strengthen industry-oriented learning, research collaboration, and skill development among students. The MoU opens avenues for industrial training, internships, joint research projects, expert lectures, and knowledge exchange, thereby bridging the gap between academic learning and real-world pharmaceutical practices.

The collaboration reflects the department's commitment to fostering innovation, enhancing employability, and providing students with practical exposure to industry standards and emerging trends. By aligning academic expertise with industrial experience, the MoU with Subhami Biopharma Pvt. Ltd. is expected to play a vital role in shaping future-ready pharmaceutical professionals.

Mystery, merriment, and memories: Secret Santa celebration

The department celebrated its annual **Secret Santa** event with great enthusiasm, continuing a much-loved tradition. Faculty members exchanged gifts anonymously, each accompanied by a thoughtful clue. The excitement of solving the clues to discover the Secret Santa added fun, laughter, and engagement to the celebration. The event fostered camaraderie, joy, and a strong sense of togetherness, making it a memorable festive occasion for all.

Research, consultancy facilities, and outcomes of the Department of Pharmaceutical Technology, Brainware University

Project Title: Characterization and Microscopical Evaluation of Given Plant Powder Including Pharmacological Evaluation of Powder

Under the supervision of, Mr. Baisnabdas Pathak & Dr. Priya Das

Department of Pharmaceutical Technology, Brainware University

The Department of Pharmaceutical Technology, Brainware University, provides well-equipped research facilities to support consultancy and academic projects related to herbal drug analysis, phytochemical investigation, and pharmacological evaluation. For the present consultancy project, the department offers comprehensive infrastructure, advanced analytical instruments, and expert guidance.

A. Phytochemical Isolation Facilities

1. Column Chromatography: Facilities are available for the isolation of major phytoconstituents using silica gel columns, suitable solvent systems, and systematic fraction collection.
2. Thin Layer Chromatography (TLC): TLC chambers, precoated plates, and UV visualization units are provided for qualitative screening and fingerprint profiling of plant extracts.

B. Characterization and Analytical Facilities

3. HPLC Analysis: High Performance Liquid Chromatography facilities are available for quantitative profiling, purity assessment, and estimation of isolated compounds.
4. HPTLC Analysis: HPTLC systems support fingerprinting and marker compound estimation for quality evaluation and standardization.
5. FTIR Spectroscopy: FTIR facilities are available for functional group identification and structural characterization.
6. UV–Visible Spectroscopy: UV–Visible spectrophotometers are provided for λmax determination and preliminary characterization.

C. Physicochemical and Pharmacological Evaluation

7. Ash Value Determination: Facilities are available for total ash, acid-insoluble ash, and water-soluble ash determination for physicochemical standardization.
8. In-vitro Antidiabetic Activity: Pharmacology laboratories are equipped to conduct in-vitro antidiabetic activity studies for scientific validation.

Faculty Insights

Technological Teaching Methodologies for Generation Z Learners: Innovations, Implications, and Guidelines for College Educators

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HOD, Pharmaceutical Technology,
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Abstract

Generation Z learners, born in an era of pervasive digital connectivity, enter higher education with distinctive learning preferences—multimedia engagement, immediate access to information, personalized learning pathways, and practical relevance. This article examines contemporary technology-enabled teaching approaches suitable for Gen Z in college settings. It also provides a structured framework to guide teachers in preparing effective, engaging, and outcome-oriented classes. Through examples and evidence-based practices, the article highlights the pedagogical shift from traditional lecture-centric models to interactive, student-centered learning ecosystems.

1. Introduction

The higher education landscape is undergoing a remarkable transformation driven by advances in digital technology and the changing characteristics of students. Generation Z (born approximately between 1997 and 2012) represents the first cohort of true digital natives. Their familiarity with smartphones, multimedia content, and on-demand information shapes their expectations inside the classroom [1,2]. As a result, college teachers must adapt by integrating technology-rich pedagogies that accommodate shorter attention spans, preference for visual content, and desire for experiential and collaborative learning [3]. This article discusses key technological teaching methodologies relevant for Gen Z learners and offers practical guidelines for faculty in class preparation and delivery.

2. Technological Teaching Approaches Suitable for Generation Z

Blended and hybrid learning models are particularly effective for Generation Z students because they merge classroom teaching with the flexibility of digital platforms. For example, a teacher may conduct an in-person session on pharmacokinetics and supplement it with short online videos explaining half-life or enzyme induction. This allows students to revisit material at their own pace, aligning with Gen Z's preference for on-demand learning [4].

Microlearning strategies also complement Gen Z learning characteristics by dividing content into brief, visually engaging modules. Instead of a continuous one-hour lecture on drug interactions, multiple 8–10-minute micro-modules with infographics and quick quizzes can improve retention and sustain attention [5].

Gamification and interactive digital tools enhance motivation and participation. Using Quizizz or Kahoot for a "Drug Safety Challenge" turns revision into an engaging competition where students receive instant feedback. These tools align with Gen Z's comfort with game-based digital environments and support active participation [6].

Project-based and experiential learning deepen understanding by enabling students to apply theory in practical contexts. For instance, analyzing a patient case involving polypharmacy helps students identify drug interactions and propose safer therapeutic decisions. Such tasks promote higher-order thinking, which Gen Z learners value [7].

AI-assisted personalized learning platforms also meet individual needs effectively. Tools that generate topic-specific practice questions based on student weaknesses provide targeted support and immediate feedback, which suit Gen Z's expectation for customization and adaptive learning [8].

Collaborative digital platforms such as Google Workspace, Padlet, and Trello foster teamwork and communication—skills essential for modern professions. For example, students working on an antibiotic stewardship project can collaborate on a shared document, brainstorm visually, and coordinate tasks digitally, mimicking real-world collaboration environments [9].

3. Guidelines for Teachers: Preparing Technology-Enriched Classes

Establish Clear and Measurable Learning Outcomes

Teachers should begin by defining specific learning outcomes guiding content selection and assessment. For instance, an outcome like "Students will be able to identify three major drug–food interactions affecting therapeutic outcomes" helps align digital resources and evaluation strategies [10].

Integrate Technology Purposefully

Technology should be thoughtfully chosen to support instructional intent rather than used for novelty. Using a short animation to illustrate enzyme inhibition is more effective than using several unrelated tools, ensuring that digital elements enhance rather than distract from learning [11].

Design Visually Enriched and Structured Learning Materials

Gen Z learners respond strongly to visuals, so digital content should emphasize diagrams, animations, and minimal text. For example, an animated pathway explaining aspirin's mechanism improves understanding more effectively than dense textual slides [12].

Include Frequent Engagement Activities

To sustain attention, teachers should introduce short activities every 10–12 minutes, such as a Mentimeter poll, rapid quiz, pair-and-share, or quick problem-solving exercise. These interactions align with Gen Z's need for continuous engagement [13].

Incorporate Real-Life and Industry-Relevant Examples

Real-world examples enhance meaning and relevance. Discussing a recent drug recall during a pharmacovigilance lecture helps students see the direct impact of regulatory science on patient safety, increasing interest and retention [14].

Ensure Pre-Class Access and Post-Class Review Materials

Uploading slides, notes, and short videos before and after class supports preparation and revision. This is especially valuable for Gen Z learners who prefer flexible, self-paced access to materials [15].

Collect Feedback and Reflect on Practice

Short digital exit slips or reflection prompts help teachers identify areas of student confusion and improve instruction. For example, asking "Which point needs more explanation?" encourages meaningful feedback that enhances teaching quality [16].

4. Conclusion

Effective teaching for Generation Z requires a purposeful shift toward technologically enriched, student-centered pedagogy. Blended learning, microlearning, gamification, AI-driven personalization, and collaborative platforms foster engagement, deeper understanding, and professional readiness. When supported by thoughtful planning—clear outcomes, purposeful technology use, visually structured content, and feedback-driven refinement—these approaches can transform the classroom into a dynamic and future-ready learning environment. Teachers who embrace innovative digital strategies grounded in solid pedagogical principles will be best positioned to meet the evolving needs of Generation Z learners.

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The 2025 Cough Syrup Tragedy: A Public Health Alert on Medicine Safety, Causes, and Preventive Measures

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The 2025 cough syrup tragedy is referring to a major public health incident that occurred in October 2025 in India, mainly in the Madhya Pradesh district of Chhindwara. Several children died after consuming tainted cough syrup formulations, raising awareness of medication safety both domestically and internationally. The total number of reported child deaths ranged from close to 19 to 25, according to initial government announcements, news reports, and alerts issued by international regulatory bodies. Numerous other paediatric patients were hospitalized due to acute illness after consuming the suspected syrups; the final figures varied as investigations continued and more cases were clinically assessed. The primary cause or root of the tragedy in oral liquid pharmaceutical preparations was found to be due to presence Diethylene glycol (DEG), a hazardous industrial solvent that is frequently used in antifreeze and braking fluids but is absolutely forbidden in pharmaceutical products. DEG contamination usually happens when pharmaceutical companies utilize inferior or tainted glycerin or propylene glycol, important excipients in cough syrups, without conducting sufficient quality testing or supplier verification (1). This is frequently

the result of cost-cutting strategies or lax regulatory scrutiny. In this case, contamination was confirmed as the main source of toxicity by laboratory examination of seized syrup samples, which showed DEG levels well over allowable pharmacopeial limits. Clinically, affected children initially showed generalized symptoms like vomiting, abdominal pain, lethargy, and decreased appetite. These symptoms were followed by severe metabolic acidosis, serious kidney damage, neurological complications, reduced production of urine (oliguria or anuria), and, in fatal situations, multi-organ failure. Immediate medical care or management facilities required in such poisoning's cases such as aggressive supportive therapy, fixing of acid–base imbalance, close monitoring of renal function, and prompt administration of alcohol dehydrogenase inhibitors such as fomepizole (or ethanol where fomepizole is unavailable) to prevent generation of toxic metabolites, along with hemodialysis in severe cases to remove the toxin and manage renal failure. From a public health standpoint, the tragedy led to emergency recalls of the recognized cough syrup brands, cancellation of manufacturing licenses, and the World Health Organization's (WHO) and national authorities' issuance of medical product alerts advising the public and medical professionals to stop consuming the affected items right away (2). Investigations were conducted into the pharmaceutical supply chain to identify the source of contaminated excipients, analyse the manufacturing practices, and identify regulatory violations, while legal action was initiated against concerned manufacturers and suppliers. The incident emphasizes the urgent need for strict precautionary and preventive measures, such as requiring the use of pharmacopeial-grade excipients, testing incoming raw materials (particularly glycerin and propylene glycol for DEG/ethylene glycol contamination), rigorous supplier qualification and inspection, batch-wise quality control testing of completed liquid formulations, and reliable pharmacovigilance systems for early detection of adverse drug reactions. In cases of unexplained pediatric acute kidney injury, hospitals and physicians must keep a high index of awareness for toxic alcohol poisoning, and pharmacists and healthcare facilities should only purchase medications from reliable, licensed sources with thorough documentation. It is equally important to raise the public's awareness of the risks of unreliable medications, to report bad events as soon as possible, and to react quickly to official drug recalls (3). Overall, the 2025 cough syrup tragedy serves as a sobering reminder that mistakes in pharmaceutical quality control can have deadly repercussions and emphasizes the shared responsibility of producers, authorities, medical professionals, and organizations in ensuring the safety, effectiveness, and quality of medications, especially those meant for vulnerable populations like children (4).

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Turn Vision into Venture

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Business development intent amongst students has foundational role in shaping entrepreneurship and fostering national economic growth, through job creation, research, innovation, securing intellectual property by evolving an interrelated, conceptual, educational and socio-economic perspective. Educational institutions in collaboration with industry, therefore could play a significant role as true motivators for students' entrepreneurial ambitions, by turning their vision into a commercially feasible ventures in near future.

Effective and fruitful Industry-Academia engagement can thus collectively aim to develop:

- Entrepreneurial mindset
- Business planning skills
- Financial and digital literacy
- Marketing and operational understanding
- Access to mentors, funding, govt and non-govt grants and schemes
- Confidence to start own businesses

On doing so, students can build their practical business skills in sales, marketing, finance, product development, compliances, through mentorship C expert guidance which in turn help to reduce startup failure risk in a large extent. Structured business planning and funding support can further help to validate ideas, calculate costs, and create revenue strategies. Multiple frameworks including entrepreneurial event model, positive perception towards creativity, self- efficacy, risk taking capacity, autonomy, need for achievement and resilience would help to shape students' intentions to launch ventures.

University and academic Institutions need to provide an entrepreneurial ecosystem which indeed requires a multidimensional approach integrating education, infrastructure, mentorship, industry linkage and culture.

1. **Integrating entrepreneurship into mainstream curriculum**
    a. Interdisciplinary Education: A holistic educational approach that should extend beyond business schools, embedding entrepreneurial mindset into engineering, life sciences, arts, humanities and STEM curricula encouraging innovations across disciplines.
    b. Experimental learning: Students need to engage themselves in real world projects, simulations, and problem-solving exercise to build practical skills and business competencies.
    c. Development of Entrepreneurial Mindset: Courses should promote resilience, adaptability, risk-taking, creativity, and self-dependence, equipping students to navigate uncertain, complex and ambiguous business environment.
2. **Establishment of Dedicated Entrepreneurial Spaces**

a. Innovations Hubs and Laboratories: Universities can create co-working spaces, and incubation centres where students can develop prototypes, collaborate across disciplines and can receive necessary mentorship from industry. Such centres can host Ideathons, workshops, pitching competitions, success stories, lecture series, etc., to facilitate community and idea exchange for industrial handholding and capacity development. High quality physical and logistic infrastructure including dry and wet labs, maker spaces, digital, software and hardware-based tools can support venture creation and network building.
b. Incentivizing Faculty Involvement: Recognizing contributions of the faculties to entrepreneurial mentorship and startup creation within academic evaluation system would be beneficial to build a supportive entrepreneurial culture in the campus.

3. **Industry-Academia Partnership**
    a. Faculty and Alumni Mentorship: Experienced industrialists, leading startups, alumni entrepreneurs could handhold for long- and short-term skill development courses, industry-ready training modules and provide guidance, exchange knowledge, and can share feedbacks. Regional industry personnel can align students with local economic priorities, evolving markets, customer needs, hotspot areas, pros and cons, and many more, to catalyze local startup developments of maximum impact with minimum resource dilution.
    b. Industry Connection: Universities should facilitate partnership with local businesses, notable startups, venture capitalists, industry experts, government and non-government agencies to create pathways for collaborations.
    c. Entrepreneurial Events: Hackathons, startup weekends, accelerator programmes, and business contest could foster peer learning and enable access to early-stage funding for developing prototype.
4. **Financial Support**
    a. Seed Funding and Grants: To allocate dedicated university funds, to collaborate with government and non-government programme, meetup or round table event between students to investors can mitigate financial blockades.
    b. Support for Intellectual Property: Offer guidance to file patent, IP compliances and licensing to protect innovations developed by students and faculties will be helpful.
5. **Continuous Monitoring**
    a. Rigorous Evaluation: Regular evaluation to track outcomes as startup launched, patent filed, venture growth, service scale, customer engagement, revenue generation will ensure students' competence in commercial field.
    b. Taking Feedback: Incorporate insights from students, industry collaborators to refine programmes and infrastructure for greater effectiveness along with incorporation of effective business personnel to take classes, involving them as advisors in board of studies and policy making team, would be beneficial to develop an overall startup ecosystem within academic environment.

Conclusion

To augment the entrepreneurial ecosystem, universities must adopt holistic strategies combining educational innovation, supportive infrastructure, mentorship, cultural transformation and strategic external industrial linkages. Implementation of such structured framework fosters resilient, innovative and socially

impactful student entrepreneurs capable of contributing meaningfully to nation-building and economic growth. Truly, Vision towards the creation of Venture is strongly influenced by a complex interplay of personal traits, educational exposure, and social context, where academic institutions remain central to nurture to empower the students, that can bridge their vision with successful entrepreneurial outcome in all possible way.

'One Health' approach for mitigation of antimicrobial resistance

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Introduction

Antimicrobial resistance is the condition when the commensal or pathogenic bacteria present in the host body do not respond to the antimicrobials. Consequently, the lifesaving antimicrobials become useless and ineffective. The presence of resistant bacteria in the environment is the primitive phenomenon, detected even before discovery of antibiotics. It is the survival strategy of the commensal bacteria present in soil or water against the natural antimicrobials released by other groups of soil microbes. The scientists found 30,000-year-old permafrost DNA possessing antimicrobial resistance genes for penicillin, tetracycline, and glycopeptides, proving these mechanisms are ancient (D'Costa et al., 2011). The natural phenomenon becomes the devil for the community when we start to use antimicrobials indiscriminately resulting selection and spreading of the resistant bacteria. In human, over prescription of antimicrobials is the major source of selection for antimicrobial resistant bacteria but use of antimicrobials in food /companion animals, aquaculture, and agriculture, and moreover, environmental resistance gene pool ('resistome') also plays important roles in this complex multi-factorial process. Further, human and animal population are at risk of cross-transmission of zoonotic bacteria via direct contact due to proximity with food animals, companion animals, live wildlife market, environment, and intake of contaminated animal origin food items. The situation becomes more complicated due to cross-transmission of antimicrobial resistance (AMR) determinants along with the infection.

AMR leads to enormous financial losses associated with high morbidity, mortality, man-day loss, hospital length of stay (LOS), direct health-care costs, and social costs of infection (Wozniak et al., 2019). About 700,000 deaths per year were attributed to AMR alone that is more than the toll caused by malaria, acquired immunodeficiency syndrome (AIDS) and tuberculosis (O'neill, 2014). World health organization (WHO) identified eight pathogens relevant to AMR, among them five are pathogenic or commensal bacteria (*Klebsiella pneumoniae*, *Escherichia coli*, *Staphylococcus aureus*, *Neisseria gonorrhoeae*, *Mycobacterium tuberculosis*) (WHO, 2018). The third-generation cephalosporin-resistant and carbapenem-resistant *Enterobacteriaceae* (CRE, e.g. *Escherichia coli* and *Klebsiella pneumoniae*) alone were reported to cause

6.4 million bloodstream infections and 50.1 million serious infections worldwide in a year (Temkin et al., 2018). A recent estimate suggested 33,000 annual deaths due to AMR in European Union and European Economic Area (Cassini et al., 2019). Additional treatment cost and loss due to methicillin-resistant *Staphylococcus aureus* (MRSA), third-generation cephalosporin-resistant and ESBL-producing *Enterobacteriaceae* ranged between 1732-9726 USD and 2.54-6.8 days per case, respectively (Wozniak et al., 2019). For the United States alone, average national health care expenditure was estimated at around 2.2 billion US Dollar due to AMR (Thorpe et al., 2018).

Addressing AMR in developing countries was considered crucial by the United Nations to attend sustainable development goals (SDGs) associated with poverty and hunger alleviation and improvement of health and economic growth. In low-and-middle-income countries (LMICs) such as India, the current rate of AMR related infections is high and is projected to grow more rapidly than the developed countries. A substantial portion (40-60%) of human bacterial infections in Brazil, the Russian Federation and India are associated with resistant bugs in comparison to developed countries (17%) (OECD, 2018). In LMICs the direct and prominent effects of AMR includes increased mortality in addition to higher morbidity and economic losses (Okeke et al., 2005). The recent projection about the financial vulnerability of LMICs revealed that additional 19 million people are going to fall into great poverty by 2030 due to AMR producing direct impacts on labour productivity (neat GDP produced by one hour labour) and increased health care costs (Ahmed et al., 2017).

Areas to be focused for mitigation of AMR

Substitution of antimicrobial use (AMU)

AMU is the single most important driver for AMR; therefore, attempts are on to slowly reduce or phase out the antimicrobials specially in veterinary medicine, aquaculture or agriculture, if not possible in one go. The alternative anti-infective strategies such as nano-material based anti-infective particles, enzymes, antimicrobial peptides, quorum sensing quenchers, efflux pump inhibitors, clay, predatory bacteria, teat sealants, and antimicrobial photodynamic therapy are in pipeline to be evaluated at field level. The supplementation of essential oils and spices as alternative to antimicrobials was reported to have beneficial health effect in poultry farm (Pathak et al., 2017; Chowdhury et al., 2018).

Raising awareness

Raising awareness among the community is the primary step to curb down the problem. It should be started from the school level, so that the children can teach their parents after returning home few basic strategies like consultation of a formal physician or veterinarian to treat the illness of them or their pets, not to take antibiotics without prescription, maintenance of personal hygiene, cleanliness of home, neighbourhood, rooms of livestock/companion animals etc.

FAO referred the farmers as “important frontline defenders” for the vital role they can play in stemming the spread of AMR by adopting good hygienic farm operations. Increasing awareness among the farmers by imparting basic knowledge may help reduce the unnecessary and indiscriminate antimicrobial use in food animals (Ferdous et al., 2019). Changing the farmers’ behaviour require multiple supportive measures, like incentive to the farmers raising livestock without antibiotics, subsidized insurance to make up losses, implementation of strict drug regulation, and establishment of a strong network of veterinary healthcare facilities accessible to rural farmers in LMICs. The mobile veterinary clinic was introduced by Government of India to reach out to the country’s remote corners.

Implementation of Government legislation

FAO identified strong government legislation as the most important component in addressing the overuse, misuse or abuse of antimicrobials. Such legislations are essential for defining the responsibilities and duties of all the stakeholders, and for sustainability of the policies and technical objectives aiming for reducing AMR (Caudell et al., 2020).

Surveillance of AMU and AMR

Many of the developed countries such as Norway, Japan, Denmark, Canada, the USA, Finland, the Netherlands, and France have articulated national surveillance programme (NORM-VET, JVARM, DANMAP, CIPARS, NARMS, FINRES-VET, NethMap-MARAN, ONERBA- RESAPATH and SWEDRES-SVARM) and the policies on AMU in animals are tailored based on the data generated from their networks. Most of the LMICs have no surveillance in place to monitor the antimicrobial consumption in animals. Government of India adopted the National Action Plan (NAP) on AMR and strongly recommended need for strong regulatory framework for restricting the AMU in animals. The Pan-India Network – ICAR-Indian Network for Fisheries and Animal Antibiotic Resistance (INFAAR, currently known as AINP-AMR) was initiated by Indian Council of Agricultural Research in collaboration with FAO to cater the objectives laid down in India's NAP on AMR.

Social studies

Antimicrobial resistance cannot be categorized as a scientific problem only but it is also considered as a social menace. The spread of AMR is largely dependent on human behaviour, influenced by cultural, social, political, and economic factors (Wood, 2016). Hence it is needed to join the hands with social scientists to find out the solution for the problem.

One Health

One Health is a comprehensive and cohesive strategy that acknowledges the interconnectedness of human, animal (domestic/livestock and wild), plant, and environmental health, along with the ecosystems they occupy. The increasing frequency and complexity of health risks are being driven by climate change, ecological damage, changes in land use, and heightened interactions between humans, animals, and the environment. These escalating challenges necessitate coordinated, multisectoral approaches that facilitate the prompt detection, prevention, and management of emerging threats including AMR. The Government of India has launched the National One Health Mission (NOHM) with the objective of fostering coordinated action across sectors to strengthen disease surveillance, enhance pandemic preparedness, and ensure integrated health for humans, animals, and the environment.

The One Health approach can take a lead role in controlling antimicrobial resistance (AMR) by integrating human, animal, and environmental health sectors to address the complex and interconnected drivers of AMR (Samanta and Bandyopadhyay, 2019; Samanta et al., 2024). The key approaches are as follows.

- Cross-sectoral Collaboration: One Health promotes coordinated efforts among healthcare, veterinary, agricultural, and environmental disciplines to monitor and manage antimicrobial use and resistance patterns comprehensively.
- Surveillance and Data Sharing: Establishing integrated surveillance systems across humans, animals, and the environment enables early detection of resistant pathogens, tracking transmission pathways, and informed policy-making.
- Prudent Antimicrobial Use: By harmonizing guidelines and stewardship programs across medical and veterinary fields, One Health reduces unnecessary or inappropriate antimicrobial use, a major factor in resistance development.

- Environmental Controls: Addressing environmental reservoirs of resistance, such as wastewater and agricultural runoff, through One Health interventions helps limit the spread of resistant genes outside clinical or farm settings.
- Education and Awareness: One Health fosters joint education campaigns targeting healthcare providers, farmers, and the public to promote responsible antimicrobial practices and hygiene measures.
- Research and Innovation: Collaborative research under the One Health framework accelerates understanding of AMR mechanisms, risk factors, and effective interventions that span species and ecosystems.

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Trametes versicolor **–a potent fungus having enormous biological importance.**

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Trametes versicolor, commonly referred to as the "turkey tail" mushroom, is a well-known medicinal macro fungus recognized for its broad pharmacological potential and diverse range of phytochemicals. This article compiles and critically evaluates current literature regarding the morphological, microscopic, chemical, and biological characteristics of T. versicolor to offer a thorough understanding of its therapeutic importance. In terms of morphology, the species features a fan-shaped, multi-hued fruiting body with concentric rings of different colours and a velvety surface, while microscopic analysis reveals a dimitic hyphal structure consisting of both generative and skeletal hyphae, along with cylindrical and smooth basidiospores. Phytochemical research has discovered a variety of bioactive components, including polysaccharopeptides (PSP and PSK), β-glucans, phenolic substances, triterpenoids, flavonoids, sterols, and glycoproteins. These compounds have been characterized via chromatographic and spectroscopic methods such as FTIR, HPLC, GC–MS, and NMR, emphasizing their structural variety and functional intricacy. The presence of protein-bound polysaccharides, specifically PSK and PSP, has been significantly associated with immunomodulatory, antioxidant, anticancer, antimicrobial, and hepatoprotective properties. Biological assessments indicate that extracts of T. versicolor display notable **radical scavenging, anti-inflammatory, cytotoxic, and antimicrobial effect**s, which are facilitated through the modulation of immune pathways and mechanisms of oxidative stress. Additionally, the constituents of the mushroom demonstrate potential synergistic effects that enhance the immune defences of the host and inhibit tumour growth. Despite the extensive studies conducted, standardizing extraction techniques, isolating compounds, and conducting bioactivity assays continues to be a challenge. This review highlights the significance of T. versicolor as a valuable source of natural therapeutic agents and emphasizes the necessity for enhanced phytochemical profiling, mechanism-oriented biological research, and clinical validation to fully exploit its pharmacological potential.

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Unexpected, Unusual, Unforgettable: Weird Cases of Medical Science

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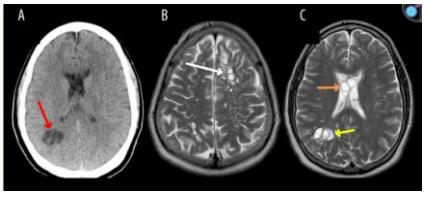
Case 1: An unusual pet house [1]

In 2023, The New England Journal of Medicine revealed that live arthropods may hide and even molt in ear canals. A 64-year-old lady described four days of "abnormal sounds" and a shifting feeling in her left ear. An ENT/endoscopy revealed a little living spider with its molted exoskeleton caught in the external auditory canal. The doctor performed an ENT suction endoscopy, which subsequently eased symptoms; no tympanic membrane injury was found.

Case 2: Mommy was right: Get your food always cooked [2]

In 2024, A man in middle age from the United States with persistent migraines observed a shift in his headache pattern; brain imaging revealed several cystic lesions; later serology and imaging verified neurocysticercosis (Taenia solium larval cysts). History indicated that the proposed source was undercooked/soft bacon he frequently had. Patient then eventually received antiparasitic-anti-inflammatory medication and may have sworn never to eat undercooked bacon again.



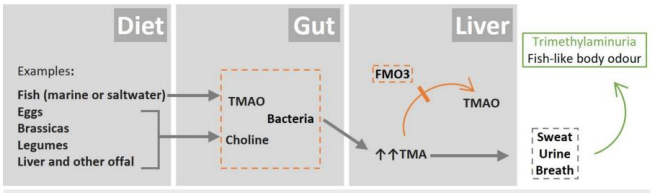
Case 3: Buddy won't get sex anymore [3]

A male patient consistently got flu-like and allergy symptoms following ejaculation (hours to days). Evaluation revealed an immunologic (allergic) mechanism in certain POIS (Post orgasmic illness

syndrome) individuals; therapy with an antihistamine resulted in clinical improvement. Reported in Urology case report in 2022.

Case 4: The mermaid boy [4]

In February 2025, Springer Nature reported that a previously healthy 3-year-old Portuguese kid acquired bouts of rotting-fish body odor everytime he ate fish. Genetic tests showed. A rare metabolic condition caused by diminished flavin-containing monooxygenase 3 activity, which leads to trimethylamine accumulation. This juvenile instance demonstrated a transitory type of TMAU, with developmental enzyme immaturity as a contributing factor. His symptoms subsided as he grew older. Similar occurrences were recorded in 1976, 2007, and 2011.[5,6,7]



Case 5: Alpha-Gel syndrome: Red meat or the poison? [8]

December 2025, Elsevier publication - The journal of Allergy and Clinical Immunology: In Practice reported a deadly food allergy attack. A young guy died of anaphylaxis about four hours after eating beef, which was the result of alpha-gal syndrome, a rare allergy caused by tick bites. Alpha-gal responses, unlike traditional food allergies, are delayed, frequently appearing hours after intake, making them difficult to identify and treat quickly. This instance, the first well-documented lethal consequence of the illness, demonstrates that delayed responses can be equally harmful as acute ones. The research study suggests for increased awareness, early diagnosis, and strict avoidance of red meat in vulnerable persons. In this case, a post-mortem investigation revealed results consistent with fatal anaphylaxis, including significantly raised alpha-gal-specific IgE levels, with no other cause of death detected.

[Disclaimer Note: All the figures are originally copyrighted by cited authors]

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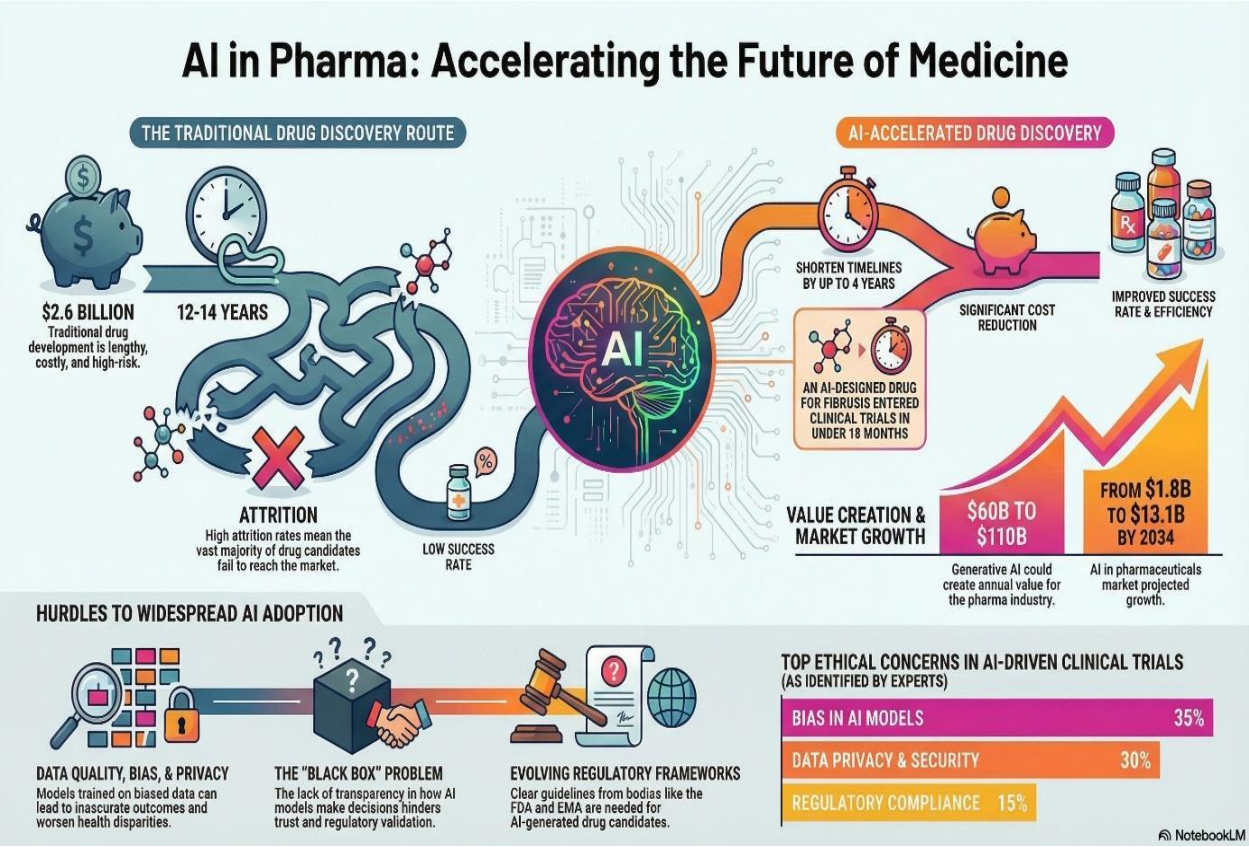
Current Perspectives in Pharmacy

From slow pathways to smart solutions: AI in Drug Discovery



This infographic — thoughtfully prepared using **NotebookLM** — illustrates how artificial intelligence is reshaping pharmaceutical drug development. It contrasts the slow, costly, and failure-prone traditional pathway with AI-driven approaches that streamline decision-making, shorten timelines, reduce expenses, and increase the likelihood of successful drug candidates. While it also recognizes challenges such as data bias, privacy, transparency, and regulation, the visual clearly shows AI's enormous potential. Importantly, at the **Department of Pharmaceutical Technology**, we have already begun integrating these AI tools into our research, analysis, and presentations, strengthening innovation and preparing our students and scholars for the future of modern pharmaceutical science.

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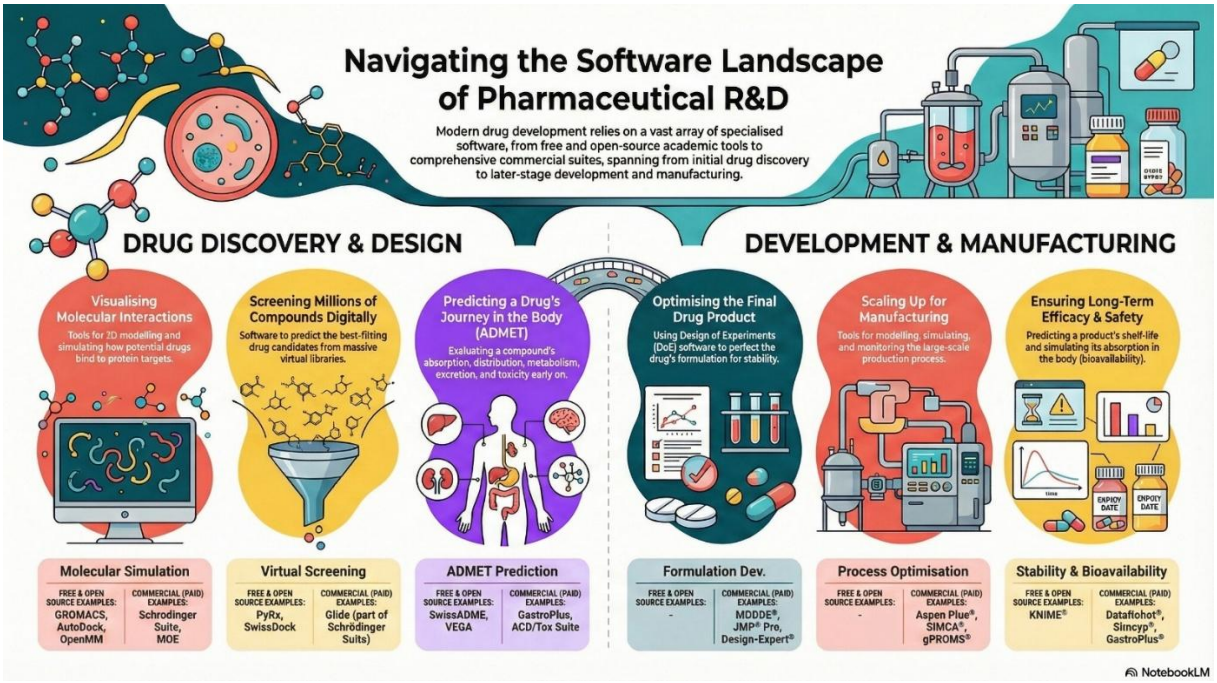
AI-powered tools transforming pharmaceutical research and drug development



This illustration highlights an extensive ecosystem of **computational and AI-driven software tools** designed to support every stage of **pharmaceutical research and drug development**, ranging from early drug discovery and molecular design to formulation development, manufacturing, and long-term safety evaluation. By utilizing advanced techniques such as molecular simulation, virtual screening, ADMET prediction, and process optimization, scientists can design and evaluate thousands of drug candidates in a **virtual environment** before they ever enter a laboratory or clinical trial.

These AI-based tools significantly minimize the reliance on traditional trial-and-error approaches using physical materials, thereby reducing time, cost, and resource consumption while improving research efficiency and accuracy. The integration of such digital technologies enhances predictive decision-making, accelerates innovation, and contributes to the development of safer and more effective medicines.

*This infographic has been prepared using **NotebookLM**, highlighting the role of AI-assisted tools in knowledge visualization and scientific communication.*

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Key AI and computational tools used in pharmaceutical sciences

Application Area	Software / Tool	Primary Purpose	Developer / Source	Access Type
Molecular Modeling & Docking	Discovery Studio, Materials Studio, InsightII, Accord, Prime, Jaguar	3D protein modeling, molecular simulation, protein–ligand interaction studies	BIOVIA (Dassault Systèmes)	Paid (academic licenses available)
	Schrödinger Suite (Glide, MacroModel, Desmond)	Structure-based drug design, docking, molecular dynamics	Schrödinger LLC	Paid
	AutoDock	Molecular docking of ligands with target proteins	The Scripps Research Institute	Free & Open Source
	MOE (Molecular Operating Environment)	Cheminformatics, bioinformatics, molecular modeling	Chemical Computing Group (CCG)	Paid
	Sybyl-X	Computational drug discovery and molecular modeling	Certara	Paid
Virtual Screening	PyRx	Virtual screening of compound libraries	PyRx Project	Free & Open Source
	SwissDock	Web-based protein–ligand docking	Swiss Institute of Bioinformatics	Free
	Click2Drug (BREED, LeadGrow, CoLibri)	Virtual library generation and lead optimization	Click2Drug Platform	Free (academic)
QSAR & ADMET Prediction	TOPKAT	Toxicity and QSAR prediction	BIOVIA	Paid
	VEGA	QSAR-based toxicity and property prediction	VEGA Hub	Free
	ACD/Tox Suite	ADMET and toxicity prediction	ACD/Labs	Paid
	SwissADME	Pharmacokinetics and drug-likeness prediction	Swiss Institute of Bioinformatics	Free
	TandemADMET	ADMET and toxicity modeling	Tandem Labs / XenoTech	Free (academic) / Paid
Binding Site Prediction	ConCavity	Protein binding-site prediction	Academic (GitHub)	Free
	SplitPocket	Identification of ligand-binding pockets	National Taiwan University	Free

	PepSite 2	Peptide–protein interaction site prediction	University of Dundee	Free
Formulation Development (QbD & DoE)	MODDE®	QbD-based formulation optimization	Sartorius (Umetrics)	Paid
	JMP® Pro	Predictive analytics and formulation design	SAS Institute	Paid
	Design-Expert®	Design of experiments and optimization	Stat-Ease	Paid
Process Optimization & Manufacturing	SIMCA®	Multivariate data analysis, PAT	Sartorius	Paid
	Aspen Plus®	Process simulation and optimization	AspenTech	Paid
	gPROMS®	Process modeling and simulation	Process Systems Enterprise	Paid
Stability & Shelf-Life Prediction	DataRobot®	AI-based stability modeling	DataRobot	Paid
	KNIME®	Predictive degradation and data analytics	KNIME AG	Free (core) / Paid
PK, PBPK & Bioavailability	GastroPlus®	PBPK and absorption modeling	Simulations Plus	Paid
	Simcyp®	Pharmacokinetic simulation	Certara	Paid
Molecular Dynamics Simulations	GROMACS	High-performance biomolecular MD	GROMACS Consortium	Free & Open Source
	AMBER	Force-field-based biomolecular MD	AMBER Consortium	Free (academic) / Paid

The following table presents a **curated and systematically organized overview of AI-driven and computational software tools** widely used across different stages of **pharmaceutical research and drug development**. These tools support molecular modeling, virtual screening, ADMET prediction, formulation optimization, process control, and pharmacokinetic simulations. The table has been **rectified for clarity, consistency, and academic presentation**, grouping tools by application domain and clearly indicating their source and access type.

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Emerging Antimicrobial Resistance trends in India (August–December 2025)

Sl. No.	Drug Name	Molecule Class	Antimicrobial Category (WHO AWaRe)	Reported Resistance (Month/Year)	Key Mechanism / Reason for Resistance	Source
1	Meropenem	Carbapenem	Antibiotic	Dec 2025	High prevalence of NDM-1 (New Delhi metallo-β-lactamase) in *Acinetobacter baumannii*, rendering ICU infections difficult to treat	ICMR-AMRSN Annual Report 2025; WHO GLASS 2025
2	Fluconazole	Triazole	Antifungal	Dec 2025	Increasing resistance in *Candida auris*, posing a persistent threat in Indian ICUs	ICMR AMR Network 2025; *The Hindu* Health Update
3	Ciprofloxacin	Fluoroquinolone	Antibiotic	Nov 2025	>95% resistance in *Salmonella Typhi* due to GyrA/ParC mutations driven by long-term oral misuse	WHO GLASS 2025 (India); *The Lancet* 2025
4	Ceftriaxone	3rd-Generation Cephalosporin	Antibiotic	Oct 2025	Widespread ESBL production in *E. coli* isolated from urinary tract infections	ICMR-AMRSN Annual Report 2025
5	Levofloxacin	Fluoroquinolone	Antibiotic	Oct 2025	Mutations in QRDR and plasmid-mediated quinolone resistance (PMQR) genes in *E. coli*	*Gut Pathogens* 2025; *Antibiotics* Vol.14

6	Linezolid	Oxazolidinone	Antibiotic	Oct 2025	cfr gene-mediated ribosomal methylation in resistant *Staphylococcus aureus* (MRSA)	*Antibiotics* 2025; ICMR Data
7	Colistin	Polymyxin	Antibiotic	Sept 2025	Emergence of mcr-1 plasmid-mediated resistance, compromising last-resort therapy	*MDPI Antibiotics* 2025; ICMR Surveillance

This table highlights critical antimicrobial resistance patterns reported in India between August and December 2025, underscoring the growing threat to effective infectious disease management and the urgent need for antimicrobial stewardship.

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Alert on Spurious Drugs reported in India (August–December 2025)

Sl. No.	Drug / Product Name	Batch No.	Date of Manufacture	Date of Expiry	Testing Laboratory (State)	Reason for Failure	Regulatory Remarks
1	Pantoprazole Gastro-resistant Tablets IP (PAN 40)	24440478	Feb 2024	Jul 2026	Regional Drugs Testing Laboratory (RDTL), Chandigarh	Under investigation	Manufacturer reported the batch was not manufactured by them
2	Telmisartan Tablets IP 40 mg (Telma 40)	18240413	May 2024	Apr 2027	RDTL, Chandigarh	Under investigation	Manufacturer denied production of the batch
3	Chymotrypsin Tablets (Chymoral Forte)	2KU6L057	Dec 2024	Nov 2027	Central Drugs Laboratory (CDL), Kolkata	Under investigation	Batch confirmed as not manufactured by the claimed firm
4	Chymotrypsin Tablets (Chymoral Forte)	2KU6L030	Jul 2023	Jun 2027	CDL, Kolkata	Under investigation	Manufacturer denied authenticity of batch

5	Buprenorphine Injection 2 ml (Noophin)	LM 18907	Jul 2023	Jun 2029	CDL, Kolkata	Under investigation	Manufacturer denied manufacturing the stated batch
6	Diazepam Injection IP 1 ml	DA-2403	Mar 2024	Feb 2026	Drugs Inspector, Bihar	Under investigation	Regulatory verification ongoing
7	Pantoprazole Gastro-resistant Tablets IP (PAN 40)	24440993	Mar 2024	Aug 2026	Drugs Inspector, Bihar	Under investigation	Regulatory verification ongoing
8	Pantoprazole + Domperidone Capsules IP (PAN-D)	23443507	Sep 2023	Aug 2025	Drugs Inspector, Bihar	Under investigation	Regulatory verification ongoing

This table summarizes drugs and pharmaceutical products declared spurious during August–December 2025, highlighting serious concerns related to counterfeit manufacturing, patient safety, and regulatory compliance in the Indian pharmaceutical supply chain.

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Drug Information Bulletin

DRUG INFORMATION CENTRE
Department of Pharmaceutical Technology
BRAINWARE UNIVERSITY

New Drugs Approved in 2025

Drug Information Summary

Sl. No	Drug Name	Indication	Common Side Effects	Adverse Effects	Contraindic-ations	Drug–Drug Interactions	Food–Drug Interaction	Storage
1	Letermovir	CMV prophylaxis in HSCT and high-risk kidney transplant recipients	Nausea, diarrhea, headache	Atrial fibrillation, ↑ liver enzymes	With pimozide, ergot alkaloids	Tacrolimus, cyclosporine (OATP/CYP3A)	No significant interaction	Below 30 °C
2	Fexuprazan HCl	Erosive esophagitis	Diarrhea, nausea	↑ liver enzymes (rare)	Hypersensitivity	Minimal	No significant interaction	Room temperature
3	Edoxaban	NVAF stroke prevention; DVT/PE	Bleeding, anemia	Major hemorrhage	Active bleeding	P-gp inhibitors (verapamil)	No significant interaction	Below 30 °C
4	Sodium Zirconium Cyclosilicate	Hyperkalemia	Edema, hypokalemia	GI discomfort	Bowel obstruction	↓ absorption of oral drugs	No significant interaction	Room temperature
5	Rimegepant	Acute migraine	Nausea, abdominal pain	Hypersensitivity	Severe hepatic impairment	CYP3A4 inhibitors	Avoid grapefruit	Below 30 °C
6	Doravirine	HIV-1 (treatment-naïve)	Dizziness, nausea	Immune reconstitution	With strong CYP3A inducers	Rifampicin, carbamazepine	No significant interaction	Room temperature
7	Tucatinib	HER2+ metastatic breast cancer	Diarrhea, fatigue	Hepatotoxicity	Severe hepatic impairment	CYP2C8 inhibitors	No significant interaction	Below 30 °C

8	Zanubrutinib	MCL, WM, MZL, CLL/SLL, FL	Neutropenia, bruising	Hemorrhage, infection	Hypersensitivity	CYP3A inhibitors	Avoid grapefruit	Room temperature
9	Linaclotide	Chronic idiopathic constipation	Diarrhea, pain	Severe dehydration	<6 yrs, GI obstruction	None significant	Empty stomach	Room temperature
10	Siponimod	Secondary progressive MS	Headache, HTN	Bradycardia, macular edema	Cardiac disorders, CYP2C93/3	CYP2C9 inhibitors	No significant interaction	Refrigerate before opening
11	Ivosidenib	IDH1-mutant AML, cholangiocarcinoma	Fatigue, nausea	QT prolongation	Hypersensitivity	QT-prolonging drugs	Avoid high-fat meals	Below 30 °C
12	Tegoprazan	GERD, gastric ulcer	Headache, diarrhea	↑ liver enzymes	Hypersensitivity	Minimal	No interaction	Room temperature
13	Relugolix + Estradiol + Norethindrone	Heavy menstrual bleeding (fibroids)	Hot flushes, headache	Thromboembolism	Pregnancy, cancer	CYP3A inducers	With or without food	Below 30 °C
14	Lu-177 Vipivotide Tetraxetan	mCRPC (PSMA-positive)	Fatigue, nausea	Myelosuppression	Severe renal impairment	Nephrotoxic drugs	Not applicable	Radiopharmaceutical guidelines
15	Upadacitinib	Ulcerative colitis	URTI, acne	Serious infections, thrombosis	Active infections	Strong CYP3A4 inhibitors	No significant interaction	Room temperature
16	Pitolisant	Narcolepsy (EDS/cataplexy)	Insomnia, headache	QT prolongation	Severe hepatic disease	CYP2D6/CYP3A4 drugs	No significant interaction	Below 30 °C
17	Etrasimod	Ulcerative colitis	Bradycardia, headache	Infections	Cardiac disorders	Antiarrhythmics	No interaction	Room temperature
18	Erdafitinib	FGFR-altered urothelial cancer	Stomatitis, hyperphosphatemia	Ocular toxicity	Hypersensitivity	CYP2C9/CYP3A4	Avoid high-phosphate food	Below 30 °C

This table presents a comprehensive yet concise summary of selected newer and clinically important therapeutic agents used across diverse disease conditions, including infectious diseases, cardiovascular disorders, oncology, neurology, gastroenterology, and immunological conditions. It systematically outlines each drug's approved indication, commonly observed side effects, serious adverse reactions, major contraindications, and clinically relevant drug–drug and food–drug interactions. In addition, recommended storage conditions are included to emphasize the importance of proper handling and stability of pharmaceutical products. By integrating pharmacological efficacy with safety considerations and interaction profiles, the table serves as a practical reference for students, healthcare professionals, and academicians. It supports rational prescribing, promotes patient safety, and aids in minimizing adverse outcomes arising from inappropriate drug use or interactions. Overall, this compilation reflects current therapeutic advances and reinforces the need for informed, evidence-based decision-making in modern pharmaceutical and clinical practice.

References

• US FDA – Drugs@FDA Prescribing Information • European Medicines Agency (EMA) – SmPC • AHFS Drug Information • Lexicomp & Micromedex Databases • National Formulary of India (NFI)

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Artwork details-

Marilyn Monroe: timeless allure, timeless contradictions

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Tranquil Afternoon on a City Street

By

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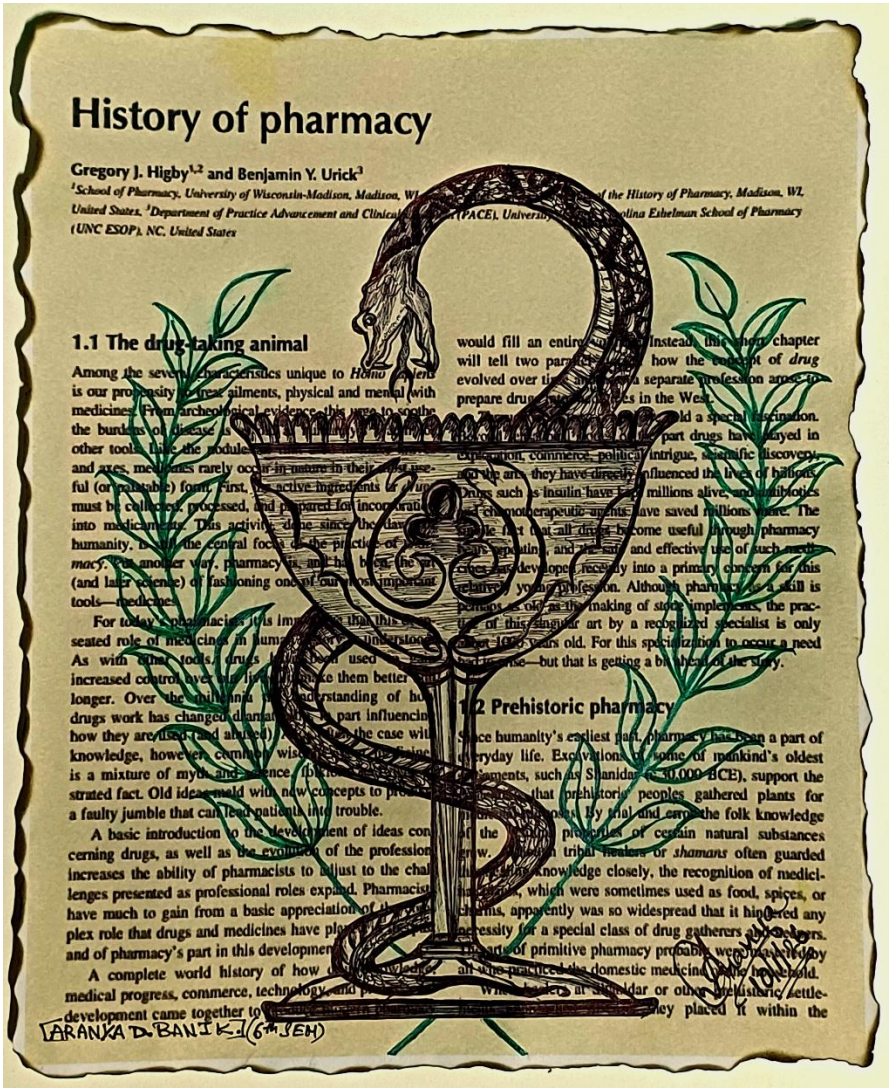
Student's Artwork



Artwork details-

Roots of Remedy: Tracing the History of Pharmacy

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The upcoming conference titled "Integrating Indian Knowledge Systems in Pharmaceutical Sciences: Bridging Tradition and Modern Medicine with AI-Enabled Approaches," organized by the Department of Pharmaceutical Technology at Brainware University, aims to encourage teamwork and new ideas by

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