



Editorial Board

Patrons

Dr. K.G. Raghavendra
M.B.B.S., DLO
Dr. Radhesh K R
M.B.B.S., MS (ORTHO)

Advisor

Dr. Bheemachari
M.Pharm., PhD
Principal
ACOP, Tumkur

Editor

Mrs. Raziya Begum

Members

Mrs. Firdos Sultana
Mrs. Bindu C
Ms. Pooja R
Ms. Likhitha V
Ms. Harshitha Devi SB
Ms. Chitrashree
Mr. Nagaraj Guptha SE

::: IN THIS ISSUE :::

-  From Principal Desk
-  Integration of AI, blockchain and python in India's pharmaceutical industry—consequent impact on employment & socioeconomic status
-  Fresher's Day Celebration – 2025 Batch
-  New frontiers in the treatment of alzheimer's disease — gene therapy, TPD, nanomedicine, immunotherapy and cell therapy
-  Celebration of International Yoga Day-2025
-  Recent advances in green chemistry approaches for pharmaceutical synthesis
-  International day against Drug Abuse
-  Vaccines and antiviral chemistry: Protecting the world at the molecular level
-  Blood Donation camp
-  International Doctors day celebration
-  3D nature meets nanotech: a new hope for cancer treatment-Herbal Nanocarriers for Cancer Therapy
-  Emergency Health Awareness Drive
-  Myth and Fact on Medicines
-  How environment impacts drug metabolism the hidden variable in pharmacology
-  Expert talk on Professional Insights
-  Celebration of World Pharmacists Day
-  Celebration of 64th National Pharmacy Week
-  3rd National cGMP Day Celebration
-  74th Indian Pharmaceutical Congress-reminiscences
-  Infrastructure and academic amenities

* * * * *



Hearty Congratulations to College Toppers

RGUHS Exams-Oct / Nov 2025

B.Pharm Second Semester



SGPA - 8.07

AISHWARYA KALAGI



SGPA - 7.90

REKHA IRANNA G



SGPA - 7.86

BHOOMIKA PM

Management, Principal & Staff
Aruna College of Pharmacy Tumkur





Editorial Board

Patrons

Dr. K.G. Raghavendra
M.B.B.S., DLO

Dr. Radhesh K R
M.B.B.S., MS (ORTHO)

Advisor

Dr. Bheemachari
M.Pharm., PhD

Principal
ACOP, Tumkur

Editor

Mrs. Raziya Begum

Members

- Mrs. Firdos Sultana
- Mrs. Bindu C
- Ms. Pooja R
- Ms. Likhitha V
- Ms. Harshitha Devi SB
- Ms. Chitrashree
- Mr. Nagaraj Gupta SE

From

PRINCIPAL'S DESK . . .

Namaskar,

Happy New Year-2026 and Seasons' Greetings to all . . .



The pharmacy profession today is experiencing one of the most transformative periods in its history. With rapid scientific progress, digital innovation and evolving healthcare needs, pharmacy has expanded far beyond traditional dispensing roles.

In recent years, the scope of pharmacy has broadened significantly. Breakthroughs in biotechnology, personalized medicine, artificial intelligence, genomics and advanced drug delivery systems have created new opportunities for pharmacists in research and development, clinical pharmacy, pharmacovigilance, regulatory affairs and the pharmaceutical industry. As the world moves toward precision and patient-centric care, pharmacists are central to ensuring safe, effective, and rational medication use.

In India, the profession is witnessing renewed momentum. Pharmacists today play a vital role in community health services, hospital pharmacy, clinical consultation, drug information and adverse drug reaction monitoring. The global pharmaceutical market continues to grow, with India recognized as a major hub for drug manufacturing, formulation development and generic medicine production. This creates an increasing demand for highly skilled pharmacy graduates who are competent, ethical and adaptable to changing professional standards.

However, with this expanding scope comes the responsibility to maintain the highest levels of professionalism, integrity and scientific expertise. Students entering the pharmacy profession must cultivate strong foundational knowledge, practical skills, critical thinking and a commitment to life-long learning. The future pharmacist must be not only a dispenser of medicines but also a guardian of public health, a researcher, a counselor and a leader in healthcare innovation.

At our institution, we strive to nurture such professionals by providing a rigorous academic environment, industry-oriented training, good laboratories and opportunities for experiential learning. We encourage students to embrace emerging technologies, participate in community outreach, develop communication and leadership abilities. Our aim is to shape graduates who can meet global demands and contribute meaningfully to the advancement of healthcare and society.

As we look to the future, the pharmacy profession stands as a pillar of the healthcare system—dynamic, expanding and full of promise. I urge students to approach their education with dedication, curiosity and a spirit of service. The world needs compassionate, knowledgeable and innovative pharmacists and each one of you has the potential to shape the future of this noble profession.

On behalf of ACOP Tumkur wishing everyone all the best.

Warm Regards
Dr. Bheemachari
Principal
ACOP, Tumkur

Also visit us @

INTEGRATION OF AI, BLOCKCHAIN AND PYTHON IN INDIA'S PHARMACEUTICAL INDUSTRY — CONSEQUENT IMPACT ON EMPLOYMENT & SOCIOECONOMIC STATUS

Introduction



Dr. Bheemachari
Prof. & Principal
ACOP, Tumkur

India's pharmaceutical sector is the world's third largest by volume and a global supplier of affordable generic medicines. The industry's evolution, however, increasingly depends on digital capabilities. AI is accelerating scientific

research and optimizing operations; blockchain is improving supply-chain security; and Python has become the primary ecosystem for data science, automation and machine-learning implementation.

At the same time, concerns emerge regarding workforce displacement, regional inequalities and the readiness of India's education and regulatory systems. The challenge is not merely technological adoption — it is ensuring that digital transformation contributes to inclusive growth.

Role of AI, Blockchain and Python in Pharma Artificial Intelligence (AI)

AI is being applied across the pharmaceutical value chain:

Drug discovery – AI models perform virtual screening, molecular property prediction and target identification, reducing the time required for early-stage research.

Clinical trials – Machine learning helps identify eligible patient cohorts, predict trial risks, and optimize protocol design.

Manufacturing – AI-based predictive maintenance reduces downtime, while computer-vision systems improve inspection consistency.

Quality assurance and pharmacovigilance – NLP models screen adverse drug event reports and detect safety signals earlier.

AI's biggest advantage is its ability to handle massive datasets faster than traditional statistical tools, making R&D more efficient and cost-effective.

Blockchain Technology

Pharmaceutical supply chains are complex, involving manufacturers, distributors, transporters and retail networks. Blockchain addresses persistent vulnerabilities:

Counterfeit drug prevention – Immutable ledgers enable end-to-end traceability.

Efficient recalls – Real-time product tracking helps identify and isolate contaminated or defective batches.

Regulatory compliance – Automated audit trails reduce documentation bottlenecks.

Smart contracts – Streamline procurement, inventory and vendor management.

As India moves toward stricter serialization norms, blockchain offers a scalable and secure infrastructure.

Python Ecosystem

Python is central to this digital transition:

It is the dominant language for **machine learning and AI** (TensorFlow, PyTorch, Scikit-learn).

It powers **data engineering** and **automation scripts** connecting instruments, databases and cloud systems.

Its readability and large open-source community make it ideal for regulated environments where transparency is essential.

Python acts as the bridge between scientific data, automation workflows and advanced analytical systems.

Implications for Employment

Job Roles at Risk

The introduction of automation and intelligent systems will affect some categories of work:

Routine manufacturing labour

Tasks involving repetitive manual operations, packing, inspection, labeling and machine monitoring may be increasingly automated.

Data-entry and administrative roles

AI systems can read documents, extract data and generate reports, reducing reliance on clerical staff.

Basic quality-control tasks

Automated visual inspection, spectroscopic analysis and AI-driven anomaly detection reduce the need for manual QC operators.

Supply-chain documentation roles

Blockchain's automated logs and smart contracts will reduce paperwork-heavy jobs in logistics and procurement.

These shifts may disproportionately affect semi-skilled workers in manufacturing-intensive regions.

Jobs That Will Grow

Despite automation, several new job profiles will expand:

1. Data Scientists and AI Engineers

Demand will grow for experts who develop, validate and maintain AI models used in R&D, manufacturing and pharmacovigilance.

2. Python Developers and Automation Engineers

Python skills will be essential for building dashboards, creating data pipelines, automating lab tasks and integrating digital systems.

3. Blockchain Architects and Auditors

Supply-chain modernization requires developers who design ledger frameworks and compliance officers who validate blockchain integrity.

4. Digital Quality and Regulatory Specialists

As regulatory guidelines begin incorporating AI and digital data standards, specialized professionals will be needed to ensure compliance.

5. Human-Machine Supervisors

Manufacturing will require technicians trained to operate, calibrate and coordinate automated systems.

Overall, employment will shift **from low-skill to high-skill roles**, emphasizing digital literacy, data management and interdisciplinary knowledge.

Socioeconomic Impact on India

Wage Polarization

Digitalization typically increases the wages of highly skilled workers, especially engineers, data scientists and IT-integrated specialists. Meanwhile, wages for routine tasks may stagnate or decline if labor demand decreases. Without re-skilling initiatives, wage inequality within the pharma sector may widen.

Geographic Concentration of Opportunities

High-tech roles will cluster in major innovation hubs:

Bengaluru
Hyderabad
Pune
Mumbai
Chennai

Traditional manufacturing hubs such as Baddi, Sikkim, Gujarat's industrial zones and parts of Telangana may struggle unless digital infrastructure and training programs expand locally.

Impact on MSMEs

Small and mid-sized pharma companies may face:

High initial cost of digital adoption

Shortage of specialized talent

Risk of losing competitiveness to digitally mature large firms

Government incentives and technology-sharing platforms will be crucial to prevent market consolidation.

Positive Public Health Effects

Blockchain-enabled traceability can reduce counterfeit drugs, a major threat to public health. AI-supported R & D may accelerate access to affordable treatments. Efficient supply chains can lower distribution costs, potentially making medicines cheaper.

Social Inclusion Challenges

Women and workers from rural regions may benefit less without targeted training, as digital roles tend to cluster in urban areas and require specialized education.

Strategic Recommendations

For Government and Policy Makers

Create national guidelines for AI and blockchain in regulated pharma settings.

Offer incentives, tax benefits and grants for digital transformation in small and mid-sized companies.

Launch large-scale re-skilling programs through NIPERs, IITs, pharmacy colleges and digital-skills platforms

Develop regional digital pharma clusters to decentralize opportunities.

For Academia and Training Institutions

Update B.Pharm and M.Pharm curricula to include:

- AI/ML fundamentals
- Python programming
- Data integrity principles
- Blockchain basics

Introduce industry-supported certification programs.

For Pharmaceutical Companies

Implement **phased digital adoption**, starting with pilot projects.

Invest in **reskilling existing workers** instead of replacing them.

Build **internal digital governance teams** to oversee AI validation, cybersecurity and ethical use.

Strengthen collaboration with academic institutions for talent development.

Conclusion

The integration of AI, blockchain and Python technologies represents a transformative shift for

India’s pharmaceutical industry. These technologies can dramatically enhance research efficiency, supply-chain transparency, product quality and global competitiveness. However, the transition also carries risks — job displacement, skill mismatches, wage polarization and regional inequalities.

The ultimate socioeconomic outcome will depend on how India manages this transition. With thoughtful policies, inclusive upskilling, and responsible automation strategies, digital transformation can create more high-value employment and strengthen India’s position as a global pharmaceutical powerhouse. Without such efforts, the benefits may remain concentrated, deepening existing inequalities.

A balanced, human-centered digital strategy is essential to ensure that technological progress supports not just industrial growth but also social well-being.

* * * * *



ARUNA
COLLEGE OF PHARMACY
Quality is our Priority
Approved by PCI New Delhi, Govt. Of Karnataka & Affiliated to RGUHS Bangalore

Hearty Congratulations to Our B.Pharm 1st Sem Students for Grabbing the Cash Prize for Short Reels Competition
as part of NPW Celebration Conducted by MIT College of Pharmacy Mysore



Management, Principal & Staff
Aruna College of Pharmacy Tumkur

FRESHERS DAY CELEBRATION – 2025 BATCH



NEW FRONTIERS IN THE TREATMENT OF ALZHEIMER'S DISEASE — GENE THERAPY, TPD, NANOMEDICINE, IMMUNOTHERAPY AND CELL THERAPY



Raziya Begum
Associate Prof.
ACOP, Tumkur

Alzheimer's disease (AD) is a progressive neurological illness marked by cognitive impairment and memory loss. AD is answerable for a tremendous social and economic cost. The prevalence rate of Alzheimer's disease (AD) is predicted to

double by 2040, despite the fact that present medicines help manage symptoms but do not prevent, slow the illness's course, or cure it. AD remains incurable and medication research suffers one of the greatest failure rates in any therapeutic field.

Recent enhanced strategies of disease-modifying therapies that are replacing symptomatic medications in Alzheimer's disease research include, Targeted protein degradation (TPD), gene therapy, nanomedicine, and next-generation immunotherapies—many of which are currently in early-mid clinical trials. These techniques aim to eliminate upstream genetic risk, directly remove toxic proteins, increase brain medication delivery, and fine-tune the immune response to amyloid and tau.

1. Targeted protein degradation (**TPD**) is an emerging therapeutic strategy for Alzheimer's disease (AD) focused on eliminating pathological proteins that contribute to disease progression, such as tau and amyloid beta (A β). Targeted protein degradation represents a paradigm leap in AD treatments, moving beyond inhibition toward the active elimination of harmful proteins. PROteolysis Targeting Chimera (PROTACs) and molecular glues presently spearhead this effort, supported by AI-driven drug design and growing modalities to target complicated proteinopathies in AD.

With several preclinical tau degraders highlighted in recent reviews, tau-directed TPD platforms tailored to Alzheimer's and frontotemporal dementia are currently being

optimized for brain penetration, E3-ligase choice, and off-target minimization. Difficulties include delivering small but polar PROTACs across the blood–brain barrier (BBB), preventing degradation of physiological tau required for microtubule function, and demonstrating cognitive benefit beyond biomarker change.

2. Gene therapy: The three primary ideas of gene therapy for Alzheimer's disease are neurotrophic /anti-inflammatory gene delivery, tau or amyloid gene silencing, and risk-gene manipulation (e.g., APOE). In early-phase trials, an AAV-based APOE4→APOE2 replacement (LX1001) in APOE4 homozygotes has demonstrated persistent APOE2 expression with favourable tau biomarker alterations and stable amyloid PET, supporting precision prevention in extremely high-risk people. The Phase 1/2 studies are being conducted on antisense oligonucleotides and RNAi "gene-silencing" treatments that target tau. Intrathecal delivery has been shown to provide dose-dependent reductions of CSF tau without significant safety concerns thus far. Although CRISPR-based editing has not yet been tested for Alzheimer's disease, it is being seen as the next big thing once delivery and safety concerns are better understood in other illnesses.

3. BBB delivery and nanomedicine: Using nanoparticles and nanocarriers to transfer tiny molecules, peptides, or nucleic acids across the blood-brain barrier by receptor-mediated or adsorptive transcytosis is the main focus of nanomedicine in Alzheimer's disease. According to current studies, drugs can be concentrated in brain regions with early disease using targeted nanoparticles, improving bioavailability and enabling stage-specific therapies at lower systemic doses. In preclinical models, anti-amyloid medicines,

antioxidants, cholinesterase inhibitors, anti-inflammatory payloads, and gene-therapy cargos have been delivered via lipid, polymeric, and ligand-decorated nanocarriers with sustained release profiles. Long-term toxicity, immunogenicity, large-scale production, and regulatory approval for long-term neurodegenerative therapy are the remaining concerns.

4. Immunotherapy (tau and amyloid): From amyloid- β monoclonal antibodies to active vaccines and tau-targeted antibodies or vaccines, next-generation immunotherapy is advancing. While lecanemab and donanemab, both passive anti-amyloid antibodies, may prevent the decline in early illness, safety concerns (ARIA) and little efficacy in moderate stages have prompted work into safer, earlier, and more diversified immunological treatments. In early trials and animal models, tau immunotherapy—both passive antibodies and active vaccines like AADvac1—has demonstrated reductions in tau pathology and beneficial improvements in cognition, with acceptable safety at present. Although passive tau antibodies or carefully crafted peptide vaccines with strict safety monitoring are preferred by many groups due to the possibility of undesired autoimmune reactions, active vaccinations strive for longer-lasting protection at lower cost.
5. Cell therapy in Alzheimer's disease primarily involves mesenchymal stem cells (MSCs) and natural killer (NK) cells to reduce neuroinflammation, clear amyloid- β and tau aggregates, and modulate immune responses, with most approaches in early-phase clinical trials. These autologous or allogeneic cells are administered intravenously or intracranially, showing preliminary safety and biomarker improvements but limited efficacy data due

to small trials. Some of the cell therapies are hUCB-MSCs, human induced pluripotent stem (iPS) cell-derived macrophage-like cells, iPS-ML, human ESC-derived BFCNs etc. Overall, these emerging approaches signal a move from symptomatic treatment toward truly disease-modifying, mechanism-based strategies for Alzheimer's disease, but they remain largely experimental and will require rigorous long term validation in larger trials. Together, targeted protein degradation, gene therapy, nanomedicine, immunotherapy, and cell therapy show that AD is increasingly being tackled at multiple levels—genetic risk, pathological proteins, neuroinflammation, and drug delivery—rather than through single-target approaches.

Although there are still issues with delivery, specificity, and long-term safety, TPD and gene therapy have the ability to permanently alter key disease processes by acting on upstream factors like tau, A β , and APOE4. By increasing CNS exposure to cutting-edge biologics while lowering systemic toxicity, nanomedicine and BBB-focused platforms may aid in overcoming these obstacles. Although the evidence is still restricted to early-phase and preclinical investigations, next-generation immunotherapies and cell-based treatments expand this paradigm by reducing inflammation, removing aggregates, and promoting brain repair. Instead of a single "cure," the most practical future is in customized combinations, such as gene or TPD-based protein reduction delivered by nanocarriers combined with immuno- or cell-based regulation. These developments encourage cautious optimism while also highlighting the likelihood that AD will ultimately call for integrated, multimodal care, biomarker-guided medication, and early diagnosis.

* * * * *

CELEBRATION OF INTERNATIONAL YOGA DAY



ARUNA COLLEGE OF PHARMACY
HAPPY INTERNATIONAL Yoga Day
Yoga is the journey of the self, to the self, through the self
Bhagavad Geeta
21.06.2025 Venue: Aruna College of Pharmacy Tumkur 9.30 AM
Admissions Open For: B.Pharm // D. Pharm



RECENT ADVANCES IN GREEN CHEMISTRY APPROACHES FOR PHARMACEUTICAL SYNTHESIS

Introduction



Bindu C
Assistant Prof.
ACOP, Tumkur

Green chemistry has emerged as a crucial pillar in modern pharmaceutical synthesis, aiming to minimize environmental impact while improving the safety, efficiency, and sustainability of chemical processes. With the rising concern over hazardous waste, energy consumption, and toxic reagents in traditional

drug synthesis, the pharmaceutical industry is rapidly adopting greener alternatives. The 12 Principles of Green Chemistry form the foundation for this shift, encouraging the use of safer solvents, energy-efficient methods, renewable feedstocks, catalytic processes, and waste reduction strategies.

Recent innovations have significantly transformed key stages of drug discovery and manufacturing, leading to cleaner processes and more sustainable production pathways.

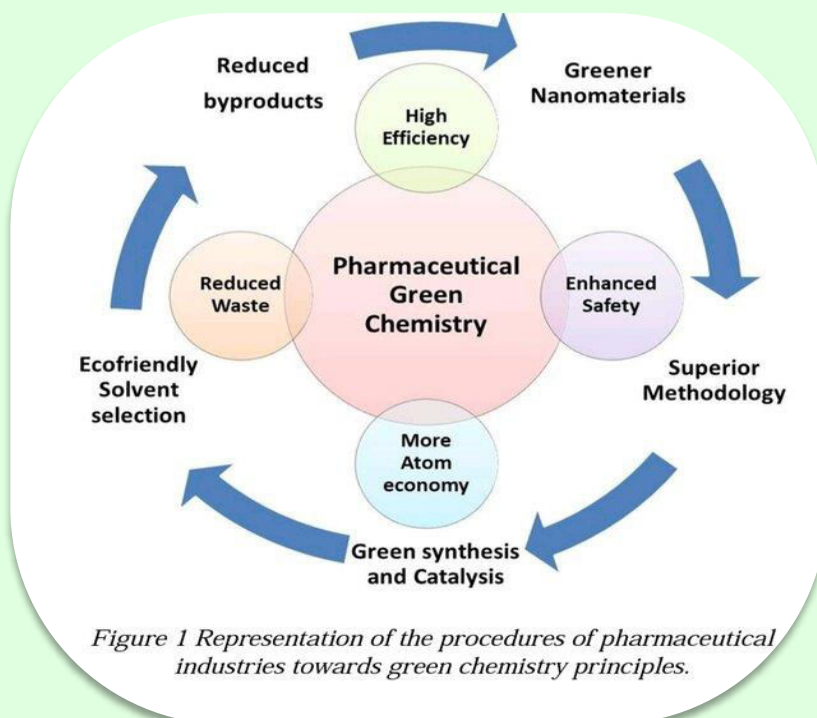


Figure 1 Representation of the procedures of pharmaceutical industries towards green chemistry principles.

1. Biocatalysis and Enzyme-Mediated Transformations

Biocatalysis has become one of the most revolutionary green approaches in pharmaceutical synthesis. Enzymes offer excellent selectivity, operate under mild conditions, and generate minimal waste.

Recent advances include:

a. Engineered Enzymes

Modern protein engineering and directed evolution have produced enzymes with enhanced stability and substrate compatibility. Example: Transaminases and ketoreductases engineered to synthesize chiral drug intermediates with high enantiopurity.

b. Enzyme Cascades

Multiple enzymes are combined to perform multi-step reactions in a single stream, eliminating purification steps and reducing solvent usage.

c. Immobilized Enzyme Technology

Improves enzyme reuse, stability, and scalability for industrial manufacturing.

Biocatalysis has been successfully applied in the synthesis of sitagliptin, atorvastatin intermediates, and many other APIs (Active Pharmaceutical Ingredients).



2. Solvent Innovations: Water, Ionic Liquids, and Deep Eutectic Solvents

Solvents contribute to nearly 80% of waste generated during drug manufacturing.

Recent developments offer greener choices:

a. Water as a Green Solvent

Aqueous micellar catalysis enables organic reactions in water using surfactant-based nanomicelles.

It is now widely used for Suzuki coupling, amide formation, and reduction reactions.

b. Ionic Liquids (ILs)

These low-volatility solvents improve reaction rates and reduce emissions.

Recent versions include biodegradable ionic liquids with low toxicity.

c. Deep Eutectic Solvents (DESS)

DESSs are environmentally benign, inexpensive, and tunable.

They've gained prominence in extraction processes, crystallization, and catalysis.

Solvent replacement has significantly reduced E-factor (environmental factor) in many pharma processes.

3. Flow Chemistry and Continuous Manufacturing

Flow chemistry technologies have transformed how pharmaceuticals are produced, enabling safe and efficient continuous processing.

Recent advancements:

- Continuous flow reactors allow precise heat and mass transfer.
- Hazardous reactions (nitration, hydrogenation) can be safely performed in flow.
- Automated continuous manufacturing reduces batch variability and enhances product quality.
- Inline monitoring (PAT tools) improve efficiency and reduce waste.
- Flow chemistry is now employed in the production of APIs like artemisinin and various oncology drugs.

4. Microwave-Assisted and Ultrasound-Assisted Synthesis

Energy-efficient reaction technologies are playing a major role in green pharmaceutical chemistry.

a. Microwave-Assisted Organic Synthesis (MAOS)

- Reduces reaction time from hours to minutes
- Enhances yield and purity
- Minimizes by-products
- Works well with solvent-free or low-solvent conditions

b. Ultrasound-Assisted Reactions

- Ultrasonic waves improve mass transfer and reduce catalyst loading.
- Especially useful in esterification, oxidation, and reduction reactions.
- Both approaches dramatically reduce energy consumption and overall reaction footprint.

5. Catalysis: Organocatalysis and Heterogeneous Catalysis

Catalysts are vital for green chemistry because they eliminate the need for excess reagents.

a. Organocatalysis

Enables metal-free asymmetric synthesis using small organic molecules such as proline, thiourea, and imidazolidinones.

b. Heterogeneous Catalysis

Solid catalysts provide easy separation, recycling, and minimal contamination.

Widely used in hydrogenation and C–C coupling reactions.

c. Nanocatalysis

Metal nanoparticles provide high activity with extremely low catalyst loading.

Recent research focuses on green synthesis of nanoparticles using plant extracts.

6. Renewable Feedstocks and Biomass-Derived Starting Materials

Sustainable raw materials are gradually replacing petrochemical-based sources.

Examples:

- Lignocellulosic biomass converted to platform chemicals
- Fermentation-derived ethanol, lactate, and succinate
- Bio-renewable terpenes used for drug intermediate synthesis

This approach supports circular manufacturing systems in pharmaceutical industries.

This approach supports circular manufacturing systems in pharmaceutical industries.



7. Waste Minimization and Process Intensification

Pharmaceutical companies are prioritizing the reduction of waste metrics like E-factor and PMI (Process Mass Intensity).

Recent tools:

- Predictive green metrics software
- Waste valorization strategies
- Solvent recovery and recycling systems
- One-pot reactions and telescoping strategies to eliminate multiple purification steps

These methods significantly reduce cost and environmental footprint.

Conclusion

Recent advances in green chemistry have reshaped pharmaceutical synthesis by integrating biocatalysis, sustainable solvents, flow technologies, renewable resources, and energy-efficient reaction systems. These innovative approaches not only protect the environment but also improve process efficiency, reduce manufacturing costs, and enhance the safety of drug production.

With continuous research, regulatory encouragement, and increased industrial adoption, green chemistry will continue to define the future of sustainable pharmaceutical manufacturing.

* * * * *

PRIVILEGE TO BE PART OF 74th IPC – 2025



74th INDIAN PHARMACEUTICAL CONGRESS INTELLIGENCE | INNOVATION | IMPACT

Bengaluru International Exhibition Centre, Bengaluru, India

19 20 21 DECEMBER 2025



INAUGURATION & STAGE CO-ORDINATION COMMITTEE



Mr. Sunil Attavar
Chairman



Dr. Kavitha A N
Co-Chairperson



Dr. Suma S
Co-Chairperson



Dr. T Mamatha
Co-Chairperson



Dr. Ramya
Member



Dr. Bhavani K
Member



Mr. Likith Harish Jain
Member



Dr. Sunil Chiplunkar
Member



Dr. Dinesh Biyani
Member



Ms. Shithin Ann Varghese
Member



Dr. Minakshi Rajgire
Member



Dr. Somashekar
Member



Dr. C. Mallikarjun Shetty
Member



Dr. Bheemachari Joshi
Member



Dr. Parijat Pandey
Member



Dr. Nimisha Jain
Member

INTERNATIONAL DAY AGAINST DRUG ABUSE



ARUNA
COLLEGE OF PHARMACY
Quality in our Priority

Approved by PCI New Delhi, Govt. Of Karnataka & Affiliated to KJ Somaiya

26th JUNE
International Day Against
Drug Abuse
and Illicit Trafficking

... SLOGAN ...
Breaking the Chains:
Prevention, Treatment and
Recovery for All

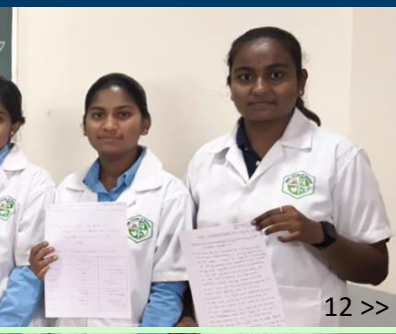
26.06.2025 Venue: Aruna College of Pharmacy Tumkur 9.30 AM



Admissions Open For: B.Pharm // D. Pharm

visit us

pharmacy.arunainstitutes@gmail.com Behind Ashwini Hospital, Ring Road, Maralur, TUMAKURU-572 105 +91-90361 72956



VACCINES AND ANTIVIRAL CHEMISTRY: PROTECTING THE WORLD AT THE MOLECULAR LEVEL

Introduction



Likhitha V
Assistant Prof.
ACOP, Tumkur

Vaccines and antiviral drugs represent two major scientific breakthroughs in controlling viral diseases. While vaccines focus on prevention by strengthening the immune system, antiviral drugs work therapeutically to stop or slow viral replication once infection occurs. The chemistry behind these tools involves a deep understanding of molecular biology, immunology, organic chemistry, and biotechnology. Together, they have transformed global public health, enabling humanity to combat pandemics, reduce disease burden, and prevent millions of deaths annually.

Viruses pose a unique challenge because they cannot replicate independently. Viruses use the host cell's own machinery to survive, which makes it hard to attack them without harming human cells. Chemical research has therefore focused on identifying viral components that differ from human cellular processes. Vaccines exploit the immune system's ability to create long-term memory, while antiviral drugs selectively block viral enzymes, proteins, or life cycle stages.



Viruses pose a unique challenge because they cannot replicate independently. Viruses use the host cell's own machinery to survive, which makes it hard to attack them without harming human cells. Chemical research has therefore focused on identifying viral components that differ from human cellular processes. Vaccines exploit the immune system's ability to create long-term memory, while antiviral drugs selectively block viral enzymes, proteins, or life cycle stages.

Types of Vaccines and Their Chemical Basis

1. Live Attenuated Vaccines

Live attenuated vaccines contain weakened viruses that replicate at low levels without causing disease. Chemically, these vaccines

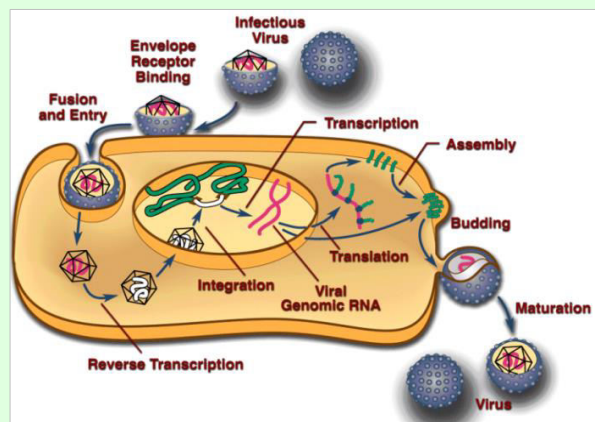


Fig 1. Virus life cycle and targets of antivirals

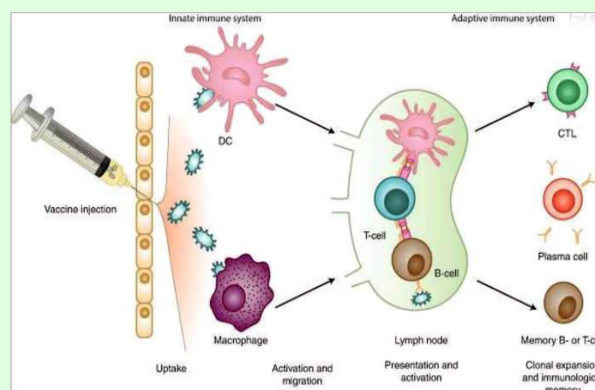


Fig 2: Mechanism of Vaccine

utilize viruses altered through heat, chemical mutagenesis, or cell culture adaptation. These modifications change amino acid sequences in viral proteins, reducing virulence while keeping antigenicity intact. Because they mimic natural infection, they generate strong cellular and antibody responses. Examples include measles, mumps, rubella, yellow fever, and varicella vaccines.

2. Inactivated (Killed) Vaccines

Inactivated vaccines use viruses that have been chemically destroyed using agents like formaldehyde or β -propiolactone. These chemicals form cross-links with viral proteins and nucleic acids, eliminating infectivity while preserving surface antigens. Such vaccines cannot replicate in the body, making them safe for immunocompromised individuals. Examples include Hepatitis A and inactivated polio vaccines.

3. Subunit and Protein Vaccines

Subunit vaccines use purified viral proteins rather than whole viruses. These proteins are

4. mRNA Vaccines

RNA mRNA vaccines represent a major leap in vaccine chemistry. They contain synthetic messenger RNA encapsulated in lipid nanoparticles (LNPs). The mRNA encodes viral proteins, such as the spike protein of SARS-CoV-2. Once inside the body, cells translate the mRNA into antigenic proteins, triggering a strong immune response.

5. Viral Vector Vaccines

These vaccines use a harmless virus (vector) to deliver viral genes into human cells. Adenovirus vectors are most commonly used. Chemically, the vector genome is modified so it cannot replicate inside the body, but it still expresses the target antigen. Examples include the AstraZeneca and Johnson & Johnson COVID-19 vaccines.

Antiviral Chemistry and Mechanisms of Action

Antiviral drugs are designed using medicinal chemistry principles to block specific steps of the viral life cycle. Their selectivity depends on identifying viral enzymes or replication pathways that differ from human cells. Below are the key categories with molecular mechanisms:

1. Nucleoside and Nucleotide Analogues

These drugs resemble the natural building blocks of DNA or RNA. Once incorporated into the viral genome, they terminate chain elongation due to lacking necessary chemical groups. Examples include acyclovir, zidovudine and remdesivir.

2. Protease Inhibitors

Protease inhibitors block viral protease enzymes needed to process polyproteins into functional viral components. They bind to the enzyme's active site through hydrogen bonding and hydrophobic interactions. Examples include ritonavir and lopinavir (HIV drugs).

3. Neuraminidase Inhibitors

These drugs prevent influenza viruses from releasing new viral particles.

They mimic the sialic acid, the natural substrate of neuraminidase, and competitively inhibit the enzyme. Examples include oseltamivir and zanamivir.

4. Entry and Fusion Inhibitors

These prevent viruses from binding to or entering human cells by blocking surface receptors or altering viral envelope proteins. Examples include maraviroc and enfuvirtide.

Advantages of Vaccines and Antivirals

Vaccines provide long-term immunity, reduce disease transmission, and protect entire populations through herd immunity. Antivirals, on the other hand, control active infection, reduce symptom severity, and prevent complications. Combined, they significantly reduce healthcare burdens, improve life expectancy, and prevent pandemics.

Applications in Medicine and Public Health

Vaccines are used for preventing diseases like polio, measles, influenza, rabies, and COVID-19. Antivirals are essential for HIV/AIDS management, hepatitis treatment, influenza therapy, and emerging viral infections. They have broad roles in epidemic control, hospital infection prevention, travel medicine, and immunization programs.

Importance in Modern Healthcare

Vaccines and antivirals are fundamental to reducing global mortality, controlling outbreaks, and enhancing public health. Their development has resulted in the eradication of smallpox and near-elimination of diseases like polio.

Future Role and Scientific Advancements

The future of vaccines and antiviral chemistry includes universal vaccines, AI-designed drugs, nanoparticle delivery systems, personalized vaccines, gene-editing-based antivirals (CRISPR) and broad-spectrum antiviral platforms. These innovations promise faster, more effective responses to emerging viral threats.

* * * * *

BLOOD DONATION CAMP



INTERNATIONAL DOCTOR'S DAY CELEBRATION

Greeted our Joint Director Dr. Radhesh K.R Sir

ARUNA
COLLEGE OF PHARMACY
Quality is our Priority
Approved by PCI New Delhi, Govt. Of Karnataka & Affiliated to RGHS Bangalore

Principal, Staff and Students of ACOP Tumkur
Heartily Wishes

Happy Doctor's Day

Happy Doctor's Day to all the doctors across the globe!
May you be blessed with the happiness and love that you have given to society



NATURE MEETS NANOTECH: A NEW HOPE FOR CANCER TREATMENT HERBAL NANOCARRIERS FOR CANCER THERAPY

Introduction



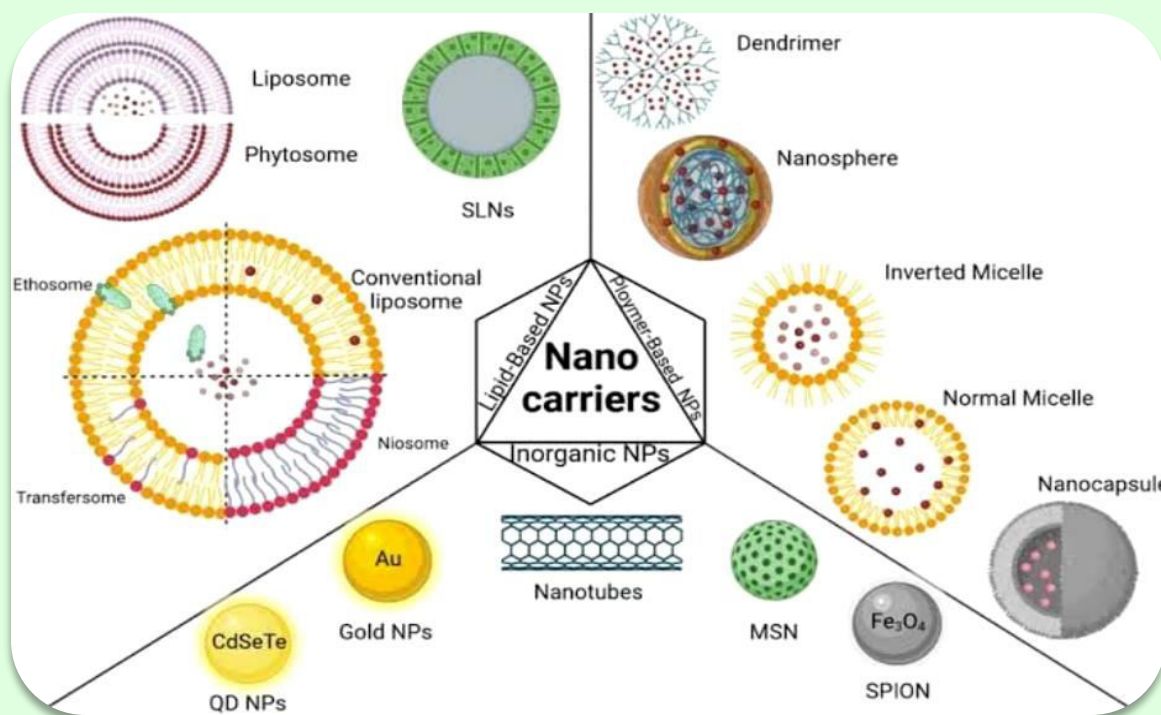
Pooja R
Assistant Prof.
ACOP, Tumkur

Cancer treatment often damages healthy cells along with cancer cells. Herbal medicines have natural anticancer properties but usually show weak effect inside the body. Nanotechnology solves this problem by carrying

herbal medicines in tiny particles called *nanocarriers*.

These nanocarriers deliver herbal compounds directly to cancer cells without harming normal tissue.

This system combines **natural healing from herbs** and **modern scientific technology**.



Importance for nanocarriers

1. Many herbal compounds (like curcumin, resveratrol) cannot dissolve well in the body and lose their effect.
2. Nanocarriers increase the absorption and strength of these herbal compounds.
3. They reduce unwanted side effects during cancer treatment.
4. They improve patient comfort and support faster recovery.
5. They open a new path for **safe, natural, and effective cancer therapy**.

Types of Herbal Nanocarriers

1. **Liposomes:** Fat-based tiny spheres that carry herbal drugs safely.
2. **Solid Lipid Nanoparticles (SLNs):** Strong, stable carriers for hydrophobic (oil-soluble) herbs.

3. **Phytosomes:** Special complexes used for curcumin, silymarin, etc., to improve absorption.
4. **Polymeric Nanoparticles:** Carriers made of safe polymers for slow and controlled drug release.
5. **Nanoemulsions:** Oil-in-water systems that enhance the delivery of herbal oils.
6. **Niosomes:** Surfactant-based vesicles used to protect herbal compounds.
7. **Gold or Silica Nanoparticles (Herbal-coated):** Used for targeted cancer therapy and imaging.

Benefits to nanocarriers

1. **Better absorption:** Herbal compounds become more powerful.

2. **Targeted action:** Nanocarriers attack only cancer cells, protecting healthy cells.
3. **Reduced side effects:** Less toxicity compared to normal chemotherapy.
4. **Controlled release:** Herbal medicine is released slowly for longer action.
5. **Higher stability:** Protects herbal molecules from breaking down too early.
6. **Improved patient safety:** Natural compounds + scientific delivery = safer treatment.

Current Uses (Ayurveda + Modern Pharmaceutics)

1. **Curcumin Nano formulations:** Strong anticancer activity and better body absorption.
2. **Turmeric, Ashwagandha, Neem extracts** are being studied in nanoform for cancer therapy.
3. **Artemisinin nanocarriers** show promising results in killing cancer cells.
4. Ayurveda herbs are converted into standardized nano-products for safe medical use.
5. Clinical studies are growing, showing improved outcomes when herbal nano formulas support chemotherapy.

Application of nanocarriers

1. Public can benefit in future through herbal nano-based supplements and medicines.
2. These products may help reduce chemotherapy side effects like vomiting, fatigue, and inflammation.
3. Public should choose only **clinically tested, government-approved** nano-herbal products.
4. Do **not** buy untested “nano herb” products online without medical advice.
5. Herbal nanocarriers may become part of safer cancer treatment plans in hospitals.
6. They can also support immunity, reduce stress, and enhance patient quality of life.

Conclusion

1. Herbal nanocarriers bring together the **power of nature** and **precision of nanotechnology**.
2. They make herbal medicines stronger, safer, and more targeted against cancer.
3. This approach promises reduced side effects and better treatment outcomes.
4. Research is growing, and future treatments may include many nano-herbal options.
5. With proper testing and regulation, herbal nanocarriers can transform cancer therapy and improve public health.

Now, with nanotechnology, these natural ingredients become more powerful, more stable, and more effective against cancer.

This new approach protects healthy cells, improves patient comfort, and offers a safer, more hopeful future for cancer care.

Together, nature and nanotech are creating a new path — a path of healing, safety, and hope for every family.

This is not just science... this is a new sunrise in cancer treatment.”

Nature Meets Nanotech

A New Hope for Cancer Treatment

Tiny nanocarriers deliver herbal medicines directly to cancer cells.

More power, less side effects, better patient comfort.

Combines Ayurveda’s natural strength with modern scientific technology.

A safer, smarter, and more hopeful step in cancer care.

Nature + Science = A brighter tomorrow for patients

MYTH AND FACT ON MEDICINES



Firdos Sultana
Associate Prof.
ACOP, Tumkur

1.Myth: If you're really hurting, you can ignore the label and take more pills.

The Fact: The truth is, if you take more than the dose on the label it can hurt you.

"The recommended dose of an over-the-counter (OTC) or prescription drug isn't just

a suggestion — it's a careful calculation based on years of research, clinical testing and practice,"

Pharmaceutical companies and doctors work hard to develop the appropriate dose of medicine for every person. Taking your pills in any other way than what is on the label can do much more harm than good.

2.Myth: Once you feel better, you don't have to keep taking medication.

The Facts : If your symptoms are gone but your medication isn't gone yet, you may be attempted to stop taking your pills. Your doctor prescribed that medicine because you need it. You want to make sure to take all of the medication your doctor prescribed to you.

If you've considered stopping your medication because it costs too much, talk to your doctor or pharmacist about ways to reduce the cost. There are many ways to make medications more affordable.

3.Myth: Natural supplements are always a safe choice.

The Facts : The word "natural" doesn't always mean "safe." It also doesn't mean you can skip talking to your doctor about them

If you're interested in natural supplements you still need to talk to your doctor or pharmacist about which ones are safe for you to use specifically. Also, since the standards for supplements are not as strict, the amount of each ingredient can vary between products. You may not have all of the information you need to take the right amount that works for you.

4.Myth: Antibiotics are the answer for every illness.

The Facts : Different illnesses require very precise types of treatments. Doctors also don't want to prescribe antibiotics when they aren't needed because overusing them may lead to resistant, hard-to-treat infections.

5.Myth: It's best to keep medication handy in the bathroom or kitchen sink.

The Facts : You may think putting medications where you'll see them every day is the best way to remember to take them. When medications are out in common areas they can be damaged by both dampness and light which can cause problems in how they work for you. Store them in the original safety-built container or in a pill box that can't be opened by little hands. And always keep medications and supplements where children and pets can't reach them.

6.Myth: It doesn't matter how you swallow a pill as long as it gets where it needs to go.

The Facts: You must pay attention to how pills should be taken and always take them exactly according to the label and prescription. The size and amount of pills are designed so the pill dissolves over a specific amount of time in your system, most likely not all at once. You should never peel or break the outer coating. Do not cut pills into pieces or crush them unless it says on the label to do so. Changing the size or makeup of the pill intentionally may affect how your system digests them and can affect how they work for you.

7.Myth: You don't need to tell your doctor which vitamins you take.

The Facts: You may be thinking vitamins are also somewhat natural because a lot of them are found in foods so you don't need to even bother mentioning them to your doctor. When prescribing a new medication or suggesting an OTC remedy your doctor does need to know about your diet, lifestyle and all the OTC and prescription medications, vitamins and supplements you are taking. This helps your doctor ensure that any new medication will not interact with your current regimen in a dangerous way.

8.Myth : Generic Drugs Are Less Effective Than Brand Names

The Facts : Generic drugs are often viewed as inferior to their brand-name counterparts, but this is a misconception. Generics contain the same active ingredients and are as effective and safe as the brand-name versions. The main difference lies in the cost, with generics being more affordable, making essential medications accessible to more people.

9.Myth : Natural Supplements Don't Interact with Medication.

The Fact: The belief that natural or herbal supplements are always safe and don't interact with medications is a common myth. In reality, many supplements can interact with prescription drugs, potentially reducing their effectiveness or causing harmful side-effects. Inform your healthcare provider about any supplements you are taking to avoid adverse interactions.

10.Myth : If a medication works for one person, it will work the same for everyone.

The Fact: Medications Affect Individuals

Differently Medications are designed to treat specific conditions, but they don't work the same way for every individual. Factors such as age, weight, genetics, kidney and liver function, and other health conditions can significantly affect how a drug works in the body. For instance, some patients may experience side effects that others do not, even if they are taking the same medication.

In a world filled with misinformation, it's crucial to separate fact from fiction when it comes to medication. By debunking common medication myths, we can make informed decisions about our health and avoid potential harm. By relying on evidence-based information, consulting reliable sources, and trusting our healthcare providers, we can navigate the complex world of medications with confidence and ensure the best possible outcomes for our health. So, let's challenge these assumptions, seek the truth, and make informed decisions when it comes to our medications.

* * * * *

74th IPC REGISTRATION & SPONSORSHIP DRIVE



INDEPENDENCE DAY CELEBRATION



HOW ENVIRONMENT IMPACTS DRUG METABOLISM THE HIDDEN VARIABLE IN PHARMACOLOGY

Introduction



Chitrashree
Assistant Prof.
ACOP, Tumkur

Drug response — effectiveness, toxicity, dosage — is often thought to depend on a person’s genetics, age, organ function, or existing disease. But mounting evidence shows that the **environment we live in** — what we eat, where we live, our

exposures over a lifetime — plays a **major role in shaping how drugs are metabolized**. Ignoring this “hidden variable” risks underestimating variability in drug response, mis-dosing, or unexpected side-effects.

The Exposome: What Is It and Why It Matters

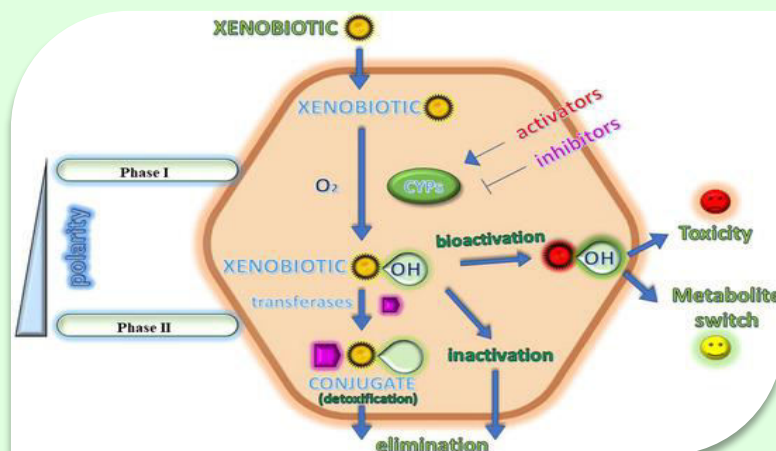
The concept of the **exposome** refers to the totality of internal and external exposures a person experiences over their lifetime — diet, environmental pollutants, lifestyle habits, infections, stress, gut-microbiome status, disease states, and more. Recent research highlights that the exposome can significantly modulate the expression and activity of major drug-metabolizing enzymes, in particular the Cytochrome P450 (CYP450) enzyme family.

Thus, beyond genetic differences, the exposome adds a dynamic, variable layer — meaning that two individuals with similar genetic make-up may nevertheless metabolize the same drug very differently depending on their environmental exposures.

Mechanisms: How Environment Alters Drug Metabolism

Several mechanisms mediate how environmental exposures influence drug metabolism:

- **Enzyme induction or inhibition:** Environmental chemicals such as pollutants, components of tobacco smoke, or dietary agents can induce (increase) or inhibit CYP450 enzymes. For example, polycyclic aromatic hydrocarbons (PAHs) — present in cigarette smoke, city pollution, or charred/coal-broiled foods — can activate receptors like the aryl hydrocarbon receptor (AhR), leading to increased expression of CYP enzymes (e.g. CYP1A1, CYP1A2, CYP1B1).
- **Dietary modulators:** Certain foods or beverages can strongly influence CYP activity. A classic example is Grapefruit juice — which inhibits CYP3A4 in the intestines, reducing first-pass metabolism and increasing systemic drug exposure. Conversely, consumption of charred meats or smoke-exposed foods may increase CYP activity.
- **Internal environment: inflammation, microbiome, disease, hormones:** Internal factors such as inflammation, chronic disease, hormonal changes, or gut microbiome composition also influence CYP enzyme regulation. The exposome framework includes these “internal exposures,” highlighting how non-external factors shape metabolism.
- **Cumulative, dynamic exposures over lifetime:** Because the exposome is cumulative and changes over time (diet changes, environmental pollution shifts, lifestyle alterations), the impact on drug metabolism is not fixed but dynamic — what was true for a patient a few years ago may no longer hold.



Real-World Evidence & Examples

There is broad evidence — both experimental and epidemiological — showing that environmental exposures affect drug metabolism:

A 2025 review demonstrated that lifetime exposures (the exposome) significantly modulate CYP450 function, influencing drug metabolism, toxicity, and inter-individual variability in response.

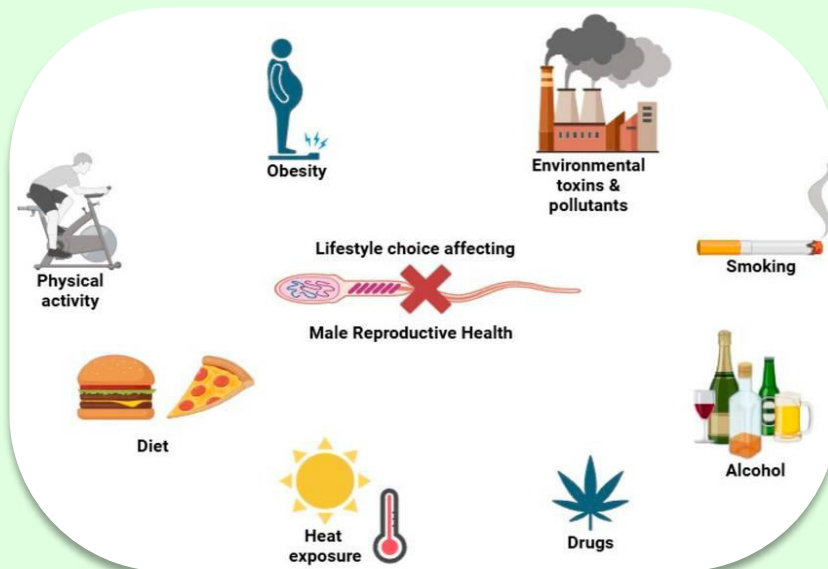
For example, exposure to cigarette smoke (rich in PAHs and other chemicals) increases activity of CYP1A2 and CYP2E1, among others. Smokers often metabolize certain psychiatric drugs, cardiovascular drugs, or other medications faster — sometimes requiring higher doses to maintain

efficacy.

On the other hand, dietary agents like grapefruit juice show potent inhibition of CYP3A4, raising systemic exposure of many drugs — with clinical implications for drug toxicity or adverse effects.

Environmental pollutants — including industrial chemicals or inhaled pollutants — have also been implicated. Persistent organic pollutants, PAHs, and airborne toxins can alter CYP expression, potentially changing metabolism of drugs, endogenous hormones, or toxins.

These examples underline that the environment — not just genetics — can shape drug response in unpredictable ways.



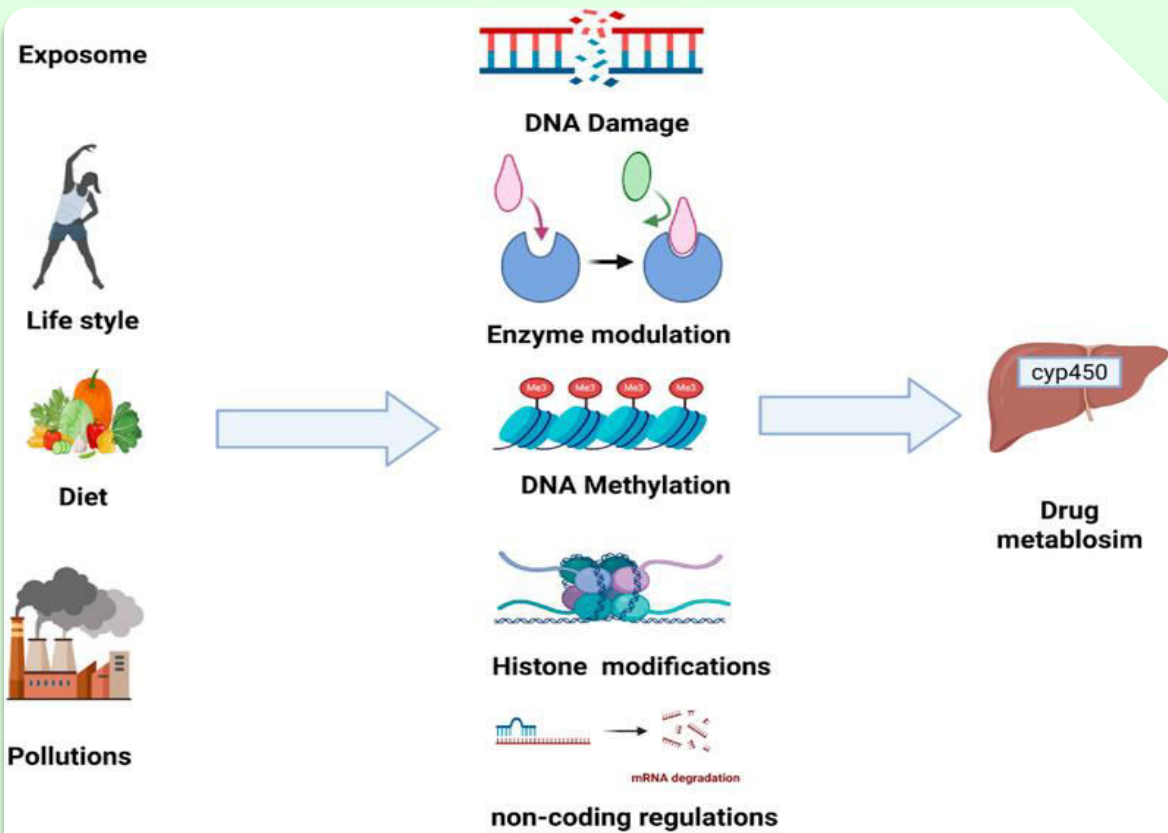
Clinical & Public Health Implications

Given this complexity, ignoring the exposome in pharmacology can have serious consequences:

- **Inter-individual variability in drug response:** Two patients with similar genetics may respond differently to the same dose, due to differing environmental exposures. This challenges “one-size-fits-all” dosing recommendations.
- **Risk of adverse drug reactions or toxicity:** If an environmental exposure inhibits drug metabolism, drug levels may build up leading to toxicity. Conversely, enzyme induction may reduce effective drug levels — risking therapeutic failure. This is especially critical for drugs with narrow therapeutic windows.
- **Need for environment-informed prescribing & monitoring:** Clinicians should consider not only patient age, genetics, comorbidities — but also lifestyle, diet, smoking, pollution exposure, and

other environmental factors when prescribing or adjusting doses.

- **Personalized medicine with exposome + genomics:** While pharmacogenomics (genetic profiling) provides valuable insight, combining it with exposome data (lifestyle, environment, internal exposures) could yield more accurate and safe personalized treatment plans.
- **Implications for global health and varied populations:** In regions with high environmental pollution, variable diets, or diverse exposures (e.g. developing countries), environment-related metabolic variability may be especially relevant. It underscores the need for locally relevant dosing guidelines and awareness among healthcare practitioners.



Challenges & What Needs More Research

Despite growing evidence, several gaps remain:

- The complexity of the exposome — mixtures of exposures over time — makes it hard to isolate the effect of any single factor. Most studies focus on one exposure (e.g. smoking, a pollutant, diet) rather than combinations.
- The relative contribution of environmental modulation vs genetic polymorphisms is often unclear; their interplay can be complex and non-linear.
- For many novel drugs (especially biologics or drugs metabolized beyond classic CYP pathways), data on environmental modulation are scarce.
- There is a lack of widespread clinical frameworks or guidelines that systematically integrate environmental history (diet, exposures, lifestyle) into prescribing decisions.

Conclusion:

Why Environment-Aware Pharmacology Should Matter to Us

The growing recognition of the exposome’s

influence on drug metabolism challenges long-held assumptions that drug response is determined primarily by genetics or fleeting factors like age. Instead, it highlights a dynamic, life-long interplay between environment, biology, and therapy.

For pharmacologists, clinicians, and public-health professionals, embracing an “environment-aware” approach can improve safety, efficacy, and personalization of treatment. For researchers, it opens new frontiers — studying not just genes, but gene-environment–drug interactions; designing drugs and dosing strategies mindful of environmental variability; and building predictive models that combine genomics, exposomics, and clinical data.

In a world of rapidly changing environments — pollution, diet shifts, lifestyle changes — understanding and accounting for environmental impact on drug metabolism may be one of the most important, yet underappreciated, challenges of modern medicine.

* * * * *

EXPERT TALK ON PROFESSIONAL INSIGHTS

ARUNA
COLLEGE OF PHARMACY
Quality in our Pharmacy

Approved by PCI New Delhi, Govt. of Karnataka & Affiliated to BSRHE Bangalore

Talk On
"PHARMACIST - ACADEMIC & COMMUNITY RESPONSIBILITIES"



Pharmacist-Community Responsibilities
Dr. Kranti Kumar Sirse M.Pharm, PhD
Registrar
Karnataka State Pharmacy Council
BANGALORE



Pharmacist-Academic Responsibilities
Dr. Ashok Kumar Malpani M.Pharm, PhD
Dean, Pharmacy
Rajiv Gandhi University of Health Sciences
BANGALORE

Patron
Dr. Radhesh KR M.B.B.S, MS (Dent)
Joint Director
Aruna Educational Trust (R)
Tumakuru

Presided By
Dr. Bheemachari M.Pharm, PhD
Professor & Principal
Aruna College of Pharmacy
Tumakuru

Event Coordinators

Mrs. Raziya Begum M.Pharm
Assistant Professor
Aruna College of Pharmacy
Tumakuru

Mrs. Bindu C M.Pharm
Assistant Professor
Aruna College of Pharmacy
Tumakuru

VENUE: ARUNA COLLEGE OF PHARMACY, LH-2 **3rd SEPTEMBER 2025**
3.45 PM

Admissions Open For: B.Pharm // D. Pharm visit us @ 

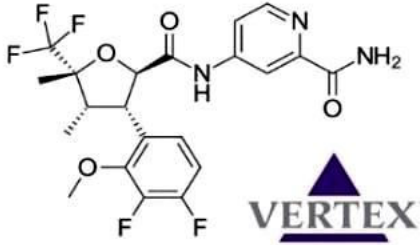
pharmacy.arunainstitutes@gmail.com Behind Ashwini Hospital, Ring Road, Maralur, TUMAKURU-572 105 +91-90361 72956



Novel Drug Approvals (1Q25)



© Chris De Savi

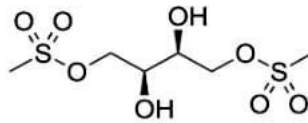


Suzetigrine (Jornavx)

To treat pain

RoA PO

Mechanism - Nav1.8 inhibitor



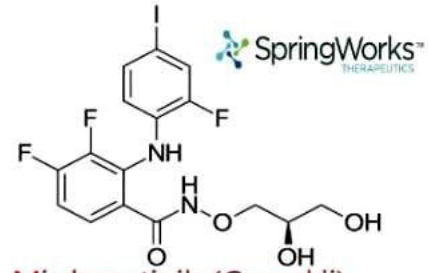
medac

Treosulfan (Trecondi)

Conditioning treatment prior to alloH SCT

RoA PO, IV

Mechanism - DNA alkylating agent

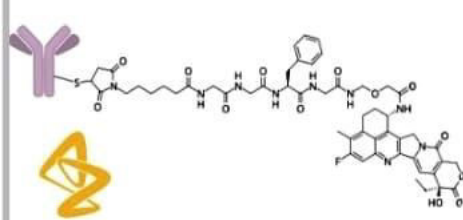


Mirdametinib (Gomekli)

To treat neurofibromatosis Type 1

RoA PO

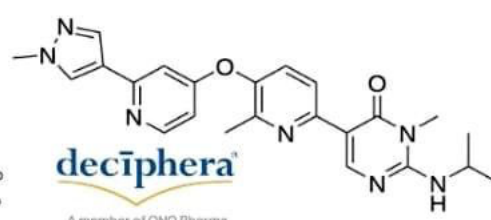
Mechanism - MEK1/2 inhibitor



Datopotamab deruxtecan (Datroway)

To treat HR+, HER2- breast cancer

Mechanism - Trop-2-directed mAb and topoisomerase inhibitor ADC



Vimseltinib (Romvimza)

To treat tenosynovial giant cell tumor (TGCT)

RoA PO

Mechanism - CSF1R inhibitor

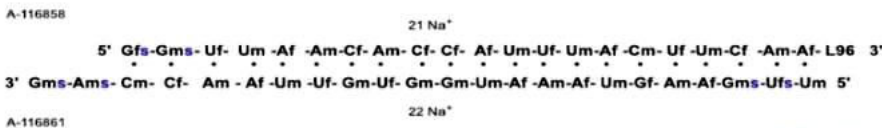


Gepotidacin (Blujepa)

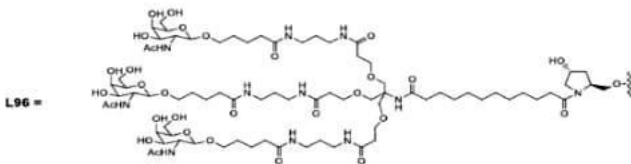
To treat uncomplicated urinary tract infection

RoA PO

Mechanism - DNA gyrase / topoisomerase IV inhibitor



Af, Cf, Gf, Uf = 2'-deoxy-2'-fluoro ribonucleotides
Am, Cm, Gm, Um = 2'-OMe ribonucleotides
s = phosphorothioate



Fitusiran (Qfitlia)

To treat hemophilia

RoA SC

Mechanism - an antithrombin-directed small interfering ribonucleic acid (siRNA)

SANOFI

Alnylam
PHARMACEUTICALS

Collected
By

Nagaraj Guptha
Assistant Prof.
ACOP, Tumkur



CELEBRATION OF WORLD PHARMACISTS DAY



Aruna Educational Trust (R)
ARUNA COLLEGE OF PHARMACY
MARALURU RING ROAD, TUMAKURU

Management of Aruna Educational Trust, Principal, Staff and Students of Aruna College of Pharmacy Tumkur Cordially Invites you all for the celebration of

WORLD PHARMACISTS DAY-2025
Theme: "Think Health, Think Pharmacist"

Chief Guest
Shri. Vinod Parmar Jain
Proprietor cum Chief Pharmacist
Jain Medical Stores, Tumakuru

Guests of Honor
Dr. Raghavendra KG MBBS, DLO
Director, Aruna Educational Trust ®
Smt. Sujatha Raghavendra
Secretary, Aruna Educational Trust ®
Dr. Radhesh KR MBBS, MS (Ortho)
Joint Director, Aruna Educational Trust ®
Smt. Swathi Rao
Board Member, Aruna Educational Trust ®

Presided By
Dr. Bheemachari M.Pharm., PhD
Principal
Aruna College of Pharmacy, Tumakuru

Date: 25.09.2025 Time: 10.30 AM
Venue: Dhanvantari Auditorium, ACOP Campus

Programme Coordinators:
Ms. Pooja R Asst. Professor
ACOP STUDENTS
Ms. Likitha V Asst. Professor



CELEBRATION OF NATIONAL PHARMACY WEEK

ARUNA COLLEGE OF PHARMACY
Quality is our Priority

Approved by PCI, New Delhi, Govt. Of Karnataka & Affiliated to KJ Somaiya Bangalore

KEA Code: 8119

Celebrates
64th NATIONAL PHARMACY WEEK (NPW)

Theme: "Pharmacists as Advocates of Vaccination"

Activities

- Significance of NPW Celebration
- Dr. Bheemachari, Professor & Principal, Aruna College of Pharmacy, Tumakuru
- Myths & Facts about vaccines
- Posters on Vaccine & Quotes explanation
- Handling of Vaccines
- Counseling role Play Station
- Talk on Vaccination Schedules
- Rabid dog bite & Vaccination role play

Faculty Coordinators

Mrs. Raviya Begum, Associate Professor, Aruna College of Pharmacy, Tumakuru

Mrs. Bindu C, Associate Professor, Aruna College of Pharmacy, Tumakuru

Admissions Open For: B.Pharm // D. Pharm

pharmacy.arunainstitutes@gmail.com Behind Ashwini Hospital, Ring Road, Maralur, TUMAKURU-572 105 +91-90361 72956



3rd NATIONAL cGMP DAY CELEBRATION

ARUNA COLLEGE OF PHARMACY
Quality is our Priority
Approved by PCI New Delhi, Govt. of Karnataka & Affiliated to KVAFSU Bangalore
BEA Code: B113

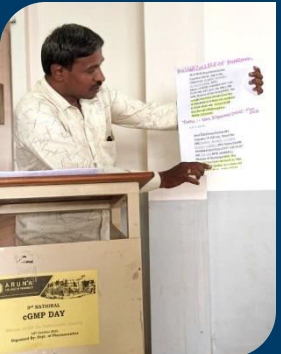
3rd NATIONAL cGMP DAY
Theme: cGMP for Sustainable Quality
10th October 2025
Organized By: Dept. of Pharmaceutics

TOPIC SIGNIFICANCE
Dr. Bheemachari M.Pharm, PhD
Professor & Principal
Aruna College of Pharmacy
Ring Road, Maralur
Tumakuru

RESOURCE PERSON
Ms. Pooja R M.Pharm
Asst. Professor
Aruna College of Pharmacy
Ring Road, Maralur
Tumakuru

Venue: Lecture Hall, ACOP
10th OCTOBER 2025
10.30 AM

Admissions Open For: B. Pharm // D. Pharm
visit us @ [Facebook](https://www.facebook.com/ArunaCollegeofPharmacy) [Instagram](https://www.instagram.com/ArunaCollegeofPharmacy) [LinkedIn](https://www.linkedin.com/company/ArunaCollegeofPharmacy)
pharmacy.arunainstitutes@gmail.com Behind Ashwini Hospital, Ring Road, Maralur, TUMAKURU-572 105 +91-90361 72956



74th INDIAN PHARMACEUTICAL CONGRESS

Dates: 19, 20 & 21st December 2025

Venue: Bangalore International Exhibition Centre



74th INDIAN PHARMACEUTICAL CONGRESS



74th INDIAN PHARMACEUTICAL CONGRESS



74th INDIAN PHARMACEUTICAL CONGRESS





SPACIOUS LECTURE HALLS & LABS

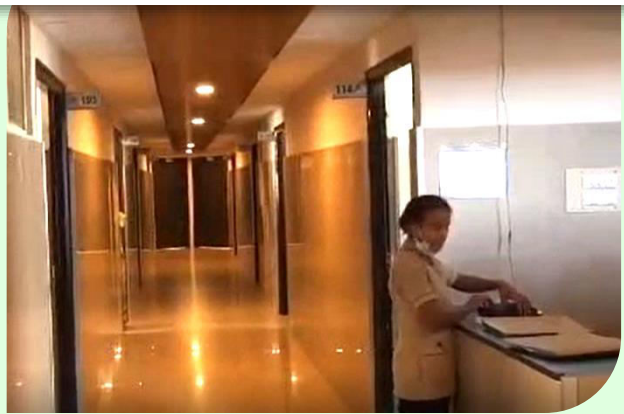


ACOP Promo Video



ACOP Promo Video





KEA / CET Code
B119

ADMISSIONS OPEN FOR

Bachelor of Pharmacy (B.Pharm)

Duration : 04 Years (08 Semesters)

Diploma in Pharmacy (D.Pharm)

Duration : 02 Years

Eligibility : Pass in PUC / 10+2 with Science stream PCMB/PCM/PCB/PCMC.

B.Pharm (Lateral Entry)

Duration : 03 Years

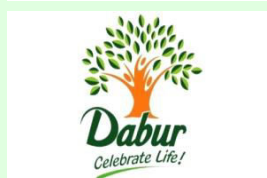
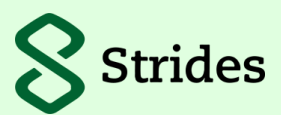
Eligibility : Pass in Diploma in Pharmacy from a PCI approved college



**PAY VISIT FOR
SELF SATISFACTION**

Call Now : 9448303173, 9036172956    

PHARMA MAJOR RECRUITERS



2026
JANUARY

SU	Mo	Tu	We	TH	FR	SA
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY

SU	Mo	Tu	We	TH	FR	SA
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

MARCH

SU	Mo	Tu	We	TH	FR	SA
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

APRIL

SU	Mo	Tu	We	TH	FR	SA
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

MAY

SU	Mo	Tu	We	TH	FR	SA
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JUNE

SU	Mo	Tu	We	TH	FR	SA
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

JULY

SU	Mo	Tu	We	TH	FR	SA
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

AUGUST

SU	Mo	Tu	We	TH	FR	SA
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

SEPTEMBER

SU	Mo	Tu	We	TH	FR	SA
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

OCTOBER

SU	Mo	Tu	We	TH	FR	SA
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NOVEMBER

SU	Mo	Tu	We	TH	FR	SA
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

DECEMBER

SU	Mo	Tu	We	TH	FR	SA
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

2026 General Holidays

◆ 14 Jan Makara Sankranthi	◆ 03 April Good Friday	◆ 15 Aug Independence Day	◆ 26 Oct. Valmiki Jayanti
◆ 26 Jan Republic Day	◆ 14 April Dr. Ambedkar Jayanti	◆ 26 August Eid- Milad	◆ 01 Nov. Kannada Rajyotsava
◆ 15 Feb Maha Shivaratri	◆ 20 April Akshaya Trutiya	◆ 14 Sept. Ganesha Chaturthi	◆ 08 Nov. Naraka Chaturdashi
◆ 19 March Ugadi	◆ 01 May Labour Day	◆ 02 Oct. Gandhi Jayanti	◆ 10 Nov. Bali Paadya
◆ 21 March Ranadan	◆ 28 May Bakrid	◆ 10 Oct. Mahalaya	◆ 27 Nov. Kanaka Dasa Jayanti
◆ 31 March Mahaveer Jayanti	◆ 26 June Moharam 10 Day	◆ 20 Oct. Maha Navami	◆ 25 Dec. Christsmas

WISH YOU HAPPY NEW YEAR 2026

ARUNA

COLLEGE OF PHARMACY



KEA/CET Code: B119

ADMISSIONS OPEN FOR



• B.Pharm 4 Yrs (8 Semesters)

• D.Pharm 2 Years

Eligibility: PUC Pass with PCM / PCB

• B.Pharm Lateral Entry

Eligibility: Pass in D.Pharm



Salient Features

- Lush Green Campus
- Well connected by road
- Multi-Health institutes campus
- Competent Faculty
- Focus on each student
- Student Overall development
- Well equipped Labs
- Enriched Library
- 200 Bed Hospital for Clinical Exposure



Job Profiles

- Drug Inspector
- Junior Scientific Officer
- Pharmacist- Govt. & Pvt.
- Faculty in Govt. & Pvt. Colleges
- Industrial Pharmacist
- QA/QC Dept. in industry
- Regulatory Dept.
- R & D Scientist
- Entrepreneur
- Pharma IT Jobs (Remote Working)
- No job recession fear

CALL NOW: 9 4 4 8 3 0 3 1 7 3 / 9 0 3 6 1 7 2 9 5 6

Behind Ashwini Hospital Ring road Maralur TUMKUR-02
acoaptumkur.in pharmacy.arunainstitutes@gmail.com

