



Editorial

AI-Driven Drug Discovery: Revolutionizing Pharmaceutical Innovation

The pharmaceutical industry stands at the junction of a significant transformation with the rapid integration of Artificial Intelligence (AI) in drug discovery. Traditional drug development, burdened by high costs, prolonged timelines (10–15 years) and low success rates, is being redefined by AI-powered tools that utilizes machine learning, deep learning and generative models.

AI is accelerating in every stage of drug discovery from target identification and virtual screening to de novo molecular design, ADMET prediction and lead optimization. By analysing vast chemical and biological datasets, AI can identify explore chemical spaces far beyond conventional methods, significantly reducing time and cost while improving success probabilities. Notable successes, such as AI-designed drug candidates advancing to clinical trials, demonstrate its growing capacity.

For India, a global leader in generics, AI-driven drug discovery presents an opportunity for paradigm shift from simple imitation to new innovation. Indian pharma companies and research institutions are increasingly adopting AI for faster molecule discovery, toxicity profiling and personalized medicine tailored to our diverse population. Government initiatives and academic-industry collaborations are strengthening this ecosystem, aligning with national goals of self-reliance in healthcare innovation.

However, challenges remain. Issues related to data quality, model interpretability, regulatory acceptance and ethical concerns around bias and privacy need focussed attention. Building interdisciplinary talent and robust computational infrastructure is critical for India to fully employ this latest technology.

The *Indian Research Journal of Pharmacy and Science* encourage researchers to submit high-quality contributions on AI applications in drug discovery, including novel algorithms, case studies and translational research. As we move forward, implementation of AI will be key to delivering safer, faster and more affordable medicines.

Indian science has the potential to lead this revolution. Let us capture this moment.

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