IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, November 2025
Impact Factor: 7.67

From Molecular Targets to Clinical Outcomes: A Comprehensive Review of Drug Discovery and Trials

Sandhya H Markad*, Nikita S Kokate[1], Sonaji B Farande[2], Akanksha U Mapari[3], Kajol B. Sonawane[4]
Sahakar Maharshi Kisanrao Varal Patil College of Pharmacy, Nighoj
sandhyamarkad69@gmail.com* and sonajifarande123@gmail.com[1]

Abstract: *Drug discovery is a multifaceted process that transforms fundamental insights about molecular targets into clinically effective therapies. This review outlines the continuum from target identification and validation to preclinical optimization and subsequent clinical evaluation. We highlight advances in computational modeling, high-throughput screening, and biomarker-guided approaches that have accelerated early discovery and improved candidate selection. Key phases of clinical development—ranging from first-in-human safety studies to pivotal efficacy trials—are examined with attention to evolving regulatory frameworks and the integration of adaptive and platform trial designs. Persistent challenges, including translational gaps, variable patient responses, and late-stage attrition, are discussed alongside emerging solutions such as precision medicine and real-world evidence. By tracing the journey from molecular mechanism to patient outcomes, this review underscores the importance of collaborative innovation and rigorous evaluation in modern therapeutic development.*

Keywords: Drug discovery,Molecular targets,Clinical trials,Translational medicine,Target identification

DOI: 10.48175/IJARSCT-30077