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Introduction

In the realm of pharmaceutical research and development, the journey from initial discovery to market-ready drug can be long, complex, and costly. However, recent advancements in Arti cial Intelligence (AI) are revolutionizing this process, o ering innovative solutions to accelerate drug discovery and development. By leveraging AI algorithms and machine learning techniques, researchers are gaining unprecedented insights into biological systems, identifying novel drug targets, designing optimized compounds, and streamlining clinical trials. In this article, we explore the transformative impact of AI on drug discovery and its implications for the future of healthcare [1].

Target identi cation and validation

One of the primary challenges in drug discovery is identifying viable drug targets—proteins, genes, or pathways associated with diseases. AI algorithms are adept at analyzing vast amounts of biological data, including genomics, proteomics, and transcriptomics, to uncover potential targets. By identifying patterns and correlations within complex datasets, AI helps researchers prioritize targets for further investigation. Additionally, AI-driven predictive models assist in validating these targets, predicting their relevance and potential e ectiveness in combating speci c diseases [2,3].

for existing drugs. By analyzing large datasets of biological and clinical data, AI algorithms uncover hidden connections between drugs and diseases. is approach enables researchers to repurpose approved drugs for new indications, bypassing much of the traditional drug development process and bringing treatments to patients more quickly and cost-e ective ly [10].

Conclusion

Arti cial intelligence is reshaping the landscape of drug discovery, o ering unprecedented opportunities to accelerate the development of safe and e ective therapies. By leveraging AI algorithms and machine learning techniques, researchers can identify novel drug targets, design optimized compounds, streamline clinical trials, and repurpose existing drugs for new indications. As AI continues to advance, its integration into drug discovery processes holds immense promise for transforming healthcare, improving patient outcomes, and addressing unmet medical needs. In the years to come, the synergy between AI and drug discovery will continue to drive innovation and revolutionize the way we approach drug development.

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