

## Drug Repurposing a Viable Tool for Speeding up Drug Discovery

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### Abstract

Traditional drug discovery and improvement includes quite a few degrees for the discovery of a new drug and to achieve advertising and marketing approval. It is integral to find out new techniques for lowering the drug discovery time frame. Today, drug repurposing has received significance in figuring out new therapeutic makes use of for already-available drugs. Typically, repurposing can be accomplished serendipitously (unintentional lucky observations) or thru systematic approaches. Numerous techniques to find out new indicators for FDA-approved tablets are mentioned in this article. Drug repurposing has consequently ended up a productive strategy for drug discovery due to the fact it gives a novel way to discover historic capsules for new use however encounters various challenges. Some examples of one-of-a-kind methods are reviewed here.

### Introduction

The labyrinthine journey from a promising molecular compound to a market-ready pharmaceutical drug is one riddled with complexity, risk, and exorbitant costs. Traditionally, the process of developing a novel medication involves extensive research, rigorous testing, and protracted clinical trials, taking more than a decade to navigate. The financial investments required for such an odyssey are staggering, often reaching billions of dollars, and the failure rate remains disappointingly high [1,2]. However, in recent years, a ray of hope has emerged in the form of drug repurposing—a pragmatic strategy that is gaining recognition as a potent tool to expedite the drug discovery process. This innovative approach entails reimagining existing drugs, previously approved for specific therapeutic uses, and unveiling their potential in addressing entirely different medical conditions. In essence, drug repurposing holds the promise of reducing development timelines, curbing costs, and mitigating risks, while offering new avenues to combat a spectrum of diseases. This article delves into the transformative world of drug repurposing, elucidating its principles, extolling its merits, and unveiling real-world triumphs of repurposed drugs. In doing so, we will uncover the undeniable potential of this approach to revolutionize the field of pharmaceutical research and bring hope to countless patients waiting for better treatments. Drug repurposing involves finding new therapeutic uses for existing drugs, which can significantly reduce the time, cost, and risks associated with drug development. This article explores the concept of drug repurposing, its advantages, and real-world examples of successful repurposed drugs [3,4].

### Understanding drug repurposing

Drug repurposing is the process of identifying and developing new medical applications for existing drugs that have already been approved for other indications. Rather than starting from scratch, researchers look for promising existing drugs that may be effective in treating different diseases or conditions. This approach leverages the vast body of knowledge about these drugs, including their safety profiles and mechanisms of action, and repurposes them for new uses. Here's how the process typically works.

**Identification of a drug candidate:** Researchers select a drug that shows promise based on existing knowledge, which can be informed by various sources such as scientific literature, high-throughput screening, or computational analyses.

**Laboratory testing:** The selected drug candidate undergoes laboratory testing to determine its efficacy in treating the new condition.

This phase involves in vitro and in vivo experiments.

**Clinical trials:** If the laboratory tests show promise, the drug moves on to clinical trials, where its safety and efficacy in humans are rigorously assessed.

**Regulatory approval:** If the clinical trials are successful, the repurposed drug can be submitted for regulatory approval to treat the new condition.

### Advantages of drug repurposing

Drug repurposing offers several advantages that make it an attractive strategy for speeding up drug discovery

**Reduced development time:** Since repurposed drugs have already undergone extensive testing for their original indications, the development timeline is significantly shortened compared to entirely new drug development.

**Lower development costs:** The cost of developing a new drug can run into billions of dollars. Repurposing existing drugs reduces the financial burden by leveraging previous investments in research, development, and safety testing.

**Known safety profiles:** Repurposed drugs have well-established safety profiles, making it easier to predict and manage potential side effects.

**Faster clinical trials:** Repurposed drugs can often progress through clinical trials more rapidly, as the initial phases of safety assessment have already been completed.

**Diverse therapeutic applications:** Drug repurposing enables the exploration of multiple therapeutic uses for a single drug, expanding treatment options and potential benefits for patients.

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**Aspirin:** Originally developed as a pain reliever and anti-inflammatory medication, aspirin was later repurposed as a blood thinner, reducing the risk of heart attacks and strokes.

**Thalidomide:** Initially developed as a sedative and later infamous for causing birth defects, thalidomide has been repurposed for treating multiple myeloma and leprosy.

**Sildenafil (Viagra):** Originally investigated as a treatment for hypertension and angina, sildenafil found its main success as a medication for erectile dysfunction.

**Metformin:** Developed as an anti-diabetic medication, metformin is being studied for potential benefits in treating cancer, polycystic ovary syndrome (PCOS), and other conditions.

**Rituximab:** Initially approved for non-Hodgkin lymphoma and rheumatoid arthritis, rituximab is now used in the treatment of multiple autoimmune diseases [5-10].

## Conclusion

Drug repurposing is proving to be a powerful tool for accelerating drug discovery and development. It harnesses the vast pool of existing drugs, repurposing them for new therapeutic uses, and offers numerous benefits, including reduced development time, lower costs, and known safety profiles. By repurposing drugs, researchers and pharmaceutical companies can provide patients with faster access to treatments for a variety of medical conditions, ultimately improving public health and well-being. As our understanding of drug mechanisms and diseases continues to evolve, drug repurposing will likely play an increasingly vital role in the pharmaceutical industry. In a world where emerging health crises, chronic diseases, and novel pathogens demand rapid and innovative solutions, drug repurposing stands as a formidable ally in the quest for medical breakthroughs. It exemplifies the notion that sometimes, the answers to complex problems lie in revisiting the past, repurposing the familiar, and forging new paths to healing. As the pharmaceutical industry evolves and our knowledge of the intricate mechanisms of diseases deepens, drug repurposing will continue to play an increasingly crucial role in accelerating the development of treatments for a myriad of conditions. By harnessing the potential of repurposed drugs, we not only expedite the journey from laboratory bench to patient bedside but also bring new hope to individuals suffering

from a range of ailments. The future of drug discovery is undoubtedly intertwined with the promise and potential of drug repurposing, offering the possibility of better, faster, and more affordable healthcare solutions for all.

## Conflict of Interest

None

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