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Editorial

Precision Medicine & Drug Repurposing for Cardiovascular Diseases; Challenges and Opportunities

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The use of a therapeutic agent other than its intended purpose is referred to as drug repurposing. The principle is of particular benefit as it allows for shorter timelines and lower developmental costs as compared to the development of a novel drug. Systematic drug repurposing has now opened new avenues. However, clinical successes for cardiovascular are hard to seek. Henceforth, systematic drug repurposing despite having a lot of potential, is not without significant barriers that have to be overcome. Some of the barriers are associated with the potential favorable benefit to risk ratio, however, adverse effects are not a major concern when it comes to drugs being repurposed. More nuanced barriers such as issues with intellectual property that can decrease financial incentives are also significant.

Induced pluripotent stem cell technology is the front runner for addressing monogenic pathologies. However, due to the rare occurrence of these monogenic diseases, lower financial gains also serve as a discouraging factor. Strategies such as second medical use patents have been introduced to enhance drug repurposing, but skepticism with regards to establishing non-obviousness and evading competition from already approved generics in the market is a hurdle. As a result, it is incumbent that reforms be made to bolster drug re-engineering, repurposing be introduced and specific recommendations proposed to actualize the benefits of drug repurposing to the fullest.

For systematic repurposing specific to the diseases of the cardiovascular systems, innovation in two domains of personalized medicine: 1) Predictive models to screen for the disease-modifying activity of active compounds and 2) Computational approaches to associate drug effects with disease signatures should be made simultaneously to streamline the process of cardiovascular drug repurposing. In truth, the combination of experimental and computational approaches has dawned a new age in drug repurposing. The high-throughput drug screening is achieved experimentally whereas the computational side deals with the manipulation of large datasets of both the drug effects as well as the molecular and phenotypical characteristics of the disease. This allows for gauging the mechanism of action of the drug with the disease pathology, aiding if required, drug repurposing based on the disease-modifying effects. With sufficient intellectual and financial backing, experimental and computational technologies could be optimized to enhance drug discovery and repurposing for cardiovascular diseases.

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