

Repurposing as a future strategy for pharmaceutical research



With the urgent need for new treatments for serious diseases and concerns about other existing unmet patient needs as well as the cost of traditional drug discovery and other productivity issues on the constant increase, drug repurposing has become an attractive alternative. Drug repurposing is defined as the process of discovering new indications for existing drug compounds (Tari and Patel, 2014). Tari & Patel (2014) further explain that the concept behind drug repurposing is “ that novel drug indications can be identified based on the principle that a primary drug target can be associated with diseases other than its original drug indication.” Various systematic approaches have been proposed for finding new indications for drugs; some of this include discovering drugs hat share a significant number of side effects as they may have similar actions and those with similar chemical compounds. The most cited success for drug repositioning is sildenafil, a drug developed by Pfizer and originally indicated for the treatment of angina but was discovered to show an improvement in patients suffering from erectile dysfunction as well (Pantziarka et al, 2014) [online]

Drug repurposing is becoming the surest way to both provide treatment for both new and old diseases, as well as reducing greatly the cost of production of these treatments. Persidis(2011) [online] lists a couple of advantages crediting this, some of which include that pre-existing drugs or those which have been proven to be safe at late-stage trials greatly reduce development risk even when repurposed for potentially new indications. The article continues to add that there is a massive money saving advantage when comparing launching a repurposed drug into the market with launching a completely new formulation to pharmaceutical companies owning original

use rights to the drug. On the other hand, NCBI suggests that as drugs are only approved for specific therapeutic indications within clear safety boundaries and after intense investigation, finding new drug-target interactions is most often hampered by safety issues regarding dosage and delivery capability as discovery of a repurposed drug working within the approved therapeutic window is a rare occurrence; suggesting also that even in a case where appropriate formulations and delivery devices were available to eliminate the problems associated with dosage and delivery within the narrow therapeutic window, the issue of lack of integration with pharmaceutical and toxicological sciences still persists. These go without including the problems associated with protection of intellectual property as various new drug-target-disease triplets are often disclosed by various online databases. Repositioned drugs have been a huge success in providing effective remedies for a large number of patients suffering from a wide range of diseases, have promised to deliver new treatments for even more diseases including some of the most perverse diseases the plague the central nervous system, cardio-vascular system, many metabolic disorders and cancer. Precisely, the scope of drug repurposing can be widened in future to cater for the development of drugs with multiple targets as in the area of oncology and those which target disease in various ways as in obesity. It can even more importantly create opportunities for the development of second-generation drugs (Sehkon, 2013) Therefore, despite any disadvantages that may arise in the process of repositioning drugs, the process remains the most effective of its kind in recent times and hence plays a very important role in pharmaceutical research concerning future drug discovery.

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It is important to note that though most repurposed drugs have desirable pharmacokinetic and pharmacodynamics properties especially those that have passed various clinical trial stages about 2000 of these drugs lie dormant of various companies' shelves and Barratt and Frail (2012) suggest that this number grows at the rate of 150-200 drugs every year.

Sequentially, this number creates more than adequate substrate on which a repurposing strategy can be developed and as discontinued compounds are a by-product of carrying out business in the pharmaceutical environment, there will never be a shortage of them. Hence, learning from these failures and applying the ever evolving science behind human biology and diseases will not only salvage efforts made in the research and development environment but also lead to the development of a very viable business model while significantly decreasing the risk of failure, cost of production and cycle time.

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