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Application of drug repurposing-based precision medicine platform for leukaemia patient treatment

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Abstract

Drug resistance in leukaemia is a major problem that needs to be addressed. Precision medicine provides an avenue to reduce drug resistance through a personalised treatment plan. It has helped to better stratify patients based on their molecular profile and therefore improved the sensitivity of patients to a given therapeutic regimen. However, therapeutic options are still limited for patients who have already been subjected to many lines of chemotherapy. The process of designing and developing new drugs requires significant resources, including money and time. Drug repurposing has been explored as an alternative to identify effective drug(s) that could be used to target leukaemia and lessen the burden of drug resistance. The drug repurposing process usually includes preclinical studies with drug screening and clinical trials before approval. Although most of the repurposed drugs that have been identified are generally safe for leukaemia treatment, they seem not to be good candidates for monotherapy but could have value in combination with other drugs, especially for patients who have exhausted therapeutic options. In this review, we highlight precision medicine in leukaemia and the role of drug repurposing. Specifically, we discuss the several screening methods via chemoinformatic, in vitro, and ex vivo that have facilitated and accelerated the drug repurposing process.