Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2024, 16(8):6-7

Commentary Article

ISSN: 0975-7384
CODEN (USA): JCPRC5

Advancements in High-Throughput Screening for Drug Repurposing

Caiden Mack*

Department of Pharmacy, University of Geneva, Geneva, Switzerland

Received: *26-Jul-2024, Manuscript No. JOCPR-24-145983;* ***Editor assigned:*** *29-Jul-2024, PreQC No. JOCPR-24-145983 (PQ);* ***Reviewed:*** *12-Aug-2024, QC No. JOCPR-24-145983;* ***Revised:*** *19-Aug-2024, Manuscript No. JOCPR-24-145983 (R);* ***Published:*** *26-Aug-2024, DOI:10.37532/0975-7384.2024.16(8).182*

DESCRIPTION

Drug repurposing, or the process of giving already-approved medications new therapeutic uses, has grown in popularity as a drug discovery tactic. Since repurposed medications have previously undergone extensive testing for safety and efficacy, it offers the opportunity to shorten the time and expense associated with generating new medications. The subject of therapeutic repurposing has benefited greatly from the rapid advancement of High-Throughput Screening (HTS), which enables researchers to test thousands to millions of molecules against a specific biological target. In order to solve the remaining hurdles and expedite the identification of new medicines, this study examines the most recent developments in high-throughput screening for drug repurposing.

The Role of High-Throughput Screening in Drug Repurposing

High-Throughput Screening (HTS) has proven to be useful in discovering novel therapeutic applications for already approved medications. HTS makes it possible for scientists to quickly evaluate vast libraries of chemicals in order to find possible therapeutic options that interact with a particular target a protein, enzyme, or receptor that is connected to a particular disease. With its capacity to screen a large number of compounds at once, HTS is an effective method for repurposing existing drugs since it enhances the probability of finding novel interactions. The effectiveness of HTS in finding hits that conventional drug discovery techniques could have overlooked is one of its main advantages in drug repurposing. While HTS simplifies the process, traditional approaches can include labor-intensive and time consuming procedures, making it possible to quickly evaluate current medications against new targets. This effectiveness is

especially useful for repurposing initiatives, where the objective is to swiftly find substances that can be repurposed to treat unmet medical requirements, such newly emerging infectious diseases or uncommon ailments.

Advancements in High-Throughput Screening Technologies

The capabilities of medication repurposing initiatives have been considerably increased by recent developments in HTS technologies. The incorporation of Machine Learning (ML) and Artificial Intelligence (AI) into HTS platforms is one noteworthy advancement. Large-scale screening data may be analyzed thanks to these technologies, which also make it possible to spot patterns and connections that conventional analysis would miss. By predicting a compound's biological activity, improving screening parameters and ranking hits for more study, AI and ML can boost the repurposing process' accuracy and efficiency. The application of phenotypic screening in HTS is another development. Phenotypic screening assesses the impact of chemicals on entire cells or organisms, as opposed to target-based screening, which concentrates on a particular molecular target. This method enables the identification of medications with one or more unknown mechanisms of action that result in the intended therapeutic effect. When it comes to finding repurposed medications for complicated diseases like cancer and neurological disorders, where the underlying biology is not fully understood, phenotypic screening has proven very effective. Drug repurposing initiatives have also been transformed by the creation of automated and miniature HTS platforms. These platforms make it possible to screen compound libraries in smaller numbers, which lowers expenses and reagent requirements. From compound handling to data processing, automation has simplified the screening process from start to finish, allowing for increased throughput and more reliable results. Furthermore, the use of organoids and 3D cell cultures in HTS has produced more physiologically accurate models, enhancing screen predictive power and raising the possibility of a successful medication repurposing.

Finally, high-throughput screening has become a cornerstone in the field of drug repurposing, offering the ability to rapidly and efficiently identify new therapeutic uses for existing drugs. Advancements in HTS technologies, including the integration of AI, the adoption of phenotypic screening and the development of more physiologically relevant models, have significantly enhanced the potential of drug repurposing efforts. While challenges remain in data interpretation and validation, the continued evolution of HTS, coupled with emerging technologies, promises to accelerate the discovery of new therapies for a wide range of diseases. As the pharmaceutical industry continues to seek innovative solutions to address unmet medical needs, HTS for drug repurposing will play an increasingly vital role in shaping the future of drug discovery and development.