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Network Pharmacology as an Appropriate Bioinformatics Tool for Drug Discovery

Venugopalan Nair SN

Associate professor, TDU (TransDisciplinary University), India

Opinion

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***Corresponding author:** SN Venugopalan Nair, Associate professor, TDU (TransDisciplinary University), Institute of Transdisciplinary Health sciences and Technology), 74/2, JB Kaval, Attur PO, Via Yelahanka, Bangalore, India, Email: venue.gopal@tdu.edu.in; venugopalansn@gmail.com

Opinion

Network pharmacology is an emerging technique which integrates systems biology and computational biology to study multicomponent and multi targeted formulations. Ayurvedic formulations and multicomponent and multi targeted but their mechanism of action is not understood. The networks can illustrate and visualized the interaction of bioactive molecular targets and their relation with diseases [1].

Many drugs used in specialties like oncology, cardiology and psychiatry, have effects on multiple targets. To better understand the underlying complex biological and pharmacological processes for chronic diseases like asthma, cancer, and neurodegenerative diseases, it is important to know the systems network of different pathways where the drugs are likely to act [2].

The natural and traditional medicines are reemerging as promising new leads, to boost new drug discovery. Combinatorial chemistry approaches based on natural product scaffolds are being used to create screening libraries of closely resembling drug-like compounds [3,4]. It is important to address multiple targets emanating from a syndrome-related, metabolic cascade so that holistic management can be effectively achieved. Therefore, it is necessary to shift the strategy from one that focuses on a single target-new chemical entity as a drug, to one of a multiple-target, synergistic, formulation discovery approach [3].

The conventional methods to study and discover the complexity of Ayurvedic formulations are inadequate for a scientific research. The network pharmacology is equipped enough to meet the challenges of a scientists of biomedicine and Ayurveda in their future research. It is possible to customize poly herbal formulations for ones Prakṛti (Psycho Somatic constitution) because it is more efficacious and produce no ill effects. It also predicts the possibilities of impending metabolic disorders in a person and helps one to take precautionary measures and design individualized combination of drugs or customized formulations [5].

A module of the Traditional pharmacopoeia database can be linked to advanced functional genomics or omics (genomics, transcriptomics, proteomics, metabolomics, phenomics) studies on disease target and pathways. This can augment *in-vitro* / *in-vivo* studies by saving the most appropriate medicine for a given condition / model. *In-silico* targets can be searched for a particular disease conditions in a short period of time. This will give quick information of the target molecules and their binding affinity, and can be used as validation tool before molecular lab studies.

The network pharmacology methods will explain how the Traditional formulations are designed and working based on various parameters.

The Ayurvedic community and researchers and industries can make use this information in their drug discovery attempts with more convincing data and analytical reports.

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