

## Network Science For Diseases: Conjugating Ayurveda and Modern Medicine

*Aparna Rai*

*Indian Institute of Technology Guwahati, Assam, India*

*raiaparna13@gmail.com*

The post-genomic era aims to understand human health and diseases with safety and economic benefits. The costlier drug discovery process and increase in high-throughput experimental data (CHIP-CHIP, NGS experiments, etc.) have led to rapid advancements in both experimental and theoretical techniques in recent years. Simultaneously, synthetic compounds are replaced by natural products for discovering new drug molecules due to high risk of major side effects from the synthetic drug. Our ancient science of Ayurveda provides us with documented knowledge of treating multiple diseases with the use of natural food like compounds. Further, advancement of statistical tools such as networks along with spectral graph theory prove to be highly potent and promising approach in addressing complex disease models. Thus, Integrating Modern medicine techniques (Cheminformatics, Graph Theory and Systems Biology) with Ayurveda (ancient science of medicine), could help us develop the grounds for target identification of new or repurposed drug molecules.

Numerous Ayurvedic medicines for different diseases have similar ingredients with varying constitutions i.e. there are multiple components that affect multiple targets in the human body. Similarly, network studies have helped to uncover complexity of the disease, its interacting patterns, role and importance of interaction patterns in occurrence of the disease, as well as find potential and important nodes in these networks responsible for causing the disease further suggesting that instead of targeting a single molecule, a group of molecules could be of profound implications.

Characterizing Ayurvedic concoctions for its constituent molecules (metabolites) results in possible drug targets for each of the metabolites. Further, the structural and spectral analysis of the drug-target network corresponding to these metabolites uncover new drug targets that can be used to cure the diseased condition.

This combination of this ancient knowledge and modern aspects of science as Cheminformatics, Graph theory and Network systems biology help us to develop the grounds for modern medicine in a time-efficient and cost-effective manner which can be useful specially for low-income countries.

