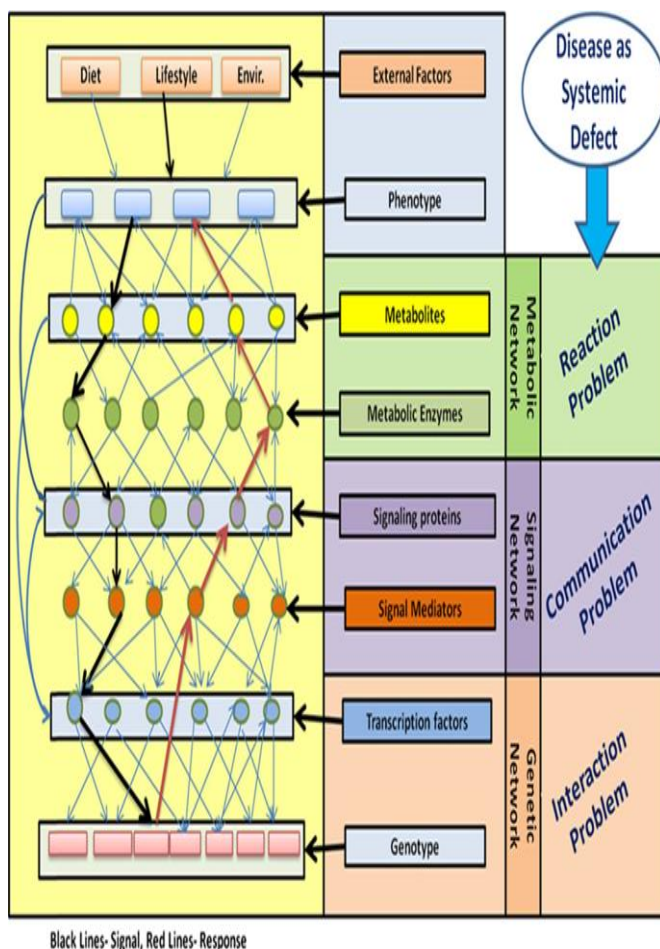


The role of the System Biology program in Health and Disease: from biological networks to modern medicine.

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Abstract

Human physiology incorporates integrated biological processes ranging from cell-to-cell interactions within a Phenotypic, physiological response. The network is embedded in a structure that controls order, which has led to an unhealthy condition called disease when disturbed unusually. Here, we present a diagnostic problem similar to the problem of error detection in engineering systems. We are reviewing the use of engineering methods to deal with human diseases from a biological perspective. Research into the human system has provided an accurate understanding of the chemical and physical properties contributing to the human body in the last few decades. In general, mitigation measures often reduce this interaction by building a more comprehensive network of organisms. Biological networks contain interactions between genes, proteins, and metabolites that combine to control cellular processes. While the interaction of many cells contributes to tissues' response, the various organs that make up different types of tissue continue to adapt to the body's response. These interactions form the basis for network design that identifies natural designs' principles that govern the body's response capacity. The review highlights the potential networks and modeling methods used to analyze human diseases. It shows the use of this analysis of cancer and diabetes. We introduce the concept of human-to-human cellularization consisting of five modules (data mining, communication, modeling, testing, and validation) to address human physiology and diseases supported by the system-level paradigm analysis. The review focuses on the importance of multiple biological and modeling networks and subsequent analysis of drug-specific diagnoses and the development of effective treatment modalities



Based on the advances in the knowledge of human systems biology, we propose a “Cell-to-Human” approach to address human diseases. We outline a framework for the application of network modeling approach towards personalized medicine. The framework consists of five basic modules i.e.—(1) data mining module, (2) networking module, (3) modeling and analysis module (4) experimental cum development module and (5) validation cum Implementation module.

Schematic diagram showing the typical coordination of genetic, signaling and metabolic networks for generating a phenotypic response. The figure shows the schematic of the typical information processing in a cellular network. Any defect at either of these levels of information process can lead to disruption in the adequate response leading to disease states mathematical.

