

Network Medicine: From the Human Diseaseome to Comorbidity Patterns

Most cellular components do not work in isolation, but exert their function through intricate networks of regulatory, metabolic, and protein interactions. These complex interdependencies among a cell's molecular components often lead to deep causal relationships between apparently distinct diseases. Aiming to understand the role of networks in disease we established a phenotypic network in which two diseases are linked if the same gene is implicated in both diseases. Contrary to the widely discussed expectation that disease proteins would also be hubs, we found that proteins associated with inheritable diseases tend to be located at the periphery of the cellular network. These results point to the need for a deeper understanding of the interplay between the genotype, cellular networks and disease phenotypes, bringing network thinking to medicine.