

Is There a Fundamental Law of Health and Disease?

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In recent years, technologies enable us to collect overwhelming amount of signals about our patients. As a result, it becomes possible to quantify health and disease of human body from an integrative system viewpoint. However, conventional biomedical research tools that have been developed with reductionist theory may not be appropriate, mainly because these tools typically focus on individual components of the whole system, while ignoring important nonlinear interactions among different components of the system. In this talk, I will discuss a general framework to study physiologic dynamics. With this framework, we can derive useful measures that best reflect the emergent properties of the integrative systems, and to identify system-level behaviors that are critical to our understanding of a healthy system and its pathological perturbations. This new approach has a wide range of biomedical applications that will also be discussed in this talk.