Goal2 Realization of ultra-early disease prediction and intervention by 2050.

Comprehensive Mathematical Understanding of the Complex Control System between Organs and Challenge for Ultra-Early Precision Medicine

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Summary of the project

We will establish **integrated research between mathematical studies** with mathematical data analysis and modeling analysis, and **experimental studies** on interaction and control between organs. In particular, we develop **DNB (Dynamical Network Biomarkers) theory** and **its complementary theory like spatio-temporal information transforming learning to detect the pre-disease state (Mebyo) and deviation from healthy states, respectively,** at ultra-early timing before tipping points to disease states and propose methodology for **Ultra-Early Medicine** based on such ultra-early detection as well as treatments as **control theory** on physiological networks. The long-term purpose of this project is to realize **a society equipped with ultra-early disease prediction and prevention systems** by 2050.
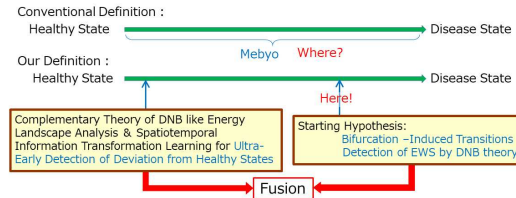

Milestone by year 2030

Based on mathematical studies, we will develop **methodology of network treatment** to detect early warning signals of the diseases in the pre-disease states before they will really occur and to **cure the imminent diseases before the onsets**.

Milestone by year 2025

We will develop methodology for **detecting early warning signals of diseases in pre-disease states before the onsets** by analyzing various data from the whole body on the basis of mathematical data analysis and mathematical model analysis.
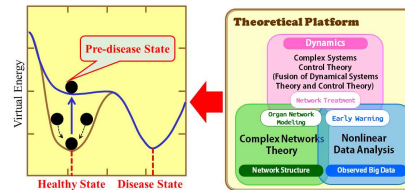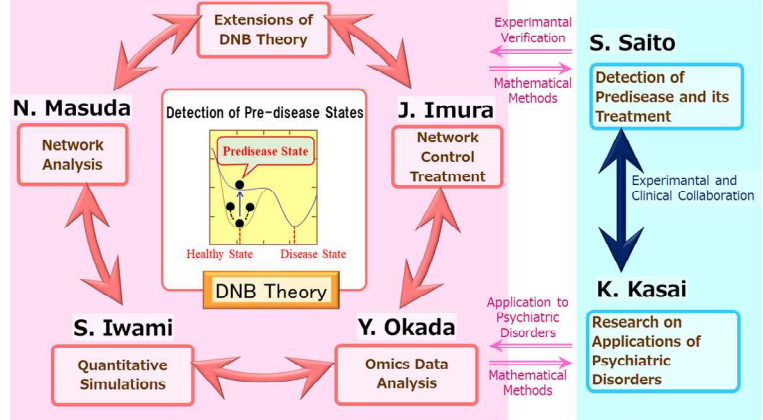

R&D theme structure of the project