

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

Challenge for Eradication of Diabetes and Comorbidities through Understanding and Manipulating Homeostatic Systems

Project manager

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R&D institutions

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Summary of the project

We will utilize AI and mathematical model analysis to elucidate the mechanisms of the inter-organ networks involved in the regulation of metabolism and circulation. Based on this, we will develop a technology to more precisely detect diabetes and its comorbidities in the pre-symptomatic stage. Furthermore, we will develop a method to control the inter-organ network with the aim of developing a method to improve the condition from the pre-symptomatic stage to the normal stage. Through this, we aim to realize a society in which, by 2050, information on diabetes and its co-morbidities will be fed back to patients, and it will be common for patients to be restored to normal in a very early stage of the disease.

Milestone by year 2030

We will develop preventive interventions for diabetes and comorbidities and establish a simple, very early diagnostic method.

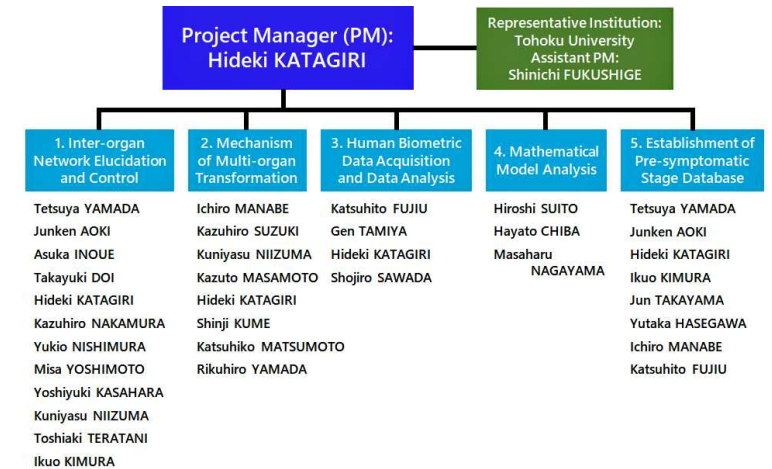
- Identify the inter-organ network systems that lead to metabolic homeostasis
- Utilize mathematical modeling to elucidate the nature of homeostasis
- Optimize methods to intervene prophylactically diabetes and its co-morbidities by regulating inter-organ network systems
- Implement a method to detect and evaluate diabetes and comorbidities using a non-invasive biometric device

Milestone by year 2025

We propose preventive interventions for diabetes and comorbidities and develop simple early-stage diagnostic methods.

- Identify candidate targets within the inter-organ network system that can lead to preventive intervention methods
- Propose specific preventive interventions for diabetes and comorbidities by controlling these targets
- Create an evaluation system for human pathology using non-invasive biometric devices and demonstrate its usefulness

R&D theme structure of the project



Our project consists of five R&D themes with close collaboration within and among themes 1-5.

- Theme 1: Elucidate the inter-organ network mechanisms that maintain homeostasis at the individual level
- Theme 2: Analyze both functional and morphological alterations in multiple organs/tissues in relation to inflammatory systems
- Theme 3: Develop and socially implement a simple and non-invasive method for detecting and predicting the early stages of diabetes and its co-morbidities
- Theme 4: Proceed with mathematical model analysis using animal experimental data and human biological data, leading to a comprehensive understanding by extracting key elements
- Theme 5: Collect various data on the transition from normal to diseased state over time using laboratory animals, with the aim of constructing a pre-symptomatic stage database