



AI (Artificial Intelligence) -Based Nutrition (AI Nutrition) Technology for Future Food Development

By developing technologies to utilize limited global capital effectively, we hope to build a new food supply industry that will both conserve the global environment and increase and improve the quantity and quality of food, followed by spreading a “natural capital (earth supremacy)-oriented society” that supports such an industrial structure for the benefit of future generations.

Project Manager (PM): TAKAHASHI Shin-Ichiro

Professor, Graduate School of Agricultural and Life Science, The University of Tokyo

Creation of Next-Generation Food Supply Industrial Chains for a Natural Capitalism Society

Keywords: AI nutrition, futuristic food, natural capitalism

Background

Cultivating Consumers' Awareness about Future-Oriented Foods with Reduction of Food Loss and Health Consideration

We have heavily utilized the various biological resources of the Earth since the beginning of human history. Because we placed a high priority on economic efficiency in industrial development, our irreplaceable Earth has been terribly damaged, resulting in environmental destruction and global warming, etc.

In this project, we will first establish "AI Nutrition Technology," a fundamental technology necessary to realize "health from food" based on scientific evidence, by making full use of multimodal digital technology. We will establish "AI Nutrition Technology", a fundamental technology necessary to realize "health from food" based on scientific evidence by making full use of multimodal digital technology, through mathematical scientific methods and collaborative creation between medicine and food. Next, by making full use of AI Nutrition technology, we will promote the development of "futuristic foods" that contribute to the extension of healthy life expectancy. Through this, we aim to calculate the total amount of nutrients necessary for all people to lead healthy lives, and then create a "next-generation food supply industry" by 2050 that provides futuristic food products that utilize the bounty provided by the earth without further exhausting the limited natural capital and without wasting it. By promoting these efforts, we will build abundant natural capital for the future.

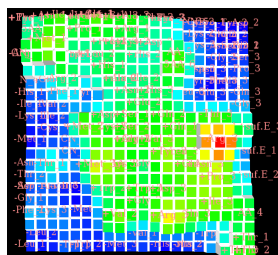
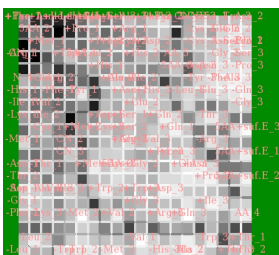
On the other hand, the food supply industry, which is formed by the demands of consumers, will work to transform the consciousness of consumers from the current economic-oriented capitalism to “natural capitalism”. “One Earth Guardians Fostering Program,” promoted by the University of Tokyo Graduate School of Agricultural and Life Sciences, will join this activity.

Research Contents

Realizing "Health from Food AI Nutrition Technology for Social Transformation!

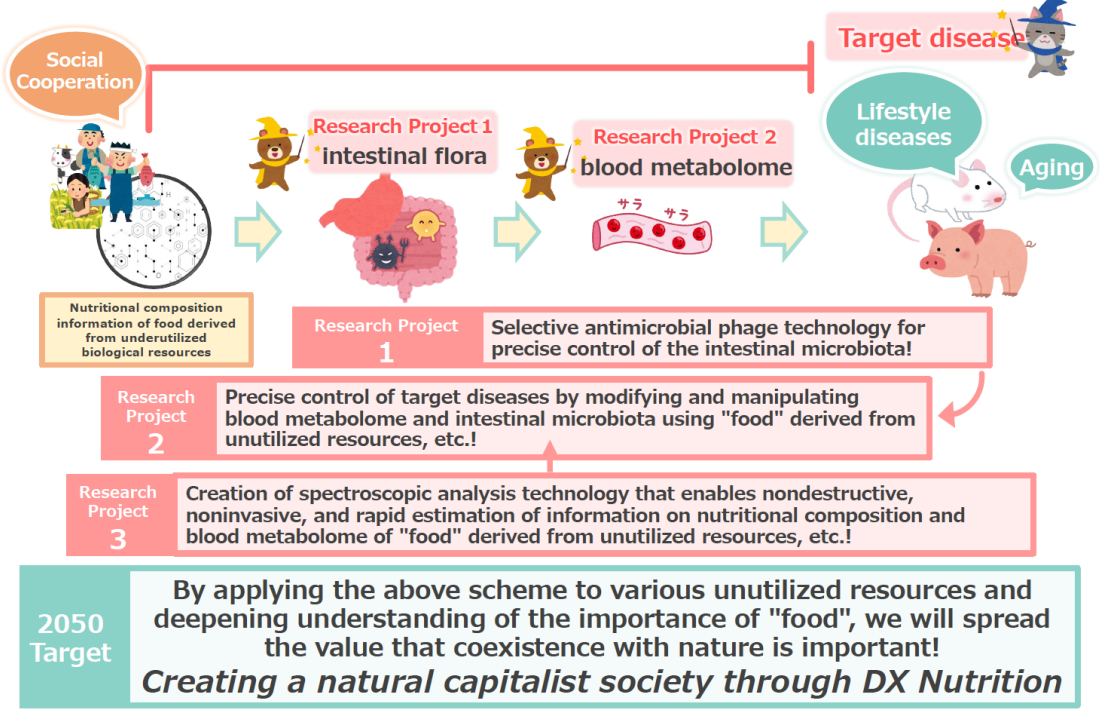
By 2030, this project will establish the foundation of "AI Nutrition Technology" to design biological information to suit specific purposes by comprehensively understanding the effects of nutrients and other components of foods and feeds on individual organisms through mathematical scientific methods and the collaborative creation of medicine and food.

Furthermore, by making full use of this technology, we will pave the way for the realization of "food for the future," which will enable the maintenance and promotion of health through "food" based on scientific evidence. In this project, we will explore "foods" that are particularly effective in preventing lifestyle-related diseases and aging.



The rats were classified by SOM analysis using the amino acid levels in the blood of rats fed various diets as input values (right figure). Blacker units indicate greater differences among rats. As shown in the left figure, the rats can be roughly classified into three groups based on blood amino acid concentration alone. On the right is a heatmap of rat liver TAG concentrations for each unit. The liver TAG concentrations can also be classified into the same three groups. This indicates that the profile (pattern) of blood amino acid concentrations determines liver TAG concentrations, and together with other results, we conclude that machine learning is effective in nutritional science. (Sci. Rep. 8: 5461. 2018)

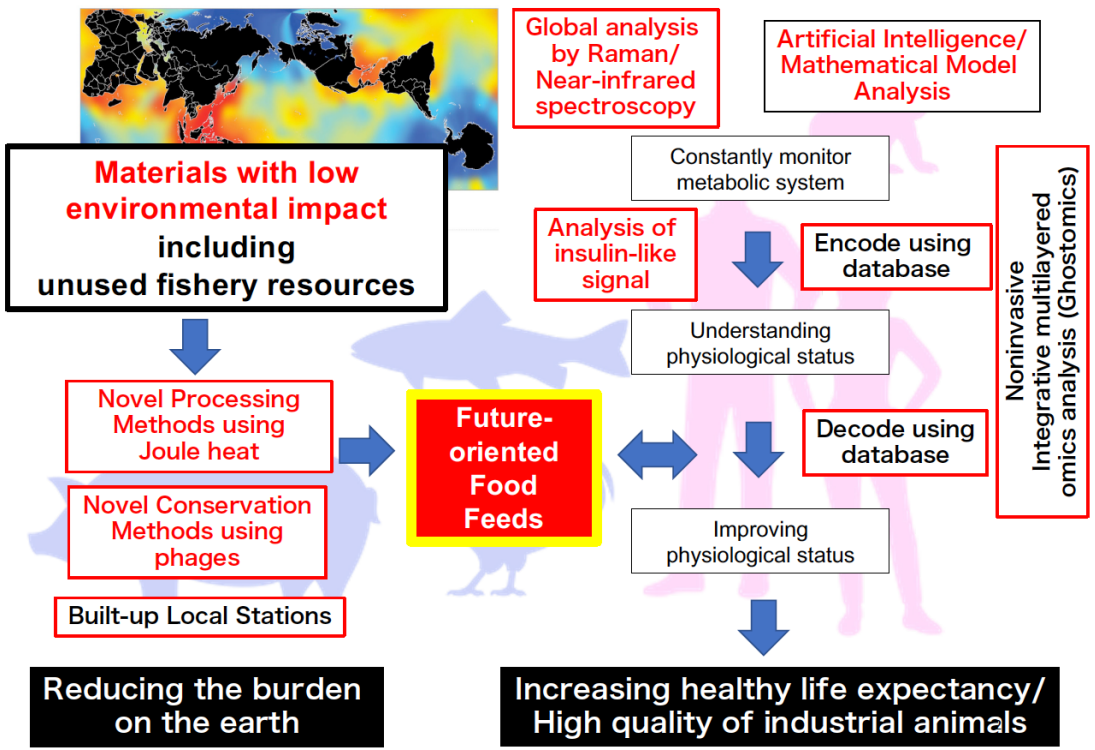
2030 Target Realize "Health from Food" based on scientific evidences by making full use of digital technology (AI Nutrition)!



Targets by 2030

By 2030, we will elucidate the effects of diet and intestinal microflora on blood nutrient dynamics and the impact of their control on health, resulting in the supply of completely new futuristic foods through the development of AI Nutrition technology.

Our Future Goals of the Moonshot Program 2030



Joint Research Institute

The University of Tokyo, Jichi Medical University, University of Tsukuba, National University Corporation

