Social Cooperation Research Program

Project Division of Genomic Medicine and Disease Prevention

ゲノム予防医学社会連携研究部門

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Diseases, including cancer and common/chronic conditions, develop/progress by the combination/interaction of genetic background, acquired environmental exposures, life-style factors and aging. Identification of risk factors at time of birth and later in life provides information on which approaches to disease prevention can be tailored. The Project Division of Genomic Medicine and Disease Prevention was started in July 2019 in cooperation with Nippon Telegram and Telephone Cooperation (NTT), with a goal to develop personalized/precision-based prevention of diseases by integrating genomic information, health records and life-style data. The Division has started its next term for another five years in April 2024 and will aim to conduct further research as well as implement outputs to healthcare.

The Project Division of Genetic Medicine and Disease Prevention was established in 2019 to obtain scientific evidence to enable disease prevention by integrating genetic information into healthcare-based information (eg health records), life-style data and age.

For this purpose, a collaborative project with NTT Life Science, Corp. was initiated in 2020 to undertake research to integrate genetic testing with healthcare data to identify disease risk. Consenting employees of NTT group companies who undertake regular/annual physical examinations were recruited to a comprehensive survey program of genetic testing using microarray analysis and healthcare data collection. The program aims to investigate use of polygenic risk scores to identify genetic risk of conditions, and to share information with participants to potentially improve/intervene through lifestyle modifications improvement in a manner that is compliant in terms of ethical, legal and social issues (ELSI). This project is being undertaken in collaboration with several hospitals, including the Center for Disease Prevention at the NTT Medical Center, Tokyo. Integration of genetic information into health records and re-evaluation of disease risks of individuals are also being examined.

In 2021, a grant from the Japanese Science and Technology Agency's JST-Mirai Program on Advanced Intelligent Information Society mission area (Human centric digital twins services) was awarded to investigate "Development of disease prevention systems by integrating multi-layered biomedical information". The prioritized theme targets individuals and organizations as components of society, using the premise of AI digital twin as its core, and aims to: (1) create new value for emerging needs and issues, and (2) propose and realize new concepts and services related to AI digital twin. Specifically, it aims at an optimal combination of technologies related to data collection, processing, conversion, and integration, which are the prerequisites for digital twinning, as well as data conversion technologies suitable for modern AI technology, intelligent integration of output results, etc., with an eye toward the future of services, in addition to the advancement of individual

core technologies.

In 2023, a grant from the Japanese Cabinet Office's Cross-ministerial Strategic Innovation Promotion (SIP) Program on Development of an Integrated Healthcare System was awarded to develop and implement a life-record-type digital twin. This project utilizes the serial healthcare/clinical data including biomedical information of the NTT working generation cohort to analyse and visualize disease onset and progression including risks.

In April 2024, the Division has started its next term for another five years and will aim to conduct further research with the aforementioned funded activities as well as implement outputs to healthcare.