January, 14, 2025

Tell Us More About Moonshot Goal #7, PD HIRANO!

Japan Agency for Medical Research and Development (AMED)
Moonshot Research and Development Program

Introduction

Hi, I'm Hirano.
I will introduce Moonshot Goal #7
by answering questions!

HIRANO Toshio, Ph.D.

Goal #7 Moonshot Program Director (PD)

Professor Emeritus, Osaka University /
President, Osaka International Cancer Treatment Foundation

【Specialized field】
immunology and life science

Discovered Interleukin 6 and opened new ways to treat autoimmune diseases. Draws on deep and wide-ranging knowledge and experience, from work promoting cutting edge multidisciplinary research to basic medical research to medical applications; served as head of Osaka University and of QST.

1. About Research & Development Program

What is Moonshot Goal #7?
What will be done?

There is ambitious goal : Realization of sustainable care systems for enjoying one's until 100 years old. We set three targets to attain the goal.

PD HIRANO Toshio

Goal #7

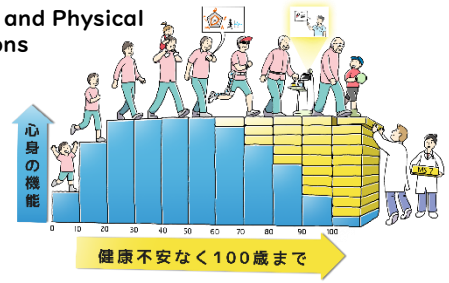
【 Moonshot Goal #7 】

Realization of sustainable care systems to overcome major diseases by 2040, for enjoying one's life with relief and release from health concerns until 100 years old.

【Targets of Moonshot Goal】

1. Realization of a society where everyone can prevent diseases spontaneously in daily life

- Develop technologies to monitor all living body trends with lower physical and mental load by 2030.
- Establish infrastructure to maintain good mental and physical health by developing technologies, in order to stay healthy and prevent the onset and aggravation of diseases by regulation of immune systems or sleep, etc., and to visualize individual physical and mental state in daily life and urge people to voluntarily take healthy maintenance actions most suitable for them by 2040.



To Age 100 without Health Concerns

2. Realization of medical networks accessible for anyone from anywhere in the world

- Establish a technology platform to provide quality medical and nursing care suitable for each individual appropriately even with less providers by developing compact, speedy and high-sensitivity diagnostic and treatment devices as well as technologies to further enhance doctors' medical opinion and diagnostic capability by 2030.
- Establish a medical network to provide the same level of medical care as a normal time regardless of region and even upon disasters and emergencies by developing diagnostic and treatment devices for simple tests and treatments at home, etc. and diagnosis- and treatment-free technologies for part of chronic diseases by 2040. In addition, develop methods for radical treatment and precision medicine for diseases such as cancer and dementia by substantially reducing the development period of drugs and medical devices, etc. through establishment of data science and evaluation systems by 2040.

3. Realization of drastic improvement of QoL without feeling load (realization of an inclusive society without health disparity)

- Develop technologies to improve body function through load-reducing rehabilitation and support self-reliant life at home and to improve ailing living biocontrol systems by 2030.
- Establish a social infrastructure to enable self-reliant life at home without depending on nursing care by developing such technologies as the recovery of body function with rehabilitation without feeling load, normalization of ailing biocontrol systems, regeneration or substitution of weakened organs and so forth by 2040.

Ⅰ. About Research & Development Program

What kind of society do you envision in 2040?

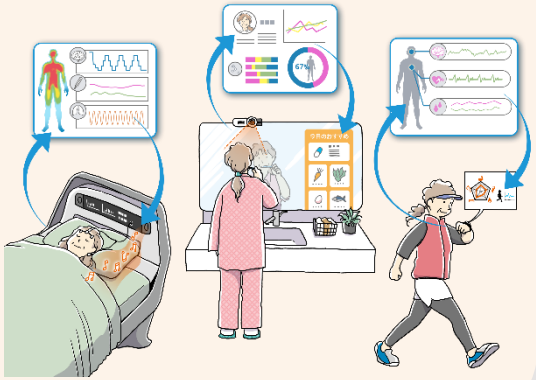
From the three targets, we believe that we can achieve the following vision of society.

HIRANO Toshio PD

Goal #7

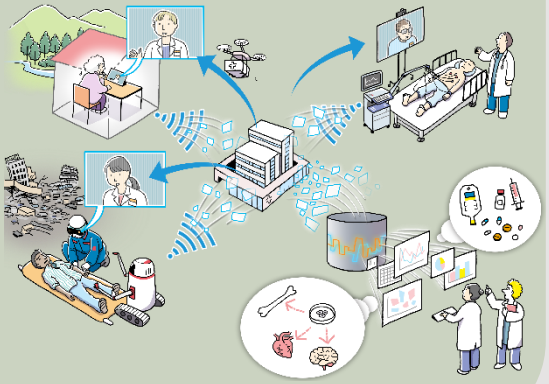
First,

Each and every one can live a healthy life of one's own accord, predicting the future health conditions, and at the same time, mechanisms to lead to health are embedded in every line of daily life.



Second,

Regardless of the skill levels and number of medical and nursing caregivers, secure and quality medical and nursing care can be provided and accessed no matter where one lives and even upon disaster or emergencies.



Third,

Even when faced with various changes in life stage with ailing mind and body function, each and every person can be empowered by technologies and social infrastructure without falling ill, and then their capabilities are unlocked.

Ⅰ. About Research & Development Program

What is the key for Moonshot Goal #7?

"Controlling the chronic inflammation" is the keyword.

HIRANO Toshio PD

Goal #7

1. Chronic inflammation is a persistent inflammatory response that deviates from control and is a major cause of age-related diseases.
2. If chronic inflammation can be controlled, disease itself can be dramatically reduced and healthy lifespan can be extended.
3. There are several approaches to control chronic inflammation, such as gut bacteria and immunity, but first we will begin research and approaches with the following projects (see below).

Control of Mitochondria

ABE PM

Control of Lysosome and Senescent cells

NAKANISHI PM

Control of Microinflammation

MURAKAMI PM

Control of Sleep/Wake

YANAGISAWA PM

The regulation of Senoinflammation

HIGUCHI PM

The regulation of brain reservoir function

FS ISA PM

The regulation of cognitive function in the brain by improving sleep

FS HAYASHI PM

Control of Chronic Inflammation

Basis for Realization of a Healthy and long-lived society

Prevention of Carcinogenesis Cancer Immunoregulation

NISHIKAWA PM

Microbiome regulation

HONDA PM

Control of Inflammation anywhere

NANGAKU PM

Normalization of cancer cells

FS KOSEKI PM

FS Feasibility Study

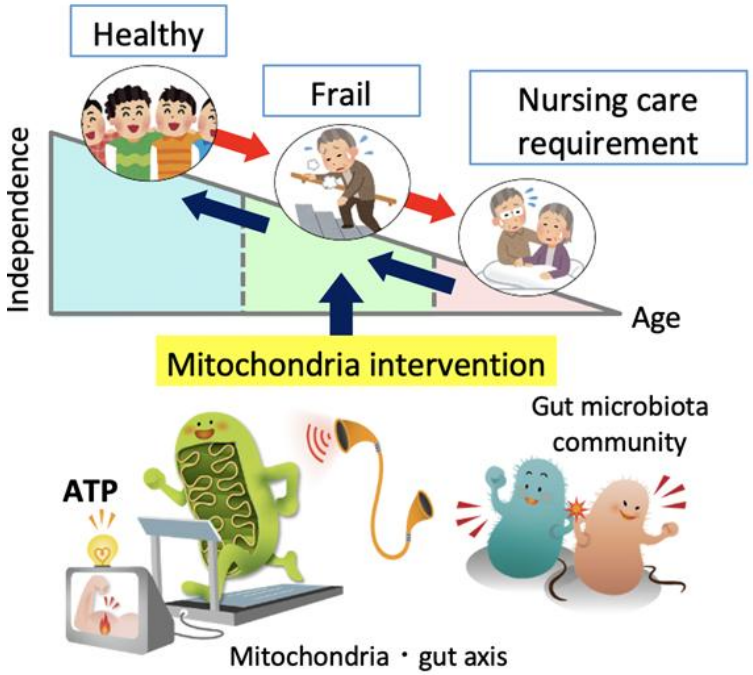
Project 1

Mitochondrial Medicine

MOONSHOT

What is your research about?

To elucidate the regulatory mechanisms through a comprehensive and integrated analysis of the "mitochondrial-gut flora relation" in which mitochondria and gut microbiota cooperate to control the health of the host, and to develop non-invasive diagnostic methods and new therapeutic agents.
Through early detection, intervention and treatment of mitochondrial dysfunction, we aim to achieve a society where healthy longevity is achieved by 2040.



ABE Takaaki PM

Tohoku University
Graduate School of Biomedical Engineering, Professor

What are the goals aimed by 2030?

- To validate new therapeutic agents not only for mitochondrial diseases, but also for many other diseases in which mitochondrial function is impaired as a basis for disease progression, such as hearing loss, sarcopenia, and Parkinson's disease.
- To develop Mitochondrial sensors
- Establish personalized prevention and personalized medicine where rehabilitation, oral care, diet, and medication to prevent frailty are suggested by linking sensor information with biomolecular information database.

How will your research change the medical care in 2040?

By connecting non-invasive sensors such as wearable sensors with the network and analyzing the data, the optimal diet, exercise, and medication for each person will be proposed, thereby achieving a long-lived society where people can live healthy until the age of 100. (prevention)

Effective diagnostic and therapeutic methods will be provided for frailty caused by progressive hearing loss, muscle weakness, cancer, cognitive impairment and depression due to age-related mitochondrial dysfunction. (medical care)

< Main Research Institutes >

Tohoku University, Keio University, RIKEN, Juntendo University, etc. 9 institutes in total

Project 3

Extending healthy lifespan by eliminating senescent cells

MOONSHOT

NAKANISHI Makoto PM

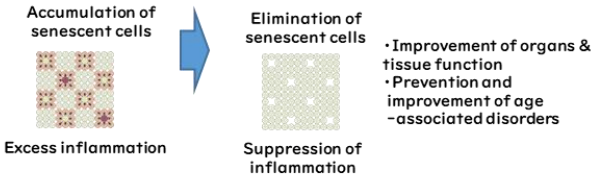
The University of Tokyo
Division of Cancer Cell Biology of the Institute of Medical Science, Professor

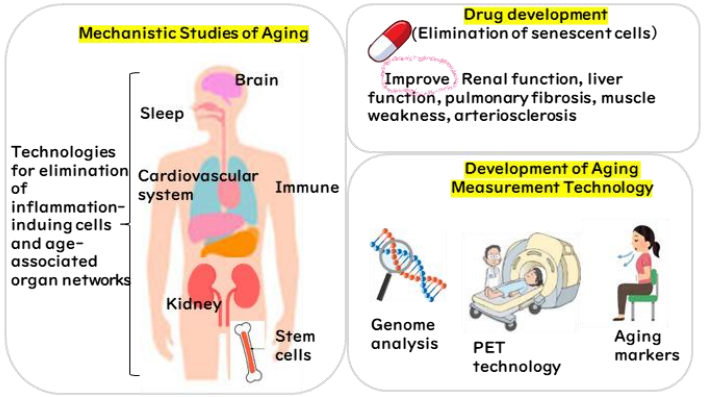
What is your research about?

This research project aims to develop innovative technologies that eliminate senescent cells (senolysis) which cause tissue microinflammation as a common pathogenesis of aging and age-associated disorders. Thereby, we will establish medical systems for the extension of healthy lifespan through which various age-associated tissue dysfunctions and disorders will be dramatically improved.
In addition, we will also develop technologies that measure senility and establish medical networks that can be easily accessed by everyone and everywhere.

What are the goals aimed by 2030?

- We will conduct clinical trials using the developed technologies for eliminating inflammation-inducing cells in elderly patients with significant organ failure associated with aging, and discover technologies that can be implemented in society.
- Elucidate the nature of inflammation-induced cells in vivo.
- We will implement in society the simple technologies (genome analysis technology, PET technology, and liquid biopsy technology) that can quantitatively measure the progression of aging.





How will your research change the medical care in 2040?

Technology to eliminate inflammation-inducing cells such as senescent cells will be implemented in society as a medical treatment to extend healthy lifespan targeting age-related diseases such as cancer and atherosclerosis, as well as various organ dysfunctions associated with aging.
We will also establish a simple test technology that can measure the degree and speed of aging and build a medical system that can quantitatively measure the adaptations and effects of senescent cell elimination therapy.

< Main Research Institutes >

The University of Tokyo, Tokyo University of Science, Juntendo University, Kyoto University, etc.　7 institutes in total

プロジェクト 4 AMED

Microinflammation regulation: Removing Microinflammation by Quantum and neuromodulation Tech!

MOONSHOT

MURAKAMI Masaaki PM

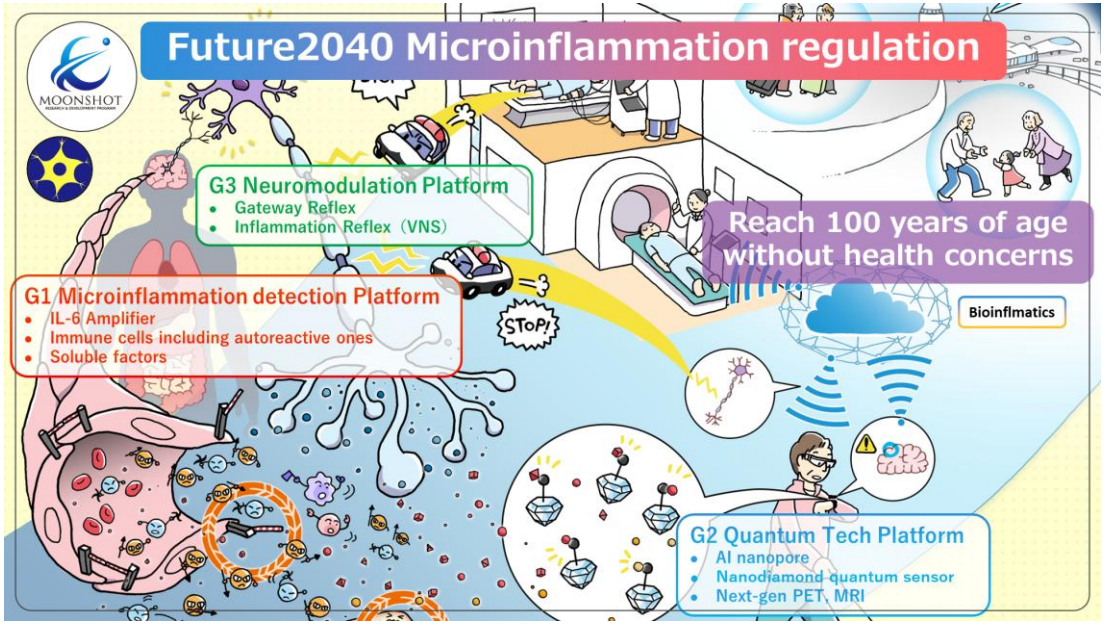
Hokkaido University Institute for Genetic Medicine, Professor

What is your research about?

There are currently no technologies to detect or eliminate "microinflammation", the starting point of chronic inflammation, at the "pre-disease" state. Here, a group of microinflammatory factors selected from the analysis of immune cells and non-immune tissue cells are measured using quantum measurement technology to quantify the pre-disease state, and neuromodulation technology is used to activate or deactivate neural circuits to revert the pre-disease state back to a healthy state.

What are the goals aimed by 2030?

- Select candidate factors, including liquid factors, that can predict the degree of microinflammation from the analysis of immune cells and non-immune tissue cells attacking the self.
- The selected candidate factors are measured by quantum measurement technology, and a prototype for scoring the pre-disease state is completed.
- Clinical research for bringing patients back to a healthy state using neuromodulation technology in an advanced state of disease and microinflammation.



How will your research change the medical care in 2040?

This research will contribute to creating an era where people can achieve healthy and fulfilling lives even at an age close to 100 years old.

< Main Research Institutes >

Hokkaido University, QST, Niigata University, The University of Tokyo, Kyoto University, etc. 13 institutes in total

Deciphering and Engineering Sleep and Hibernation -- The Future of Medical Care

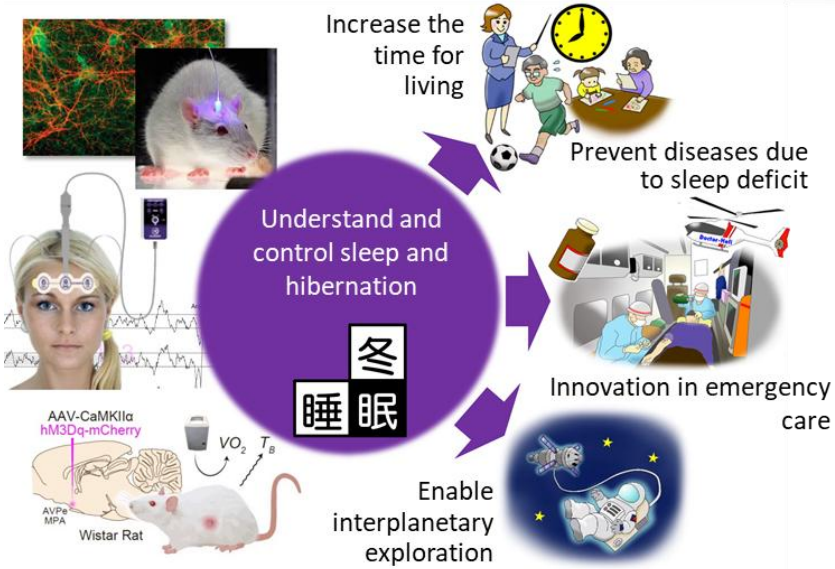
YANAGISAWA Masashi PM
University of Tsukuba
International Institute for Integrative Sleep Medicine, Professor

What is your research about?

Through elucidating the neurophysiological roles and regulatory mechanisms for two immobile modes of animal behavior, sleep and hibernation, we will develop technologies to control sleep and induce hibernation in humans, transforming the future medicine. Induced hibernation will be a step forward to space expedition, a dream of humankind.

What are the goals aimed by 2030?

- To develop fundamental technologies to regulate the sleep time needed by the brain and to control REM sleep.
- To start development of a deep learning model that analyzes sleep big data of 1 million individuals to predict the risk of disease which increases by sleep deficit.
- To develop lead compounds that will be the base of new artificial hibernation inducing drugs, or hibernation induction technologies which will be less invasive on body. In addition, we will develop basic technology to induce artificial hibernation in macaque monkeys.



How will your research change the medical care in 2040?

We will prevent the onset and severity of diseases caused by sleep deficit through the development of technology to adjust amount of the sleep and REM sleep rate required by the brain, and through the deep learning models' development to predict disease risk by analyzing sleep big data.
We also promote development and application of synthetic hibernation technologies and realize to slow the progression of disability in patients with fatal diseases and catastrophic trauma and aim to reduce mortality and aftereffect dramatically.

< Main Research Institutes >

University of Tsukuba, RIKEN, Keio University, S'UIMIN, etc.
7 institutes in total

Project 6 AMED

Bring hospital into home toward controlling inflammation at home

MOONSHOT RESEARCH & DEVELOPMENT PROGRAM

NANGAKU Masaomi PM

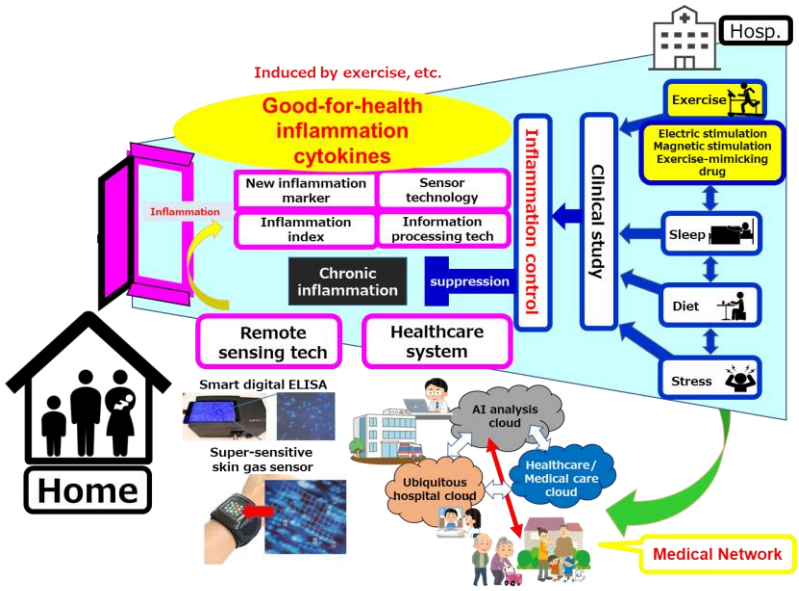
The University of Tokyo Hospital, Department of Nephrology and Endocrinology, Professor

What is your research about?

We will establish technologies analyzing gases emitted from human skin to monitor health condition and then research and develop technologies (exercise-substituting therapy and exercise-mimicking drug) to reproduce “good-for-health inflammation” induced by exercise, etc. By building a medical network that connects wearable sensors and hospitals to enable home diagnosis, we aim to realize a healthy longevity society.

What are the goals aimed by 2030?

- We will build a system that can monitor inflammation biomarkers and conduct clinical research in combination with solutions related to exercise, sleep, and diet.
- We will create an "on-site digital bioanalyzer" that can measure factors related to lifestyle-related diseases, such as inflammation markers, in the comfort of the home.
- We will formulate a clinical trial strategy using controlled inflammation medical technology to induce "controlled inflammation," and build a medical network integrating the solutions obtained.



Toward realization of innovative telemedicine accessible anywhere

How will your research change the medical care in 2040?

We will characterize the state of inflammation for each individual with an "inflammation index" using digital bioassay technology for remote, low-cost, non-invasive assessment, ultra-sensitive body gas sensing, and other technologies. Through control methods of inflammation using electrical and magnetic stimulation devices and exercise-mimetic drugs, we will achieve a society where innovative telemedicine for chronic diseases is "accessible to anyone, anywhere".

< Main Research Institutes >

The University of Tokyo, Nippon Medical School, Kanagawa University of Human Service, etc. 6 institutes in total

Project 7 AMED

Understanding and harnessing the role of the gut microbiome in healthy longevity

MOONSHOT RESEARCH & DEVELOPMENT PROGRAM

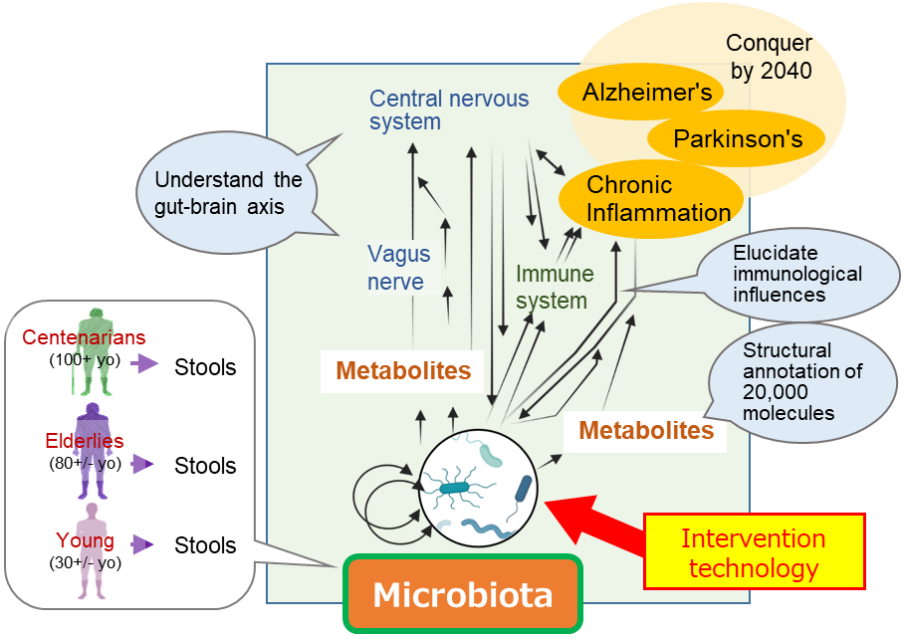
HONDA Kenya PM Keio University School of Medicine, Professor

What is your research about?

We will illuminate the structure of metabolites produced by intestinal microbiota, which are currently poorly defined, and understand their operating principles as well as their effects on the nervous and immune systems.
Through these studies, we aim to conquer Alzheimer's disease, Parkinson's disease, and chronic inflammation, realizing the unprecedented prevention and treatment methods.

What are the goals aimed by 2030?

- We will elucidate the structure and function of 20,000 metabolites derived from intestinal bacteria.
- We will identify intestinal bacterial strains and their responsible molecules that lead to an increase in healthy life span.
- We will elucidate the mechanism of the gut-brain interface and explore its application.
- We will identify intestinal bacteria and their responsible molecules that lead to the control of chronic inflammation and develop intervention methods.



How will your research change the medical care in 2040?

Routine analysis of metabolites derived from intestinal bacteria provides a mechanism for easy health management and understanding of pathological conditions wherever you are.
We offer new therapies to fundamentally prevent and treat chronic inflammation and intractable neurological diseases such as cognitive dysfunction and Parkinson's disease.
We control chronic inflammation and neurological diseases, maintain cognitive and motor functions, and extend healthy longevity through medical intervention of intestinal bacteria such as strain cocktails, dietary modification, endolysin, and IgA therapy.

< Main Research Institutes >

Keio University, RIKEN, Osaka University, CIEM, Tohoku University, etc. 7 institutes in total

Project 8 AMED

A world of zero cancer risk created by rejuvenation using cell lineage conversion

MOONSHOT RESEARCH & DEVELOPMENT PROGRAM

KOSEKI Haruhiko PM

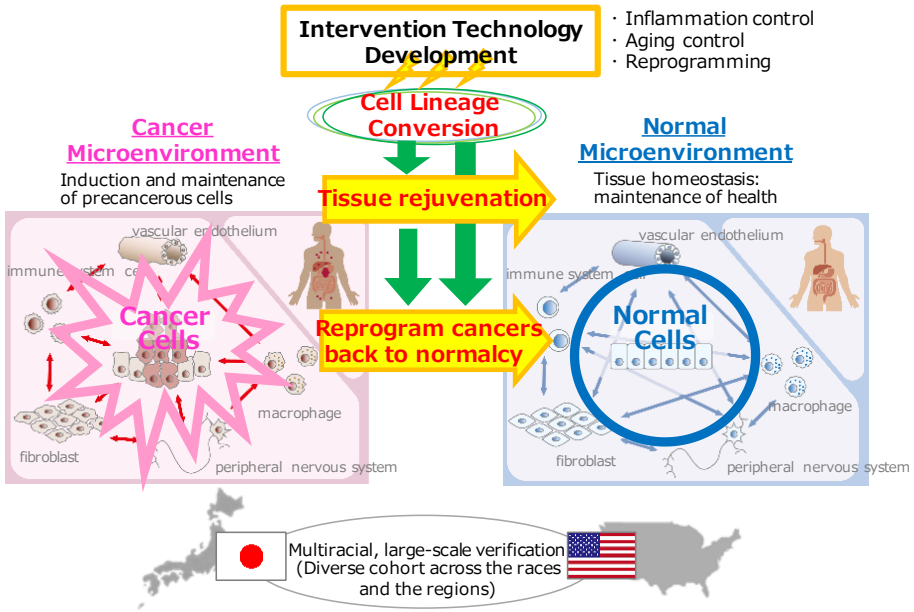
RIKEN,
Center for Integrative Medical Science,
Deputy Director

What is your research about?

Chronic inflammation, which causes aging and cancer, can be a "double-edged sword" because it has the potential to cause "cell lineage conversion" such as cell rejuvenation.
By applying the mechanism of the reprograming in the cells of regenerative medicine,
We will develop a technology to "reverse cancer tissues to normal tissues" via cell lineage conversion. Our interdisciplinary approach involves a multi-racial, large-scale clinical studies based on the Japan/US cooperation.

What are the goals aimed by 2030?

- We will elucidate the mechanisms by which cellular senescence-associated secretion phenomenon (SASP) and chronic inflammation induce the capacity for cellular fate transformation.
- We will elucidate how cell fate transformation by in vivo reprogramming transitions the cellular networks that comprise cancer tissues.



How will your research change the medical care in 2040?

We will develop therapeutic technologies that intervene in the network supporting cancer tissue through cell fate transformation and preventive intervention technologies for precancerous conditions to realize a society with zero cancer risk.
We will globally implement medical and preventive technologies that transcend race, region, and environment through multiracial large-scale validation through Japan-US collaboration.

< Main Research Institutes >

RIKEN, Osaka University, The University of Tokyo, Chiba University, etc.　6 institutes in total

Actualization of a cancer-free society through regulation of chronic inflammation

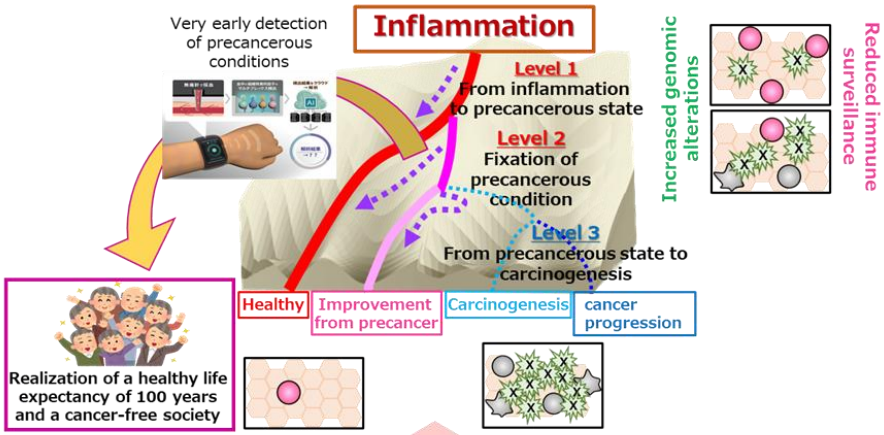
NISHIKAWA Hiroyoshi PM
Kyoto University, Graduate School of Medicine, Professor

What is your research about?

We will elucidate the mechanism of the inflammation-precancerous state-carcinogenesis transition and establish novel technologies to detect cancer-initiating cells at an ultra-early stage based on immune-genomic analysis. We will also work on preventive medicine and new drug discovery / development using wearable devices, etc.
The Japan-U.S. team will strongly pursue this program to realize a "society with zero incidence of cancer"

What are the goals aimed by 2030?

- We will develop a mathematical model to predict the changes of the inflammation-precancerous state-carcinogenesis and build a dynamic prediction model.
- We will develop devices that can identify the origin of inflammation and cancer cells at very early stage with high sensitivity.
- We will develop novel prophylactic and therapeutic methods that target cancer cells in the precancerous state and develop preemptive and ultra-early-stage cancer therapies that can prevent carcinogenesis.



Tight collaboration with the U.S. team

Cancer Immunology : Jedd Wolchok Cancer Genome : Matthew Meyerson
Cancer Epidemiology : Philip Castle
Clinical Trial of Cancer Immunotherapy : James Gulley

How will your research change the medical care in 2040?

We will provide preemptive medicine based on cancer risk (Precision Preemptive Medicine = cancer prevention medicine).
We will provide ultra-early-stage cancer treatment for pathological conditions that have led to irreversible carcinogenesis (establish a new concept for medical treatment after conventional cancer has been detected).
We will realize a system to detect minute changes of inflammation-precancerous state-carcinogenesis at an ultra-early stage.

< Main Research Institutes >

Nagoya University, Aichi Cancer Center, The University of Tokyo, Kyoto University, NCC, etc. 7 institutes in total

Project 10

Study of reservoir functions that support resilience* of the brain and its enhancement to overcome dementia

ISA Tadashi PM

Kyoto University,
Graduate School of Medicine,
Professor

What is your research about?

We will develop methods to enhance cognitive function by promoting the reservoir function, which involves inducing the activation and plasticity of intact neurons, in addition to traditional methods that prevent Alzheimer's disease pathology. Through this, we aim to realize a society where people can maintain a healthy brain up to the age of 100.

*resilience : ability to overcome difficulties flexibly and recover

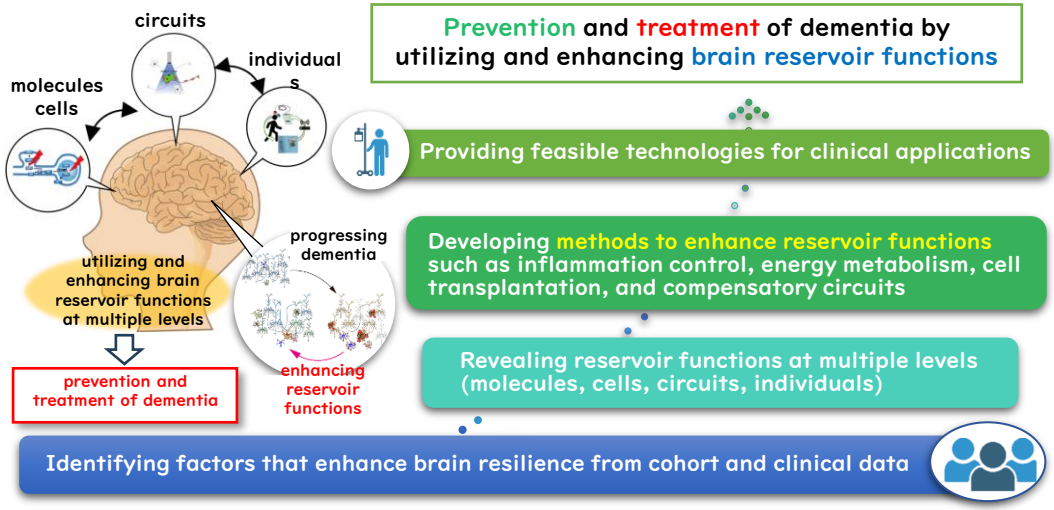
What are the goals aimed by 2030?

- Test the mechanisms of action of neuromodulation methods to improve cognitive function in humans in mouse and primate models.
- Initiate intervention studies to improve brain reservoir function in humans.

How will your research change the medical care in 2040?

The project will search for methods to enhance reservoir function in conjunction with findings from cohorts of elderly people and observations of postmortem brains, and will verify the effectiveness of methods proven in mouse models of dementia in primate models such as marmosets and macaque monkeys.
Furthermore, we will conduct clinical research in conjunction with neuromodulation methods such as brain stimulation in humans and dual task training for exercise and cognition, aiming to realize prevention and recovery from dementia by 2040.Translated with DeepL.com (free version)

Creating a society where individuals can maintain resilient and healthy brain until reaching 100 years old



< Main Research Institutes >

Kyoto University, Ritsumeikan University, Kobe University, Nagoya University, Keio University, Aichi Medical University, etc. 10 institutes in total

Life course approaches through sleep to protect, nurture, and activate the brain

HAYASHI Yu PM

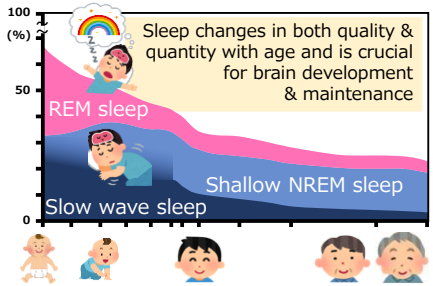
The University of Tokyo,
Graduate School of Science,
Professor

What is your research about?

In dementia, sleep disorders often appear earlier than cognitive decline & are the most frequent peripheral symptoms, often being the primary reason for patients requiring institutional care. We aim to unravel the mechanisms by which sleep protects, nurtures, & activates the brain, focusing on the regulation of cognitive functions. By harnessing the power of sleep, which everyone experiences daily, we strive to create a society where dementia can be prevented and overcome.

What are the goals aimed by 2030?

- Identify the optimal sleep architecture for preventing and overcoming dementia for each disease background based on scientific evidence.
- Create a simple sleep measurement device applicable to patients with neuropsychiatric disorders, and complete AI-based methods for subtype classification and early prediction of dementia.
- Clarify methods to prevent dementia based on external stimuli, etc., toward the realization of sleep manipulation medicine and sleep replacement medicine in humans.



Dementia and sleep

Developmental & psychiatric disorders accompanied by sleep disturbances pose a risk for dementia

Sleep disturbances appear from the preclinical stage of dementia

Sleep disturbances are the most frequent peripheral symptoms of dementia & a major factor leading to caregiver breakdown

Elucidation of sleep abnormalities associated with dementia & the mechanisms by which sleep restores brain function

Controlling cognitive function through development of devices that easily & accurat measure sleep quality and methods for optimizing sleep induction

By "sleep manipulation therapy" & "sleep substitution therapy," we aim to enable individuals & caregivers to naturally prevent or treat dementia in their daily lives without feeling burdened.

How will your research change the medical care in 2040?

By identifying the optimal sleep state for each individual and developing “sleep manipulation medicine” using drugs, diet, and sensory stimulation, as well as “sleep replacement medicine” for patients with significantly impaired sleep quality, it will be possible to prevent the onset and progression of dementia. In addition, a system will be developed to detect the risk of dementia based on sleep and brain wave patterns in daily life at an early stage and take appropriate measures. This will realize a society in which the elderly can live independently.

< Main Research Institutes >

The University of Tokyo, Nagoya University, Kyoto University, etc.　7 institutes in total

Project 12

Early detection and modulation of the dementia pathogenesis based on the concept evolving from glial pathology to senoinflammation

HIGUCHI Makoto PM

National Institute for Quantum Science and Technology, Institute for Quantum Medical Science, Advanced Neuroimaging Center, Director

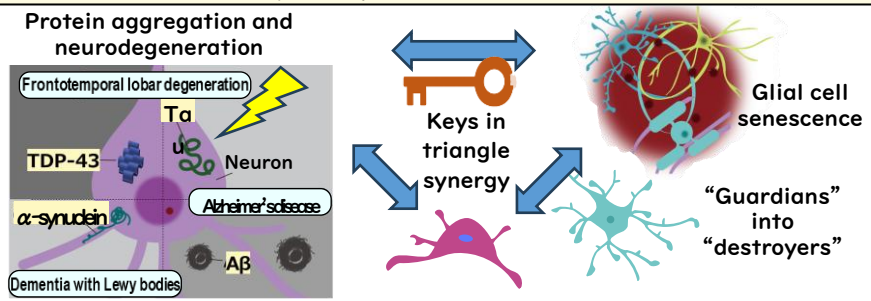
What is your research about?

We hypothesized that the fundamental basis of dementia lies in the transformation of brain "guardians," such as glial cells, into "destroyers" through a process called "senoinflammation," which involves the interaction between inflammation and cellular senescence. This transformation leads to pathological protein aggregation and neurodegeneration. Our goal is to identify key molecules that influence this "senoinflammation" in the brain at a very early stage and to develop a next-generation dementia diagnostic workflow that allows us to monitor and control these key molecules.

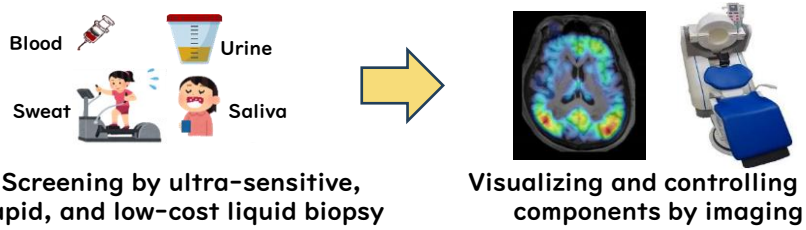
What are the goals aimed by 2030?

- Conduct clinical evaluations of head-specific PET systems and body fluid measurement systems while leading a multi-center clinical research system to demonstrate the usefulness of next-generation biomarker measurement.
- Sequentially complete non-clinical evaluation of the efficacy and safety of prevention and treatment methods targeting senoinflammation.
- Elucidate the impact of brain senoinflammation, which is composed of the triad of protein deposition, cellular senescence, and inflammation, on brain dysfunction.

Identification of key components in brain senoinflammation



Next-generation theragnostic workflow targeting key molecules



Screening by ultra-sensitive, rapid, and low-cost liquid biopsy

Visualizing and controlling key components by imaging

How will your research change the medical care in 2040?

Achieve pharmaceutical medical device approval and food for specified health uses approval and dissemination of "easily accessible, rapid, inexpensive, highly accurate, and minimally invasive" diagnostic technologies and "inexpensive, easy, and highly effective" treatment technologies that target key molecules of senoinflammation and utilize innovative optical enrichment technology and next-generation dedicated head imaging devices. This will enable casual monitoring of dementia risk in daily life and life modulation according to the results.

< Main Research Institutes >

National Institutes for Quantum Science and Technology, Yamanashi University, etc.　12 institutes in total

2. How to promote Research & Development

How is the program implemented and who are involved?

Goal 7 System Chart

Review the operational structure as necessary.

HIRANO Toshio PD

■Advisors with expertise in cancer, mathematics, engineering, ELSI, etc. will be assigned to the management structure, and management will incorporate the perspective of fusion of different fields.

Advisers

- SAKUMA Ichiro
- SUHARA Tetsuya
- TAKAYASU Misako
- TOKUHISA Takeshi
- MATSUO Makiko
- OSHIMA Masanobu
- AKIYAMA Haruhiko
- OKABE Shigeo

■Establish a cooperative system to receive advice from an international perspective as necessary.

MS Evaluation Committee
[External Experts]

・Preliminary evaluation of PM at the time of adoption
・Mid-term and Ex-post evaluation of PM

■An external evaluation committee was established, and experts with a variety of knowledge composes the evaluation committee. In addition to the mid-term evaluation in the third year and the ex-post evaluation in the fifth year, external evaluations will be conducted whenever deemed necessary and incorporate the results into research promotion.

ABE PM
NAKANISHI PM
MURAKAMI PM
YANAGISAWA PM
NANGAKU PM
HONDA PM
Researcher 1
Researcher 2
KOSEKI PM
NISHIKAWA PM
ISA PM
HAYASHI PM
HIGUCHI PM

2. How to promote Research & Development

How is the program managed?

- We regularly hold joint meetings of PD, advisors, and all PMs to pursue synergy through collaboration among PMs.
- We also monitor the progress of the projects by inspecting R&D sites and attending the individual project meetings.
- For example,
  Advanced sensors to which quantum science and technology been applied will be utilized in collaboration among multiple projects as much as possible, and we pursue maximization
  of results and efficient allocation of funds as Goal #7.

Goal #7 **HIRANO Toshio PD**

What is important in the implementation of research?

There is a lot, but I'd broadly divide them into the following three!

① Collaboration with other MS goals, with other AMED-implemented projects, and with different academic fields

- To utilize management measures for other goals.
- To seek collaboration particularly with Goal #2 in highly sensitive detection of inflammation, acquisition of time-series data on the onset of inflammation, and integrated analysis with biological information.
- To create synergistic effects by collaborating with related researches in and out of Japan including projects conducted within AMED.
- To consider integrating different fields such as mathematical sciences and humanities and social sciences. And to address R&D in a cross-project manner.

② Effort for Social implementation through co-creation activities

- To introduce the engineering and regulatory science perspectives to bridge the gap from the basic to social implementation and engage in dialogue with industry. Individual projects are also planned considering measures for social implementation and collaboration with companies.
- To take the necessary effort for social implementation by engaging in dialogue and co-creation activities from the early stages of research with the public to discuss the state of society through the implementation of research results and the ethical, legal, and social issues (ELSI) as well as the health economic perspectives.

③ Publicity and Outreach activities

- introduce research content in an easy-to-understand manner, and actively utilize SNS and other means to reach the younger generation.
- To disseminate to the world through symposiums with overseas institutions and enriching the website in English.

Conclusion

It sounds like the Moonshot Goal #7 will change our medical & care system and even our lifestyles better. We are excited with the progress of the researches!

Thank you, Hirano PD, for explaining the details of the program!

It was my pleasure. Thank you for asking questions. In addition to MS Goal #7, Moonshot program targets the following goals from 1～10 in different research areas.

Search for Moonshot online. We offer a lot of information online, so please take a look. Please look forward to our project.

Goal #7 HIRANO Toshio PD

(Reference) Overall view of Moonshot Research and Development

“Moonshot for Human Well-being”

(Moonshot R&D to realize Human well-being)

3 Areas for Goal Setting

- Society: Turning the aging society into the innovative and sustainable society by harnessing diversity through techno-social transformation.
- Environment: Recovery for global environment and growth of civilization
- Economics: Exploring frontiers with science and technology

10 MS Goals to be Achieved

- Goal #1: Overcoming limitations of body, brain, space and time
- Goal #2: Ultra-early disease prediction and intervention
- Goal #3: Coevolution of AI and robots
- Goal #4: Cool Earth & Clean Earth
- Goal #5: Sustainable food supply and consumption
- Goal #6: Fault-tolerant universal quantum computer
- **Goal #7: To Age 100 without Health Concerns**
- Goal #8: Controlling and modifying the weather
- Goal #9: Increasing peace of mind and vitality
- Goal #10: Fusion energy

↑ AMED promote Goal #7