National Center for
Geriatrics and Gerontology

Overview 2022-2023

Our mission is to
"promote the physical and mental health
of the elderly in order to build a society
of healthy longevity."

Greetings from the President

Thank you for visiting the National Center for Geriatrics and Gerontology website. My name is Hidenori Arai, and I have been the Board President of this center since April 1, 2019. The National Center for Geriatrics and Gerontology (NCGG) was established in 2004 as one of six national centers and became an independent administrative agency in 2010. Since this conversion, the NCGG has been arranged into several smaller sub-centers including the following: the Center for Development of Advanced Medicine for Dementia, the Center for Comprehensive Care and Research on Memory Disorders, the Center for Gerontology and Social Science, the Innovation Center for Translational Research (ICTR), the Educational and Innovation Center for Geriatrics and Gerontology, the Assistive Robot Center,and the Medical Genome Center, and has continued to develop activities in line with their mission. In 2015, the NCGG became the National Research and Development Agency and began to operate with further emphasis on R & D. During this time, under the excellent leadership of President Emeritus Shinichi Oshima and former president Kenji Toba, the center has been developing human resources to take on the medical, nursing, and welfare needs of a super-aged society while providing medical care, which has become the standard for older adults and which includes advanced care for geriatric syndromes in Japan, such as dementia and frailty. Further, the NCGG has endeavored to develop the necessary public education activities while acting as a think tank for policies in several countries regarding the medical, nursing, and welfare needs of older adults. As a research center, the NCGG has striven to undertake various foundational studies on aging, clinical research, and epidemiological studies which aim for the realization of a society of longevity and good health. As the third board president, I intend to steadfastly continue with the roles the center has fulfilled thus far, and further, to strive for the center staff to work together, allowing us to become an international center on geriatrics and gerontology, open to the world. I would like to request guidance from all of you in this pursuit.

In response to the national project of “ORANGE Registry”, we have reformed the organization of NCGG. We have the largest memory clinic in Japan, working on the Comprehensive Care and Research on Memory Disorders. We also have the Medical Genome Center, in which the data of clinical information, imaging, blood and genomic information were accumulated. Comprehensive Care and Research on Memory Disorders collaborates tightly with basic dementia science (Center for Development of Advanced Medicine for Dementia) to find new seeds for dementia treatment.

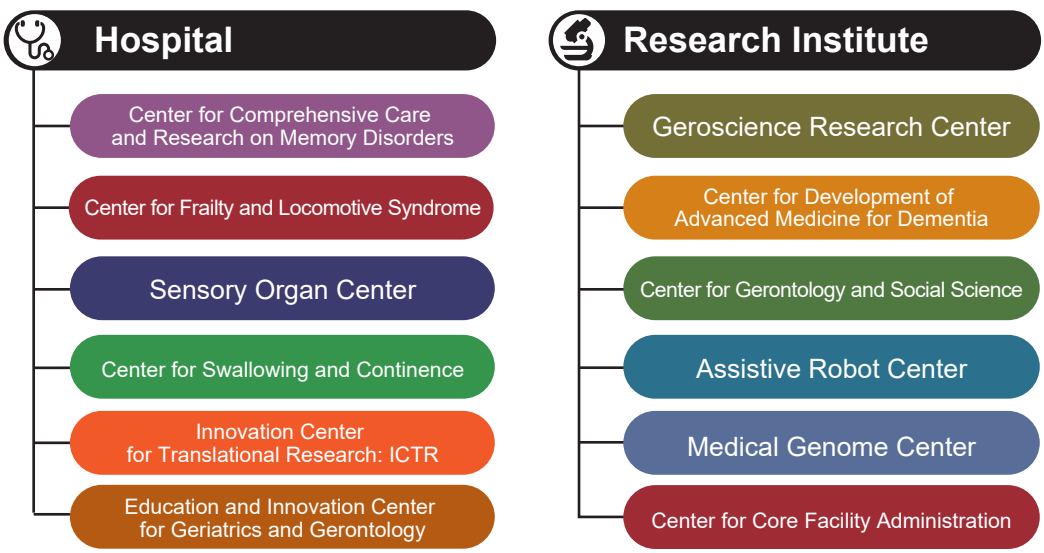
Our mission is to “promote the physical and mental health of older adults in order to build a society of healthy longevity.” Behind this mission is the fact that globally, Japan ranks first in longevity, with over 28% of the current population consisting of those aged 65 or above. In a super-aged society in which the only increase in numbers is that of older adults aged 75 or above, there needs to be a paradigm shift from the conventional “cure-seeking medical care” to “cure- and support-seeking medical care.” Within this treatment paradigm, the most important task is to handle dementia, which has become the main reason for requiring long-term care. Several organizations within the NCGG, including the centers for Development of Advanced Medicine for Dementia, Comprehensive Care and Research on Memory Disorders, the Assistive Robot Center, and the Medical Genome Center, have been mobilized for the prevention, diagnosis, treatment, and care of dementia and have experienced some success in their results. Further, to contribute to community development, we have started collaborating with Aichi Prefecture on the Orange Town Plan.

Together, we have a vision for rebuilding the old ward, after 50 years, into the Orange Hospital, a core facility for “building a dementia-friendly community,” to integrate research and medical care, which will be the symbol of Orange Town. We will strive to practice appropriate care, dementia rehabilitation, and family classes promoted by the NCGG and return the results to the community and the public.

Frailty refers to a state in which, although able to lead an independent life, one is vulnerable to various stresses, due to changes in organ functions which accompany aging. This condition is a major obstacle to realizing a society of healthy longevity. With the Center for Frailty and Locomotive Syndrome at the core, we hope to elucidate pathologies and establish treatment strategies for related conditions, such as sarcopenia and locomotive syndrome. Further, the active use of robots is imperative, and I plan to emphasize the role of the Assistive Robot Center. Through these research activities, I hope to participate in the development of new industries and contribute even a small amount to the longevity of our nation. Beyond these research and development pursuits, the NCGG will continue to improve our meticulous consultation and medical services for older adults more than ever. In these pursuits, I humbly request your continued advice and encouragement.

Hidenori Arai, MD, PhD.
President, the National Center for Geriatrics and Gerontology

National Center for Geriatrics and Gerontology Organizational Structure



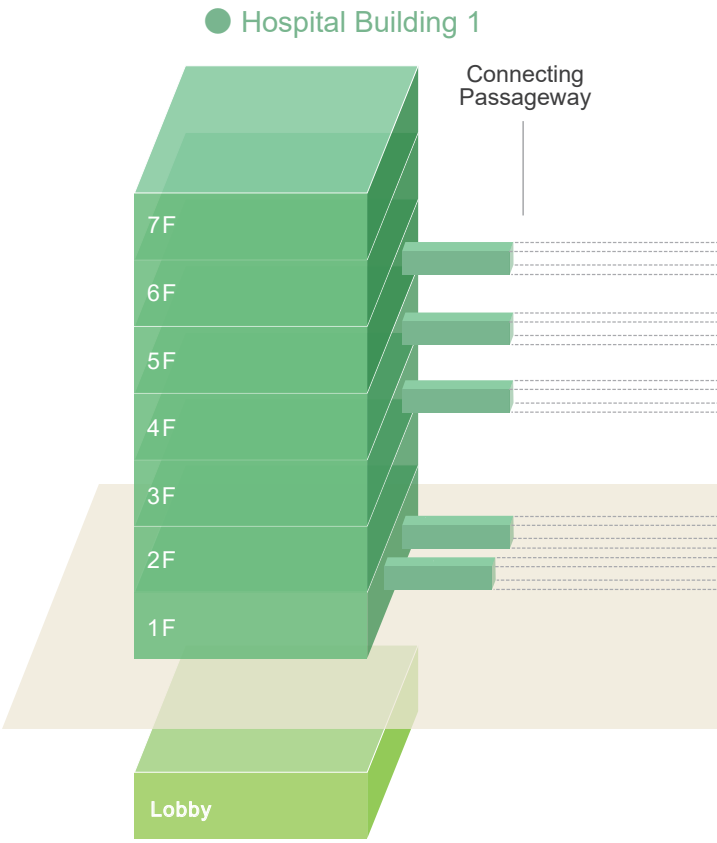
Outline of activities

At the National Center for Geriatrics and Gerontology, we diagnose and treat diseases such as cardiovascular, respiratory, digestive, neurological, metabolic, bone/joint, and urological diseases, as same as in a common medical institute. In addition, for dementia, depression, urinary incontinence, and falls, we provide optimal medical care through scientific knowledge and technology for geriatric syndromes. Not only for curing diseases, we practice medical care for preventing the decline in mental and physical capacities of older adults and improving their living functions and quality of life. It is our sincere hope that older adults will maintain a healthy and active life for as long as possible and achieve a healthy longevity. Our center has the world's largest memory clinic, practicing advanced trials on dementia. On the other hand, at the center of locomotive syndrome and frailty, we evaluate factors that reduce mental and physical independence, and attempt to improve them. We also have the sensory organ center where we not only treat the difficulties of seeing and hearing, but also evaluate the functions of sensory organ for tasting, smelling, and touching. We believe that these practices would also help to achieve healthy longevity. Finally, in order to provide seamless services from medical treatment to long term care, we will contribute to care in the community through community comprehensive care support wards and home visit rehabilitation and the introduction of nursing care robots into homes.

Izumi Kondo, MD, PhD.
Director, NCGG Hospital

● Outpatient building

Hospital Building 1	
7F	Dining Hall / Cafeteria Multipurpose Hall
6F	Administration Department
5F	Operating Room
4F	Center for Frailty and Locomotive Syndrome Rehabilitation Medieine
3F	Center for Sensory Organ Function Clinical Laboratory
2F	Radiology, Endoscope Room
1F	Outpatient, Central Treatment Room
Lobby	General Reception, Outpatient, Cafeteria Section of Regional Medical Liaison



Departments

Geriatric Medicine, Endocrinology, Hematology, Psychiatry, Neurology, Respiratory Medicine, Gastroenterology, Cardiology, Surgery, Orthopedics, Neurosurgery, Dermatology, Vascular Surgery, Urology, Gynecology, Ophthalmology,Otolaryngology, Rehabilitation Medicine, Radiology, Dentistry and Dental/Oral Surgery, Anesthesiology.

Specific Outpatient Services

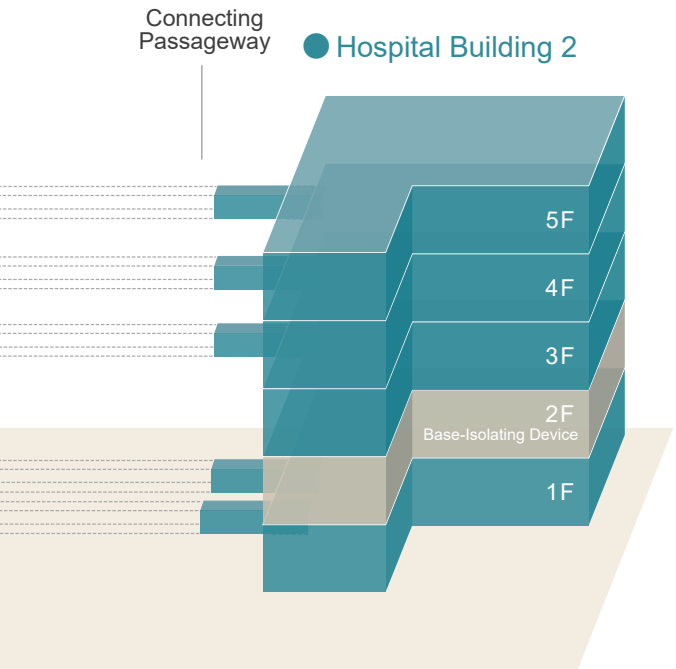
Memory Clinic, Osteoporosis Clinic, Fall Prevention Clinic, Hip Joint Clinic, Hearing Aid Clinic, Swallowing Difficulty Clinic, Total Denture Clinic, Oral Care Clinic, Mammary Gland & Proctology Clinics, Short Breath Clinic, Sleep Apnea Clinic, Mental Vitality Clinic.

Number of Beds

Medical Law Approval;
General Beds: 383

Hospital Building 1

Hospital Building 2



● Inpatient Building

Hospital Building 2	
5F	North Ward Rooms 501-520 West Ward Rooms 551-572, HCU
4F	North Ward Rooms 401-420 West Ward Rooms 451-473
3F	North Ward Rooms 301-320 West Ward Rooms 351-373
1F	Center for Comprehensive Care and Research on Memory Disorders Division of Holistic Physio-Cognitive Rehabilitation

Research Institute Overview

The National Center for Geriatrics and Gerontology was established in 2004 and its mission is "to investigate, research, and develop technologies for diseases associated with aging". Our goal is to contribute to solving the health problems faced by an aging society.

In Japan, the increase in the life expectancy of the Japanese people combined with the declining birthrate has resulted in an aging society at a speed unparalleled in the world. Characterized by a high percentage of older people aged 75 and over, there is growing interest in geriatric syndromes such as dementia, sarcopenia, and frailty from the perspective of long-term care prevention. Protecting the physical and mental health of older adults has become one of the nation's most important policies, involving not only the medical field but also the nursing and welfare fields.

This research institute consists of the following six divisions (research centers), which intensively promote research that contributes to the extension of "healthy life expectancy", the period during which the older person can live in good health.

The Geroscience Research Center conducts research on the mechanisms of aging, pathophysiology of age-related physical changes and diseases.

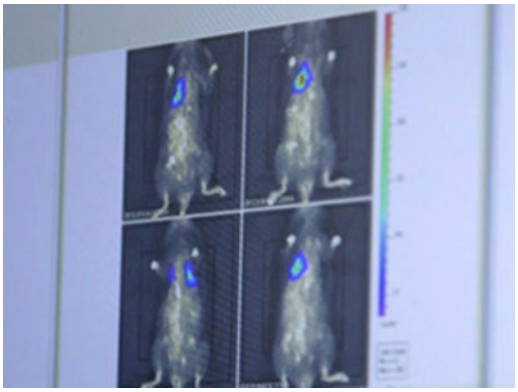
The Center for Development of Advanced Medicine for Dementia conducts research such as the development of blood biomarkers for dementia, and research and development for social implementation of multifactorial interventions aimed at dementia prevention.

The Center for Gerontology and Social Sciences operates a large regional cohort to conduct empirical research on health and social issues among older adults, including support for independence, social participation, and driving.

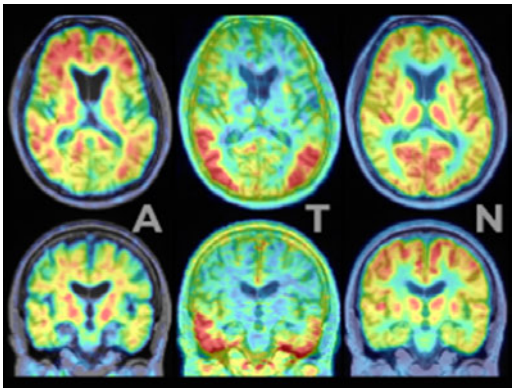
The Assistive Robot Center promotes engineering research and supports robot development to benefit older people and their caregivers in the field of geriatric medicine.

The Medical Genome Center is building the infrastructure for genomic medicine and conducting genomic research on dementia and other diseases. It also operates a biobank that has accumulated clinical and genomic information on more than 30,000 individuals.

The Center for Core Facility Administration develops innovative research technologies and manages extremely sensitive measuring instruments. The Aging Farm is one of the Center's most unique activities!



Mechanism of Aging



Dementia Biomarkers

Community Activities

Nursing Robot

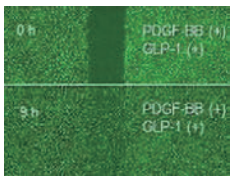
At the research institute, we are conducting innovative research with originality and ingenuity based on the principle that "all research should lead to the cure of diseases". The data base established at the Institute is also the foundation of geriatric research in Japan. All of us are determined to contribute to the health maintenance of older people through our research activities, and we look forward to your continued guidance and encouragement.

Takashi Sakurai, MD, PhD.
Director, Research Institute

The Geroscience Research Center (GSRC) was newly established on April 1, 2021, which is one of the 6 centers under the research institute in the National Center for Geriatrics and Gerontology (NCGG). GSRC is the novel organization which conducts basic research leading to the development of prevention, diagnosis, and treatment methods with the aim of elucidating the essence of the factors and mechanisms of age-related alterations and the onset of diseases. In Japan, as one of the advanced aging societies, in order to contribute to the extension of healthy life span, the results of fundamental and basic research based on scientific evidence leading to medical care for the elderly are extremely important issues. Specifically, we will address research and development aimed at overcoming problems by each research group with a mission deeply linked to the daily diseases of the elderly such as dementia, sarcopenia, and infectious diseases, or frailty caused by various stresses due to decline in biological functions with age, that is an obstacle stands in the way of “built and realization of a healthy longevity" or "promote the mental and physical health of the elderly", respectively.
Simultaneously, I intend to strive to foster GSRC to be a novel stronghold where we can discuss various age-related basic research strategies and results with domestic and abroad researchers and experts, consequently to be a unique international and the world standards research center.

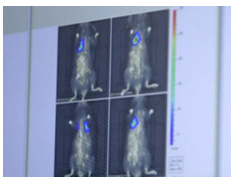
Mitsuo Maruyama, PhD.
Director, GSRC

Research Activities of GSRC
Department of Metabolic Research



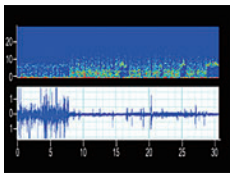
We investigate the action of bioactive substances, i.e. hormones, growth factors, cytokines etc. and the underlying mechanism such as signal transduction with biochemical, pharmacological and molecular biological analyses, using cultured cells and clinical samples.

Department of Inflammation and Immunosenescence



Through the machinery of cellular senescence with aging, we study the effects of inflammation caused by senescence on tissue functions and pathology. We also research on the mechanisms of immune dysfunction with aging to develop methods to maintain sustainable immune homeostatic function.

Department of Integrative Physiology



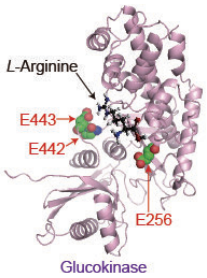
The aim of our study is to understand the central mechanisms regulating age-associated sleep alterations. We are also aiming to elucidate the effect of chronic abnormal sleep-wake patterns in systemic body function and longevity, and to identify biomarkers for age-associated sleep dysfunction in humans.

Department of Integrative Neuroscience

We aim to identify useful biomarker candidates that reflect the pre-dementia stage and to develop effective methods for the prevention and treatment of dementia through understanding of the molecular mechanisms underlying the effects of altered nutritional energy metabolism and exercise on cognitive function.

Department of Chemical Biology

We have identified several intracellular proteins regulating aging and geriatric disease. Using protein degrader/PROTACs technology, we are trying to develop drug candidates for anti-aging, anti-diabetes, anti-flail and anti-cancer.

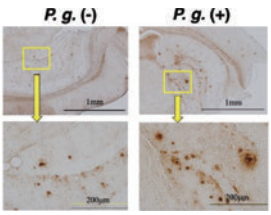


Department of Musculoskeletal Disease

Aim of our research group is to understand the molecular mechanisms and develop novel diagnostic and therapeutic strategies, e.g. biomarkers and the seeds, for musculoskeletal diseases of elderly, such as spinal stenosis, osteoarthritis, and sarcopenia, by employing the approaches including genomics and other omics using human specimens as well as mouse and cellular models for the diseases.

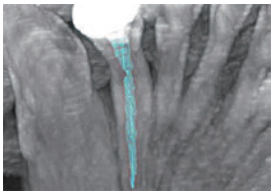
Department of Oral Disease Research

We focus on oral diseases such as periodontal disease from the perspective of geriatric disease or lifestyle-related diseases, and aim to develop new preventive and therapeutic methods to maintain oral functions over the long term. We also analyze the effects of oral bacteria and their components on the oral cavity and the whole body, and develop methods to control them. Furthermore, we develop the prevention and treatment for xerostomia.



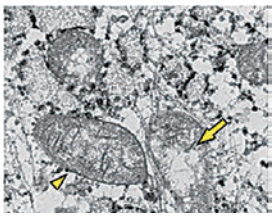
Laboratory of Dental Regenerative Medicine

We innovate endodontic treatment through dental regenerative medicine and form a base for its generalization and promotion. We also work to increase awareness of people's health and welfare by prolonging the life of teeth and increasing the populations who achieve the 80-20 campaign. Furthermore, we work to prolong the healthy life span of individuals of society by regenerating vascular, nerve, and other tissues with pulp stem cells.



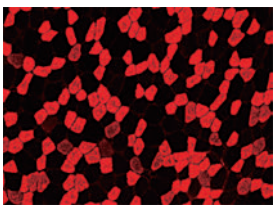
Aging Stress Response Research Project Team

We are studying pathophysiological research on the mitochondrial stress response in locomotive organs and on the mechanism of cell fate determination by intracellular redox stress response, as well as on the mechanism of functional foods that mitigates organ aging.



Brain-Skeletal Muscle Connection in Aging Project Team

Focusing on the functional linkage between the brain and skeletal muscle,we are engaged in research that will lead to the development of preventive and therapeutic interventions for sarcopenia.In particular,we are focusing on the NAD+metabolism in the hypothalamus and skeletal muscle,and on its relationship to sarcopenia.



The Center for Advanced Medical Development of Cognition (CAMD) is a research center specializing in dementia, from prevention, diagnosis to care. In 2021, beta-amyloid antibody therapy was conditionally approved by the U.S. FDA as a disease-modifying drug for Alzheimer ‘s disease, which accounts for 60% of the causes of dementia. But the PMDA in Japan is continuing its deliberations, and more time is needed for the clinical use of disease-modifying drugs.

Therefore, it is necessary to further accelerate research and development to conquer dementia; CAMD opened the door to new science in 2018 with the world's first development of a dementia blood biomarker that reflects the accumulation of amyloid-β in the brain. CAMD promotes highly original research, including the development of new probes that can visualize inflammation in dementia; research on cerebrovascular lesions and the relationship between the brain and diabetes and nutrition; multifactorial interventions aimed at dementia prevention; and research on dementia care and quality of life. In collaboration with other research divisions of the NCGG and overseas research institutes, we are doing our utmost to prevent dementia and develop dementia care that allows patients to live the same life as before even if they have dementia.

Takashi Sakurai, MD, PhD.
Director, CAMD

Research Division of the Center for Development of Advanced Medicine for Dementia (CAMD)

Department of Biomarker Research
Department of Clinical and Experimental Neuroimaging
Department of Aging Neurobiology
Department of Neurogenetics
Department of Prevention and Care Science

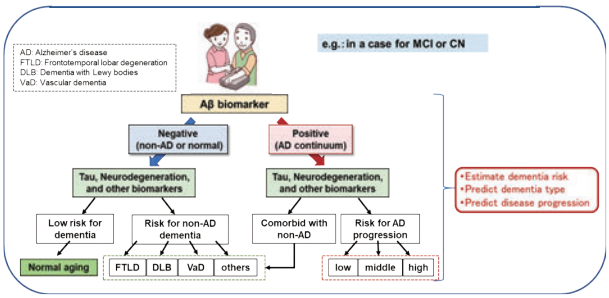
Main research theme

- Development of blood biomarkers for dementia
- Elucidation of pathophysiology of dementia through development of imaging biomarkers using PET, and MRI.
- Elucidation of the mechanism underlying neurodegeneration, neuroinflammation and neurovascular dysfunction in Alzheimer's disease
- Research on Dementia, Diabetes and Obesity,and APO E
- Development of prevention methods for dementia through multimodal lifestyle interventions
- Research Study on Long-Term Prognosis and Quality of Life in Dementia

Center for Development of Advanced Medicine for Dementia (CAMD)

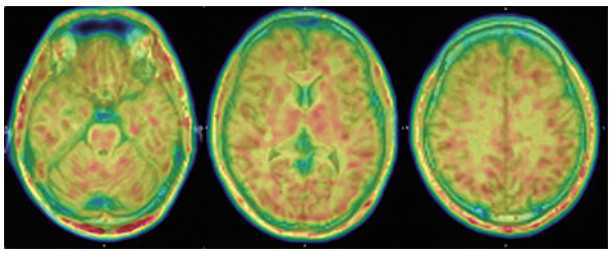
Diagnosis of dementia requires the development of biomarkers for pathological conditions, and CAMD is working with researchers across Japan to stratify dementia using brain imaging and blood biomarkers. In addition, we have developed a PET ligand (NCGG401) focused on inflammation in dementia and have initiated a first in human study.

Integrated blood-based stratification system for dementia

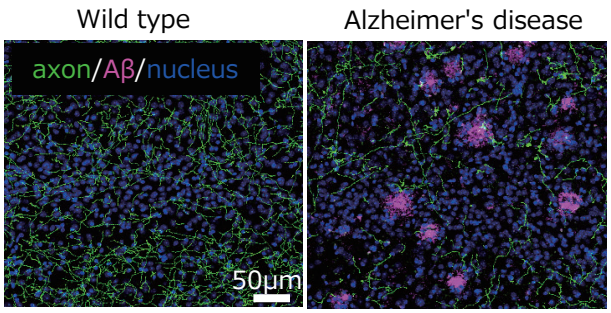


We are investigating the neurobiological basis of dementia. Genetic factors and acquired risk factors are closely related to the onset of dementia. We are focusing on changes in astrocytes and neurovascular units in mouse models of Alzheimer's disease. Also, we are creating an Alzheimer's disease model with obesity and diabetes to analyze genes specifically expressed in the brain.

Brain PET image by [11C] NCGG401



Noradrenergic neurons in Nucleus accumbens in an Alzheimer's disease model



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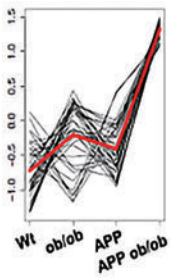
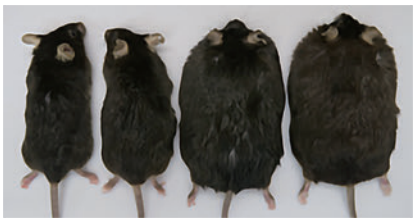
Furthermore, to prevent dementia, we are conducting a multifactorial intervention study (J-MINT) consisting of exercise, nutrition, and brain training for older people at high risk of dementia. We are promoting research in the community to ensure that the results of these national projects are widely disseminated.

Multifactorial Intervention for Dementia Prevention

Alzheimer’ s disease model Complicated by Obesity and Diabetes

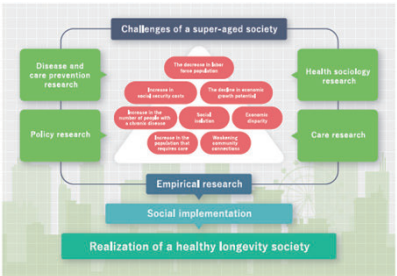




Center for Gerontology and Social Science (CGSS)

The Center for Gerontology and Social Science (CGSS) was established in April 2012 to contribute to the development of a healthy society with longevity. It promotes the physical and mental independence of older people, which is in accordance with the philosophy of the National Center for Geriatrics and Gerontology. In order to accomplish the task, we are conducting empirical research on the various problems of diverse aging societies.

The CGSS consists of six research divisions and one project team, and conducts empirical research to clarify the scientific basis for formulating health, medical, and welfare policies to address gerontological and social issues that develop with aging. The CGSS' main focus is to develop strategies to promote the independent, comfortable, and secure living of older people in their communities, focusing on the social challenges. We promote empirical research on a wide range of problem-solving issues, including policies, legal systems, and economic perspectives based on the following keywords: social participation, independence support, social support, social welfare, home medical care, long-term care insurance, economic effects, and community-based comprehensive care. Through the dissemination of information and promotional activities based on scientific findings from our research, we aim to promote the physical and mental independence with better life satisfaction of the older population, thereby contributing to the creation of a healthy society with longevity.



Hiroyuki Shimada, PhD.
Director, CGSS

Department of Preventive Gerontology

Goals and Roles

Department of Preventive Gerontology scientifically verify whether lifestyle factors such as exercise, nutrition, intellectual activity, and social activity are effective in preventing dementia and frailty. In addition, we promote digital healthcare for older people through artificial intelligence (AI) and IoT devices.

Outline of the research

We are conducting an ongoing large-scale cohort study on community-dwelling older adults to understand the risk of geriatric syndromes and to identify effective intervention methods.

Department of Social Science

Mission

We aim to realize an ideal community-based comprehensive care. We conduct observational and interventional studies to prevent the adverse prognosis of dementia and improve the quality of life of individuals with dementia, those needing care, and their families.

Research Focus

Our interdisciplinary research observes changes in physical and mental functions, the level of care needs, and well-being of individuals with dementia and their families, and clarify their correlates.

We also develop care programs for individuals with dementia and their caregivers, verify their effectiveness, and examine measures for social implementation.

Department of Epidemiology of Aging

Outline

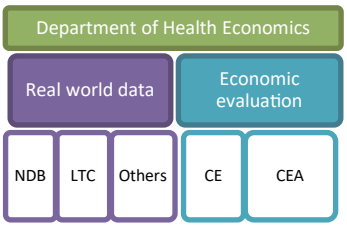
We conduct the "National Institute for Longevity Sciences-Longitudinal Study of Aging (NILS-LSA)" that is a long-term epidemiological study on aging. The main purpose is to systematically observe the process of aging in humans, and the additional purpose is to identify factors associated with longevity, aging, and geriatric diseases. We also establish a research network for integrating data of cohort studies on aging and conducting multicenter collaborative investigations.

Department of Frailty Research

We aim to verify the usefulness of frailty concept, and facilitate its introduction in health care service and geriatric medicine. Furthermore, we are committed to investigate how to utilize the assessment of frailty to implement the effective intervention and minimize dependency and disability in frail older adults.

Department of Health Economics

We aim to contribute to the optimization of resource allocation in health services for the elderly. Using large-scale real-world data (RWD) such as the National Database of Health Insurance Claims and Specific Health Checkups of Japan (NDB) and nationwide data of long-term care services, we evaluate health care quality for the elderly and conduct economic evaluations such as cost estimation and cost-effectiveness analysis.



Department of Gerontological Evaluation

We conduct observational studies and program evaluations from the perspective of interdisciplinary gerontology, aiming to build a scientific foundation for a society of healthy longevity. We collaborate with municipalities and conduct JAGES (Japan Gerontological Evaluation Study) on 300,000 older people and develop JAGES HEART (Health Equity Assessment and Response Tool).

Data Sharing Project Team

We conduct a large-survey study to clarify the association of adverse health outcomes with lifestyle, living environment, and nutrition status among the Japanese older adults. By sharing the data obtained from the large-survey research, we aim to establish cross-disease big cohort data and to build evidence that contribute to extending healthy life expectancy.

With the rapid development of aging society, there is a need for healthy longevity support robots that assist the lives of the elderly and realize “lively activities” in the community. Therefore, at the Assistive Robot Center (ARC), we are engaging in empirical research for various nursing robots, built-in artificial intelligence (AI) to robots, introduction of developed robots to communities and homes, development of robots for maintenance of cognitive function of dementia patients, and demonstration of rehabilitation robots

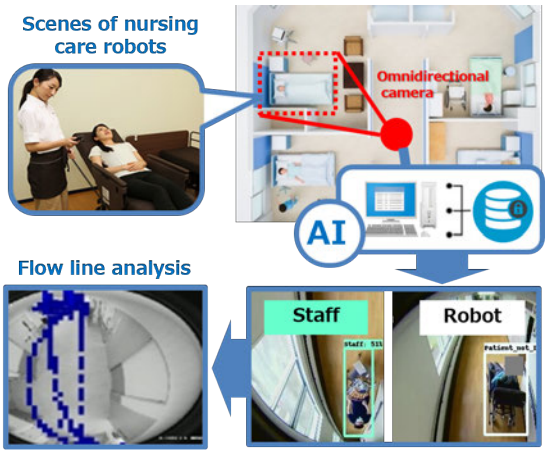
Izumi Kondo, MD, PhD.
Director, ARC

Activity Overview

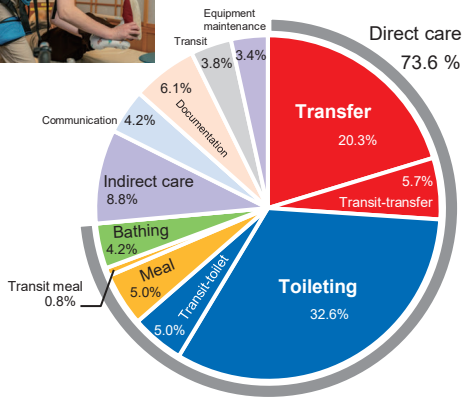
Since 1950, the Japanese population of elderly people aged 65 or older (hereafter referred to as “older adults”) has steadily increased, surpassing 30 million people in 2012. As of September 15, 2018, the number of older adults was estimated at 35.57 million. Older adults comprised 28.1% of the total population at that point, an increase of 0.4% compared to the previous year’s 27.7%, and the percentage of older adults is higher than ever before.

With society undergoing the kind of rapid aging described above, three primary issues will need to be confronted: 1) dementia, 2) frailty, and 3) end of life care. With respect to these issues, and frailty in particular, given that we will be seeing a decrease in labor resources as society ages, the introduction of robots in everyday life that can help the older adults maintain their lifestyles and possibly even improve and sustain function is expected to be essential so that people can look forward to healthy life expectancies. Surveys conducted of the families of older adults have indicated that people have high expectations of robots, particularly in terms of taking over the burden imposed by caregiving. Moreover, studies examining the need for robots in the everyday lives of the older adults have shown that, although people currently do not view the use of robots as particularly desirable, respondents felt that in the near future, particularly considering their own decreased functionality with aging, the older adults will begin using robots.

Development of a flow line analysis system for nursing care staff

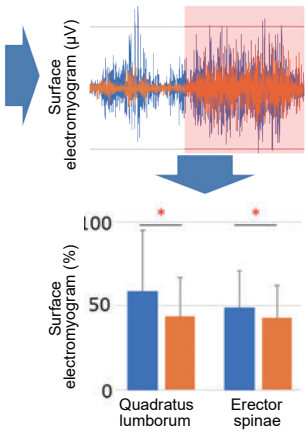


Empirical research on nursing care robots



Under the consideration for these problems, the mission of this robotic center would be to 1) suggest the needs of older adults to the developers properly, 2) collect the existed or being developed seeds as many as possible, 3) provide the place to validation to applicable seeds, 4) foster the application of seeds in the hospital and home, 5) prepare the framework of rules to apply the robot, i.e. guideline for safety use and make a proposal for legal system, 6) make the system for provision and maintenance with the support of developer, and 7) set the education process for the professional to adjust the use of robot from the expert knowledge. This center was established on April 1, 2015, and not only carries out the above activities, but also builds a close cooperative relationship with the prefectural Aichi Service Robot Support Center, which is annexed to the center, and develops and implements robots in society.

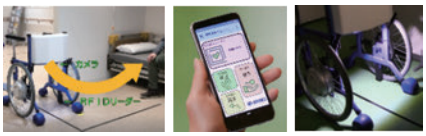
An electromyography measurement system for physical burden analysis



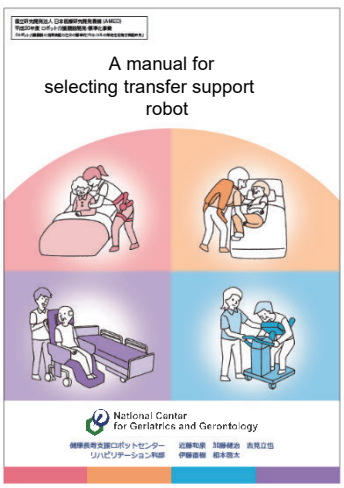
Transfer assistance equipped with nursing care robots

Development of a toilet assist walker

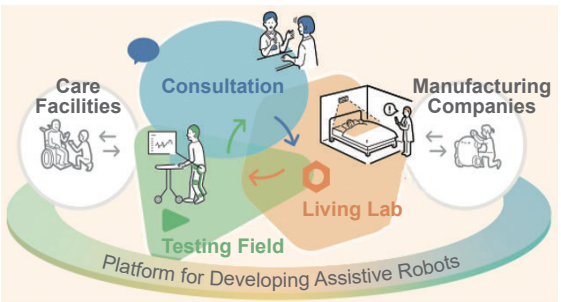
Robosnail OVER



Publication of nursing care robot introduction and operation manual



Development of Living Lab Network



The medical genome center (MGC) was launched in 2016 as a research infrastructure to promote genomic medicine for more accurate diagnosis and more appropriate treatment using personal genomics. The implementation of genomic medicine in geriatric syn-dromes, including dementia and sarcopenia, requires further research.

Our MGC is organized in three department and one division: biobank, the department of genomic medicine, the department of bioinformatics and the information management division. Biobank extensively collects and stores patient samples. The department of genomic medicine comprehensively analyzes the omicsdata, including genomic information obtained from the samples. The department of bioinformatics performs data science and develops omics-clinical databases. The information management division ensures the sample clinical information is handled with a high level of security. The development of genomic medicine is facilitated through the collaboration of these three divisions. Moreover, our MGC provides the biobank samples and analyzed outcomes to outside researchers, which positively supports genomic medical research.

Kouichi Ozaki, PhD.
Director, MGC

Division of Biobank (NCGG Biobank)

Recent data-driven medical research requires a large number of patient samples. Our NCGG biobank collects and stores blood samples (serum, plasma), cerebrospinal fluid (CSF), urine, tissue, feces, DNA, and associat-ed data from patients, which are mainly affected with geriatric syndromes, including dementia and joint disease. As of May. 2022, there are approximately 12,000 enrolled from our hospital and approximately 21,000 from a cohort study of recruited local residents. More than 140,000 samples have been distributed to many medical researchers and has contributed to development of medical science.

NCGG biobank is a member of the National Center Biobank Network (NCBN), a collaboration of six national centers. The sample information collected in our biobank is enrolled in a catalogue database of NCBN central biobank and available for inspection by anyone via https://ncbiobank.org/.

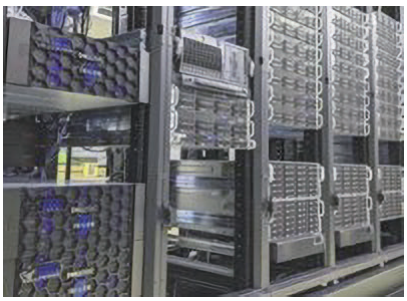
Biobank

Department of Genomic Medicine

To promote genomic medicine for the Japanese population, the information storage for a large scale of Japanese personal genomes is important. The department of genomic medicine accumulates and analyzes the genomic and omics data in collaboration with our biobank, and identifies genetics risk factors and genes associated with multifactorial disorders such as late onset Alzheimer disease. We are further engaged in the construction of disease risk prediction models and discovery of drug repositioning using diseases risk variants an AI. These data resources accumulated in MGC is available to outside researchers through approval by our ethic committee.

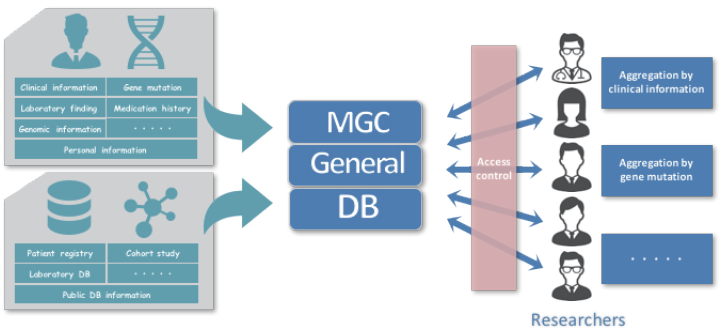
Department of Bioinformatics

The department of bioinformatics integrates the genomic and the other omics data in collaboration with the department of genomic medicine and our biobank, and aims to identify genetics biomarkers associated with diseases and to develop sophisticated disease risk prediction models through machine learning and AI based approaches. We further construct a database using data resources accumulated in MGC. This integrative and comprehensive database will contribute in studies of outside researchers



Data and Information Management Division (IMD)

The information management division (IMD) has centralized control over all information that our MCG handles: biobank enrollment information, diagnostic information, and the other omics informa-tion. Moreover, the IMD develops its own integrated data anonymization system which allows for the use of the omics data and clinical information in a safe and effective manner. Currently, the IMD is developing a general database system that enables effective use for medical scientists in NCGG.



Center for Core Facility Administration (CFA)

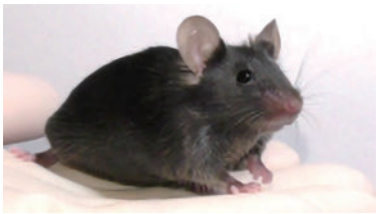
Center for Core facility Administration (CFA) is an essential infrastructure that support research conducted within NCGG. Biomedical researchers rely on a variety of tools and techniques. CFA offer state-of-the-art shared research equipment and facilities that are available for use by all NCGG investigators. Core facilities physically housed in Research Institute, including experimental animal facility, joint use lab, radiation facility and BSL2-3 labs, molecular analysis lab, drug discovery lab and research promotion office, are administered by CFA.

Shumpei Niida, PhD.
Director, CFA

Experimental Animals

The Experimental Animal Facility provides technical research assistance using laboratory animals as following.

- Providing care and management services of experimental animals, including animal welfare assistant.
- Providing researchers with naturally aged mice (aging farm) and disclosing basic data necessary for research.
- Providing reproductive engineering technology for animal cleaning/embryo-sperm preservation.
- Providing information related to animal experiment and guidance on experimental techniques.



Equipment Management

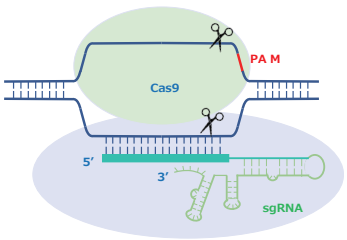
The equipment management division maintains and manages precision equipment such as next-generation sequencers (NGS), mass spectrometry, and confocal laser microscopies, as well as many other joint-use instruments such as the cryo-microtome and digital PCR. We provide technical support for research utilizing these equipment and conduct joint research.

Biosafety Administration

The Biosafety Administration Division manages radiation sources, infectious materials, and other hazardous materials used in NCGG. We maintain radioisotope facilities and BSL-2 and -3 laboratories to conduct experiments safely and efficiently. We also provide education and training for researchers to carry out experiments safely and securely in compliance with applicable laws and regulations.

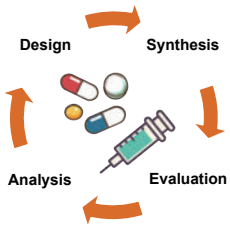
Molecular Analysis

The Molecular Analysis Division maintains and manages equipment for nucleic acid analysis, such as DNA sequencers, and provides technical support to users. For genes genetically related to age-related diseases, we generate knockout and knock-in animals and analyze their functions. In addition, we support and conduct research on epigenetic analysis.



Drug Discovery

The Drug Discovery Division supports the research and development of therapeutic drugs for age-related diseases. We search for compounds that act on target molecules involved in the onset and pathological progression of dementia and aim to identify clinical candidates by optimizing the lead compounds. We also support the development of novel PET ligands and seek to apply them to diagnostic, clinical, and drug discovery research.



Research & Development Promotion

Recently, the research-related tasks such as procurement of research funds and administrative work related to the management of research progress and funds have become diverse, and the amount of work is too much to be handled by individual researchers. The R&D Promotion Division supports researchers to help them carry out those tasks smoothly.

The Center for Comprehensive Care and Research on Memory disorders comprises an outpatient memory clinic and an inpatient ward specialized for people with dementia. Around 1,000 persons newly visit our memory clinic every year to have diagnosis and treatment. And 300-400 people with dementia are admitted to the ward to receive treatment for behavioral and psychological symptoms of dementia or physical complications. We strive to provide the very best and leading-edge medical care to enable persons with dementia and their families to live without concern.

In addition to the regular dementia care, NCGG conducts various activities, such as clinical trials for newly developed medicines, holistic physio-cognitive rehabilitation, post-diagnostic support for people with dementia and their families, risk reduction programmes, assisting in building dementia support networks in neighboring communities, collaborating with Aichi Prefecture and National dementia policymakers, and providing dementia-related educational programmes for professionals including doctors, nurses, and administrative officials.

Akinori Takeda, MD, PhD.
Director, Center for Comprehensive Care and Research on Memory Disorders

Our Mission

Our mission is to fulfill the wishes of persons with dementia and their families so that they can live at home without concern for as long a time as possible.
To achieve the mission, we

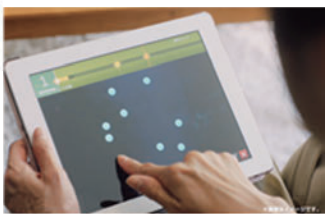
- provide medical care and services to maintain cognitive function
- promptly alleviate behavioral and psychological symptoms of dementia (BPSD)
- maintain daily life activities
- prevent geriatric syndromes, such as falls, aspiration and incontinence
- reduce caregiver's burden
- provide information on dementia care services in their neighborhoods
- provide inpatient care in emergencies

Our Activities

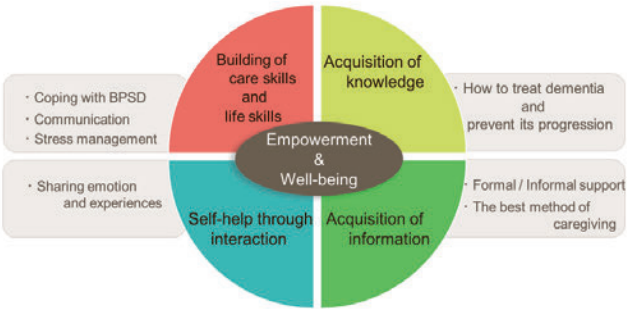
- Staff members: Doctors (22), Nurses (6), Psychologists (6), Mental Health Workers (1), Clerks (2)
- Establishment of the ideal model of dementia care
- Development of a database for clinical research and trials;
- Comprehensive Geriatric Assessment, Neuropsychological examinations, Frailty assessment, Brain imaging [MRI, SPECT, and PET-CT (FDG, Amyloid, Tau imaging)], Spinal fluid analysis
- Creation of an ideal medical and long-term care network

Preventive Activities: Combinatonal prevention approach of exercise, nutrition, and cognitive training

J-MINT
Japan-Multimodal Intervention Trial for prevention of dementia



Memory Class: People with dementia and their families mutually learn, teach and support while socializing



Holistic Physio-Cognitive Rehabilitation for People living with Mild Cognitive Impairment and Dementia :

We provide comprehensive rehabilitation aimed to prevent the onset and progression of the condition and to maintain and improve daily life functions not only for people with the condition, but also for their families.

Experts provide cognitive training, exercise, support and advice to families. We published a manual packed with our rehabilitation know-how.

Our Activities are Ever-Expanding

We are conducting clinical and translational research on dementia in close cooperation with the research division, including biomarker development for early diagnosis, prevention activities, care robots, and the development of a novel socio-medical network (Aichi Orange Town Initiative).

We are very looking forward to seeing and collaborating with you!

Center for Frailty and Locomotive Syndrome

Extension of the healthy life expectancy, i.e., elongation of the period when elderly people can live independently to keep mental and physical health, has become a very important social challenge against the rapid graying of the Japanese society. In the Center for Frailty and Locomotive Syndrome we have been engaging in the approach to contribute to the promotion of healthy longevity, by establishing the Integrated Healthy Aging Clinic, the world' s first novel diagnostic system that comprehensively evaluates problems among elderly patients through a multidepartmental and multidisciplinary cooperation and assesses their physical frailty status and sarcopenia.

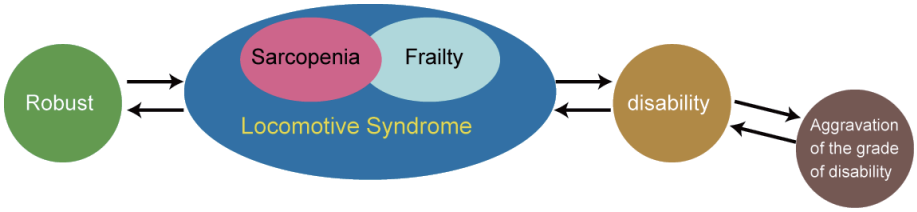
Yasumoto Matsui, MD, PhD.
Director, Center for Frailty and Locomotive Syndrome

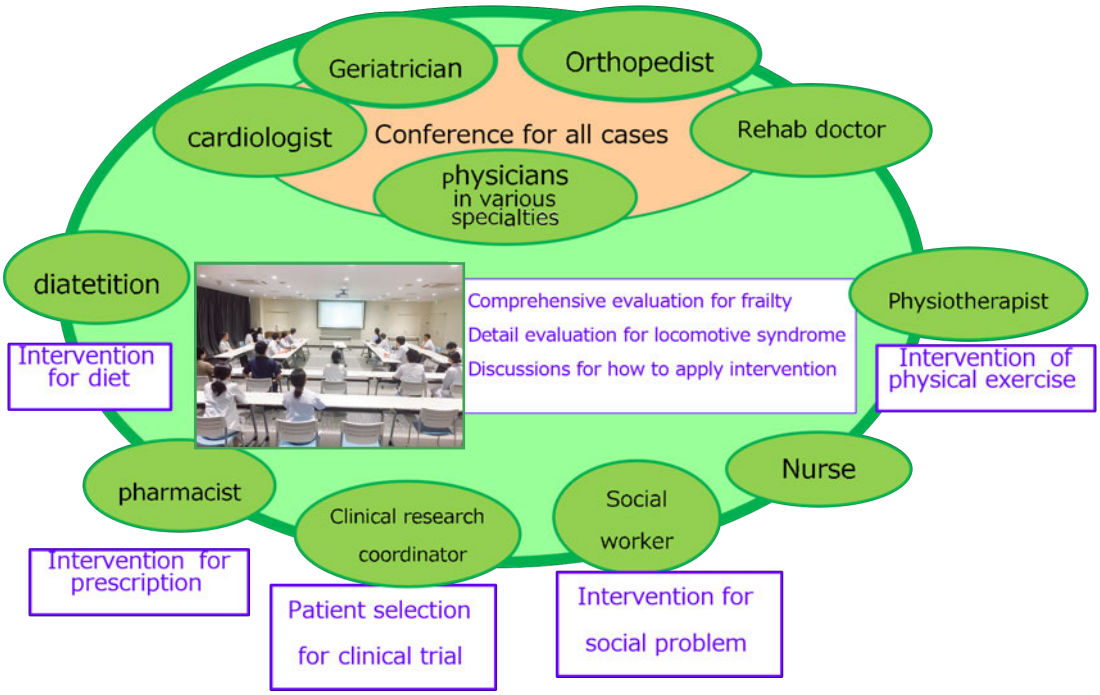
The aims

- Providing medical service to improve and keep physical, life and cognitive capability
- Prevention for disability and its aggravation
- Proper diagnosis, prevention and treatment of locomotive syndrome, frailty and sarcopenia
- Development and research to clarify pathologies and useful interventions for locomotive syndrome, frailty and sarcopenia
- Development of innovative medical and life instruments to prevent these conditions through collaboration with academia and industries
- Enlightenment and permeation of these conditions

The activities

- Comprehensive clinical evaluation of locomotive syndrome, frailty and sarcopenia through multidisciplinary cooperation
- Establishment of the database for clinical research and clinical trial
- Comprehensive evaluation for these conditions and case conference by multidisciplinary specialists
- Interventions for malnutrition and physical impairment
- Activities to promote the public awareness and dissemination of these geriatric conditions
- Development of innovative medical devices for these conditions and evaluation of newly provided various equipment by industries
- Collaboration and association with domestic and internal researchers and academic societies
- Holding lectures for general public to prevent and improve these conditions





Medical practice

Staffs: MDs【geriatrics, orthopedics, rehabilitation medicine, cardiology, pulmonary medicine, metabolism, pathology】, physical therapist, dietician, pharmacist, nurse, social worker, clinical research coordinator, research assis-tant, medical clerk

Clinic: Mon, Tue, Wed, Thu, Fri (need reservation)

Assessments or tests: Questionnaires regarding basic attributes (e.g. age, sex, educational level, family structure, recognition of need for long-term care), higher cognitive function, sociability, frailty, locomotive syndrome, comorbidities, medications, nutrition, and anthropometric measurements, Oral and swallowing function, spinal radiography, whole lower limbs radiography, brain MRI, dual-energy x-ray absorptiometry whole-body images, thigh computed tomography scan, body composition, blood biochemical profile (including nutrition, bone metabolism, and endocrinology), and motor function (walking speed; grip strength; timed up and go; SPPB (walking, balance, chair rise, total score); one leg standing time; center for gravity sway test; two locomotive syndrome tests; ankle dorsiflexion angle measurement, etc.

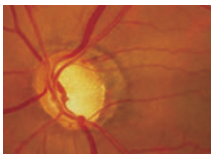
Case conference: one in 2 weeks. Pathological status or problems are examined for all cases to decide intervention methods (nutritional and exercise interventions, Interventions for polypharmacy, cognitive impairment, and social issues)

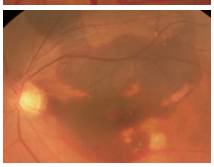
Sensory Organ Center

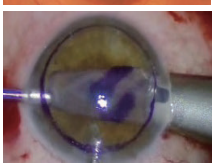
We live our life by obtaining information from the outside world through our sense organs. Sensory organ dysfunction associated with the aging of the population has reduced the daily functioning and cognitive function of the elderly, greatly hindering their independence. The Sensory Organs Center provides the best medical care to treat factors that impede the independence of the elderly by comprehensively evaluating sensory organ functions, including not only vision and hearing, but also taste, smell, and touch, as well as developing new treatments to improve sensory organ functions and conducting research on regenerative medicine. In addition, the center collaborates with other centers to provide medical care to improve the life functions of the elderly.

Tsutomu Inatomi, MD, PhD.
Director, Sensory Organ Center

1. Comprehensive sensory organ practice.
   - Ophthalmology
   - Otolaryngology
   - Outpatient clinic for sensory organs
   - Sensory and motor function clinic

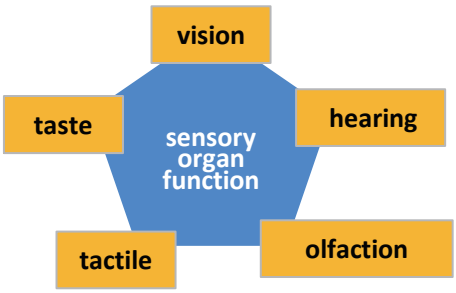






2. Advanced Sensory System Therapy and Regenerative Medicine
   - Early diagnosis and therapeutic intervention for sensory organ diseases
   - Glaucoma Treatment and Age-Related Optic Neuropathy Diagnosis
   - Biologics Treatment for Age-Related Maculopathy
   - Corneal and amniotic membrane transplants
   - Hearing loss, taste and smell testing and treatment
   - Sensory Rehabilitation for the Elderly

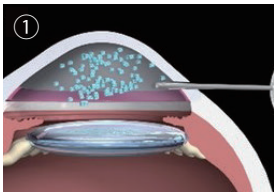
Comprehensive Sensory Functional Care and Return to Elderly Care

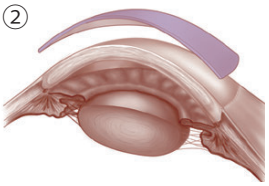


- Maintaining Quality of Life for the Elderly
- Independence Support for the Elderly
- Treatment Algorithm Development
- Sensory System Rehabilitation
- Frail Prevention
- Sarcopenia

Advanced medical development for intractable diseases of the sensory organs

- Cultured corneal endothelial cell injection therapy for bullous keratopathy ①
- Transplantation of cultured autologous oral mucosal epithelial sheet for refractory corneal disease ②
- Treatment Development for AMD
- Glaucoma Gene Analysis and Preemptive Medicine
- Artificial inner ear surgery
- Introduction of hearing aids for patients with dementia
- Hearing Loss and Genetic Polymorphisms





Comprehensive Sensory Function Assessment for the Elderly

The program is set up to treat patients who are below the limit of independence based on a comprehensive evaluation of the five senses, and includes therapeutic intervention, sensory rehabilitation, and other advanced medical treatments for each sensory organ.

① Sense of balance: To elucidate the pathophysiology and causes of Meniere's disease and related disorders by evaluating the images of cochlear contrast-enhanced MRI using 3T MRI, and to apply the findings to treatment.

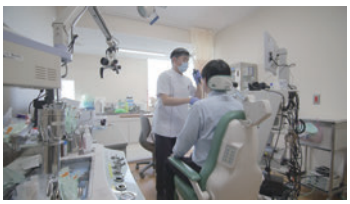
② Vision: Clarify the relationship between vision and life functions of the elderly, improve vision by treating eye diseases through advanced and regenerative medical treatments, and promote the independence of the elderly.

③ Hearing: Early detection of age-related hearing loss and cerumen plugs, which cause hearing loss, and prevention of cognitive decline and depression through new treatments such as cochlear implants and hearing aids.

④ Olfaction: Examine the relationship between olfaction and aging and cognitive decline, and investigate early detection of neurodegenerative diseases such as Parkinson's disease, Alzheimer's disease, and MCI, as well as treatments that can be continued by the elderly, such as olfaction training.

⑤ Taste: Elucidate the relationship between taste and olfaction, and intervene to reduce the sense of taste.

Vision care



Hearing care

Diagnosis and Treatment

Staff: Doctor【Ophthalmology, Otolaryngology】, RN, Vision Trainer, Speech therapist, Reception Clerk

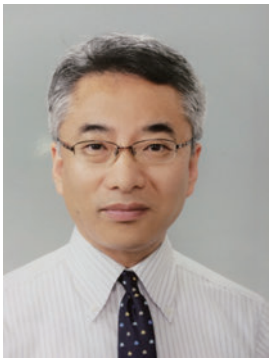
Vision test: Corrective visual acuity test, intraocular pressure measurement, refraction test, corneal curvature radius measurement, adjustment test, corneal shape analysis test, fundus camera imaging (normal, fundus fluorescence, autofluorescence), dynamic/static quantitative visual field test, fundus three-dimensional image analysis, anterior segment three-dimensional image analysis, retinal tonometry, optical eye axis length measurement, stereo visual acuity test, corneal endothelial cell microscopy, central flicker test, ultrasonography), ocular protrusion measurement, lacrimal secretory function test, blink analysis, tear fluid stability test (DRI), laser speckle LSFG test], ocular fundus 3D imaging analysis, anterior segment 3D imaging analysis, retinal electroretinography, optical axial length measurement, stereoscopic ophthalmoscopy

Auscultation: 【Pure tone audiometry, speech audiometry, tinnitus testing, hearing aid compatibility testing, auditory brainstem response, inner ear function testing, tympanometry, otoacoustic emissions (DPOAE)】

Taste test: 【Electrical taste and the filter paper disk testing】

Olfaction: 【Reference olfaction test, venous olfaction test】

Center for Swallowing and Continence



Center for Swallowing and Continence treats Swallowing and Continence as a basic activities of life. Many old people have trouble with eating, urinary continence, and fecal excreting. These impairments greatly affect their activities of daily living (ADL), and vice versa. Stroke, spinal cord injury, dementia, frailty, and sarcopenia cause dysphagia, urinary incontinence, and defecation disorders.

We make safe oral intake by adjusting diet and posture for patients with dysphagia. We also evaluate lower urinary tract function by bladder diary and residual urine volume. The presence or absene of constipation is assessed by ultrasound. We offer good quality of life for old people.

Hitoshi Kagaya, MD, DMSc.
Director, Center for Swallowing and Continence

Mission

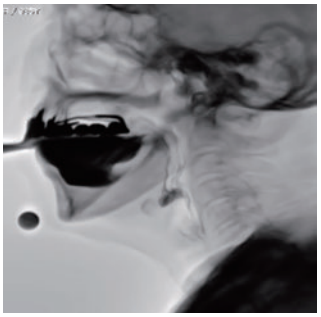
- We provide the highest standards of current medicine for Swallowing and Continence as a basic activity for life.
- We disseminate our findings throughout the country and abroad.

Activities of Center for Swallowing and Continence

- Detailed evaluation of dysphagia, urinary incontinence, and defecation disorders
- Videofluoroscopic examination of swallowing, videoendoscopic evaluation of swallowing, and Swallowing CT for dysphagia
- Rehabilitation for patients with dysphagia
- Evaluation and prevention for dysphagia due to frailty and sarcopenia.
- Appropriate behavioral therapy, medication, low invasive surgery, and rehabilitation for patients with incontinence
- Removal of inappropriate indwelling urinary catheter
- Evaluation of fecal stasis by ultrasound
- Providing medication and rehabilitation for constipation
- Treatment for dysphagia, urinary incontinence, and defecation disorders due to polypharmacy

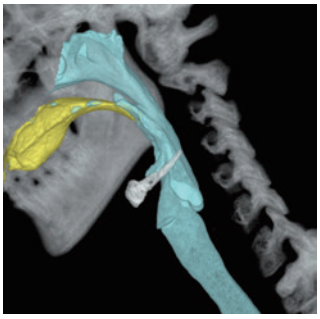
Dysphagia

- Dysphagia is a swallowing difficulty between oral cavity and esophagus. Dysphagia robs joy of eating especially in old people. Eating is the easiest ADL, so it is the first activity to try for severe impaired patients.
- The videofluoroscopic examination of swallowing, videoendoscopic evaluation of swallowing, and swallowing CT for dysphagia are used for swallowing assessment.
- Oral functional management is needed for swallowing
- Appropriate rehabilitation is provided for patients with dysphagia



Videofluoroscopic examination of swallowing

Videoendoscopic evaluation of swallowing



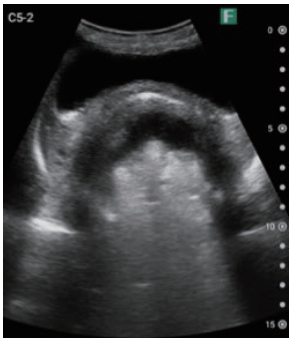
Swallowing CT

Urinary incontinence

- Lower urinary tract function is one of the most easily damaged activities in old people. Incontinence in old people with frailty and dementia affect not only lower urinary tract function, but physical function, ADL, balance, cognitive function.
- We have urinary care team consisted of urologists, nurses, and therapists. We provide transdisciplinary approach in addition to urological approach.
- Special clinic on every Monday for patients with urinary incontinence. Urologists and certified instructors for continence provide treatment and care advice.

Fecal Excreting

- Fecal excreting affects ADL and social activities.
- Ultrasound for lower abdomen clarifies the fecal stasis and makes appropriate treatment.



Ultrasound for lower abdomen

The members of Center for Swallowing and Continence include Department of Rehabilitation Medicine, Dentistry and Dental/Oral Surgery, Comprehensive Geriatric Medicine, Otolaryngology, Urology, Gastroenterology, Dermatology, Oral Disease Research, Laboratory of Practical Technology in Community, and Nursing. We make transdisciplinary approach among Physicians, Dentists, Nurses, Speech-Language-Hearing Therapists, Physical Therapist, Occupational Therapists to solve problems related to Swallowing and Continence.

The prior mission of the National Center for Geriatrics and Gerontology (NCGG) is to contribute to society through the results of advanced clinical research on diseases such as dementia and frailty that are required immediate responses in super-aging society. In order to establish a support system for conducting a greater number of high-quality clinical trials and clinical studies, the Innovation Center for Clinical Research (ICCR) was founded on April 1, 2014. This institute was renamed as the Innovation Center for Translational Research (ICTR) on April 1, 2021.

Keisuke Suzuki, MD, PhD.
Director, ICTR

Outline of ICTR

With the aim of supporting high-quality clinical trials and clinical studies at NCGG, ICTR is composed of the four departments, the Clinical Research Promotion Division, the Clinical Research Support Division, the Quality Management and the Data Analysis Division and Data Center, and the Development and Affiliate Promotion Division (Figure 1).

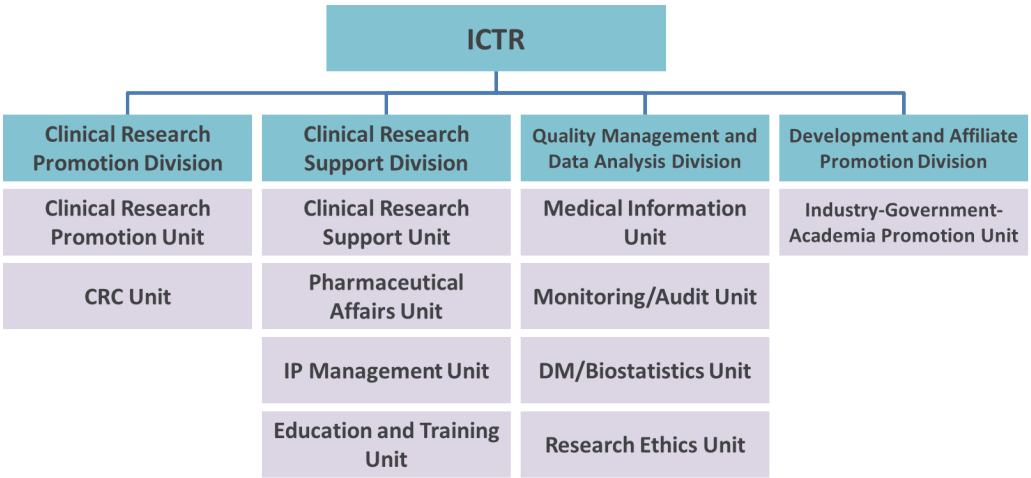


Figure 1 The Organization of ICTR (as of July 1, 2022)

・The Clinical Research Promotion Division has two units, the Clinical Research Promotion Unit and the CRC Unit. In addition to clinical research coordinators (CRCs) and clinical psychologists, one medical doctor and one pharmacist are also members of the Clinical Research Promotion Division and play a role as the driving force for the clinical trials and clinical studies conducted at NCGG. The clinical trial secretariat that provides administration support for the Institutional Review Board belongs to the Clinical Research Promotion Division. In addition to the six CRCs who are professionals that support the progress of clinical trials and clinical studies, the unit has two clinical psychologists who evaluate cognitive functions that are indispensable for dementia research.

Amyloid imaging, which is the reliable diagnostic tool for the selection of patients in dementia trials, is used at NCGG, and the Clinical Research Promotion Division is actively applying this technology.
(Figure 2)

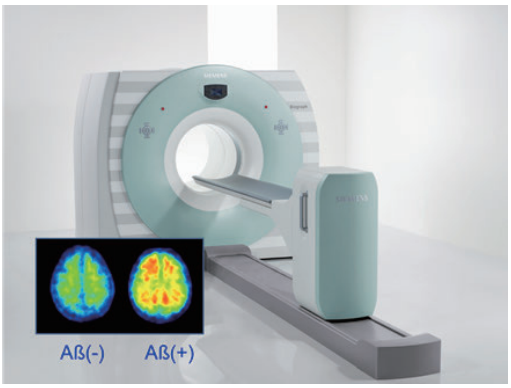


Figure 2 The Amyloid imaging in clinical trials for Alzheimer's disease

・The Clinical Research Support Division conducts support activities related to clinical trials and studies including intellectual property management. The division offers a comprehensive support for researchers, such as study design, drafting protocol, ethical reviews collaborated with the Research Ethical unit, data management which includes biostatistics, and monitoring. The education and training unit provides various educational and training programs and seminars, from basic biostatistics and research ethics to up to date topics, related with clinical trials and researches. The workshop on planning the high-quality clinical studies have been held since 2017 for clinical researchers in NCGG and provided attendees with practical examples.

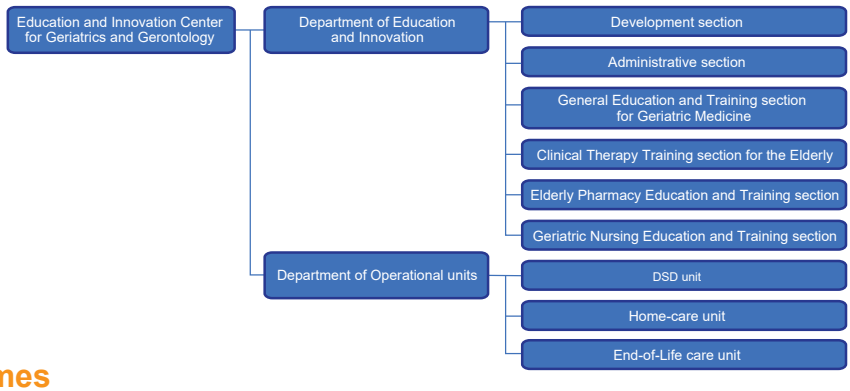
・The Quality Management and Data Analysis Division performs quality control of clinical research by appropriately collecting, managing, and analyzing clinical research data from an independent standpoint to ensure the reliability of the results. The medical doctor who belongs to the Medical Information Unit of the Data Center is promoting the digitization of data to improve the efficiency of the above work. In addition, one biostatistician belongs to the DM-Biological Statistics Unit of the Data Center. With the Clinical Research Support Department, the Data Center responds to various questions from researchers, such as selection of appropriate statistical methods, calculation of sample sizes, selection of test designs, and biostatistics counseling.

・The Development and Affiliate Promotion Division and its Industry-Government-Academia Promotion Unit was established with the aims of discovering the seeds of future research, not only in NCGG but also in the academic and corporate sectors, and providing a seamless bridge to clinical research. To realize a healthy and long-living society, it is extremely important to develop innovative new drugs, promising diagnostic devices, effective rehabilitation equipment, and nursing robots for elderly. Therefore, it is necessary to discover promising seeds at the basic research stage, nurture the seeds until they proceed to clinical studies or clinical trials, and confirm their usefulness.

The Education and Innovation Centre was founded on 1 April 2014 with the mission to develop human resources who can contribute to the development of a healthy and longevity society; in April 2015, an education and training facility was built with a main seminar hall with a capacity of 200 participants and an accommodation facility with a capacity of 30 individuals.
Our mission at the Education and Innovation Centre is to contribute to the improvement of the health and care of the older people in our country and to the independent and valuable lives of older people by sharing the knowledge and experience gained from clinical practice and research with professionals in the medical, nursing and administrative fields, as well as with the general public.
As well as education and training in our hospitals, we also manage clinical training for various medical professions and accept more than 500 trainees a year from hospitals, medical universities, medical colleges and nursing colleges across the country.
We also plan and manage education programmes commissioned by the national and local governments, such as training for the "Dementia Support Doctors (DSDs)" and the "Initial-Phase Intensive Support Team for dementia (IPIST)" members, as well as “Comprehensive educational programme for nurses on Elderly Health Care and Home Care” and "Cognicise" training programme for dementia prevention. In addition, we offer workshops and lectures for the broader range of people all year round, so we hope you will take your time to check our website for the latest information and join us.

Shinichiro Maeshima, MD, PhD.
Director, Education and Innovation Center for Geriatrics and Gerontology

Organization



Key Programmes

①Education Programme for "Dementia Support Doctors (DSDs)"

DSD Education Programme was launched in 2005, and a total number of over 12,000 doctors had been certified as DSD by the end of JFY 2021 (Figure 1). DSDs are expected to play a crucial role in facilitating the development of a regional dementia network, such as serving as lecturers for the "Educational Programme for Family Doctors to Upskill Dementia Practice" and participating as team members of the "Initial-Phase Intensive Support Team for dementia (IPIST)".
Also, DSDs are one of the staffing requirements for the additional fee for dementia care in acute care hospitals, and many doctors are actively involved in a wide range of fields.
The Government aims to increase the number of DSD to 16,000 by JFY 2025.

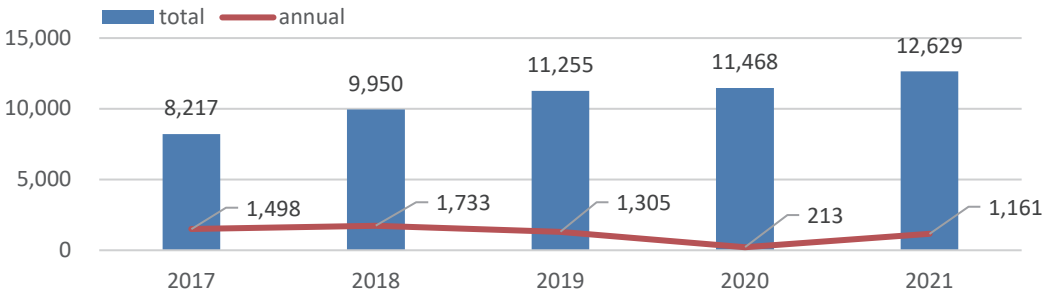


Figure1. The number of Dementia Support Doctors

②Education Programme for "Initial-Phase Intensive Support Team for dementia (IPIST)" members

IPIST member Education Programme has already been completed by more than 11,000 people in the past six years, with participants from a variety of prefectures (Figure 2). IPISTs play an active role in providing initial support for the people with dementia and their families in the community, and we are planning to deliver further training sessions in JFY 2022.

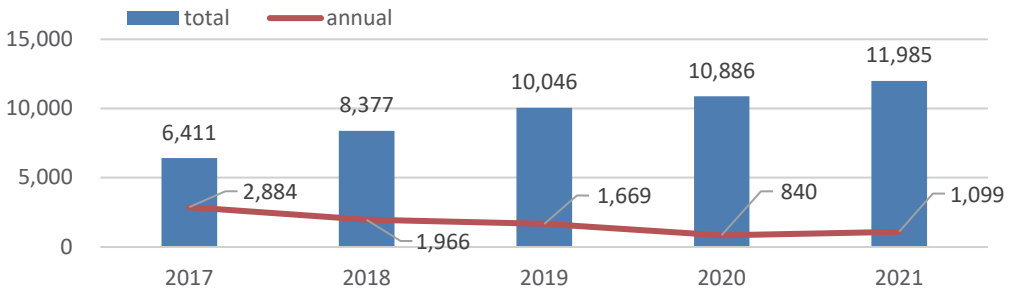


Figure2. The number of Initial-phase Intensive Support Teams

③Comprehensive educational programme for nurses on Elderly Health Care and Home Care

We trained more than 100 nurses every year (Figure 3), and our dementia courses are also designated as a requirement for one of the additional fee for dementia care at hospitals.

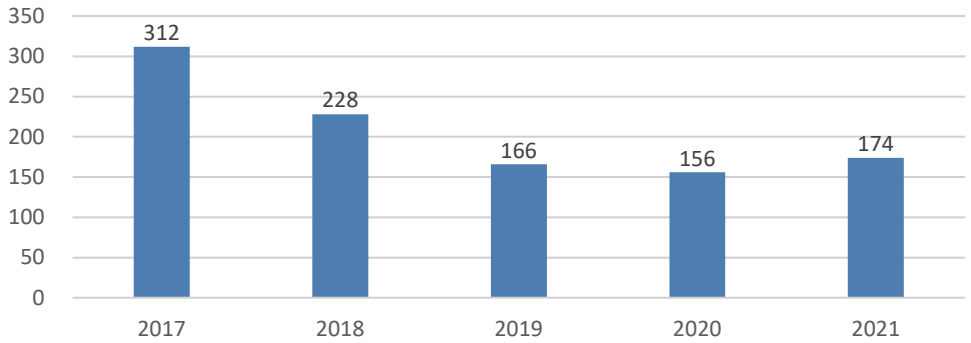


Figure3. Comprehensive educational proramme for nurses

④Training sessions for Instructors and Practitioners of "Cognicise"

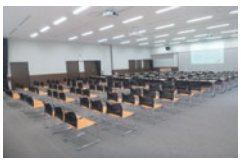
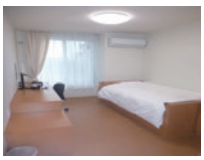
"Cognicise" is a uniquely designed programme aimed at preventing dementia. We host training sessions for its instructors and practitioners twice a year each. Due to the high number of applicants, participants will often be randomly selected by lottery.

Education and Training Facility

A spacious seminar hall is available for large groups. It is used ten occasions per month on average.

Photo Gallery

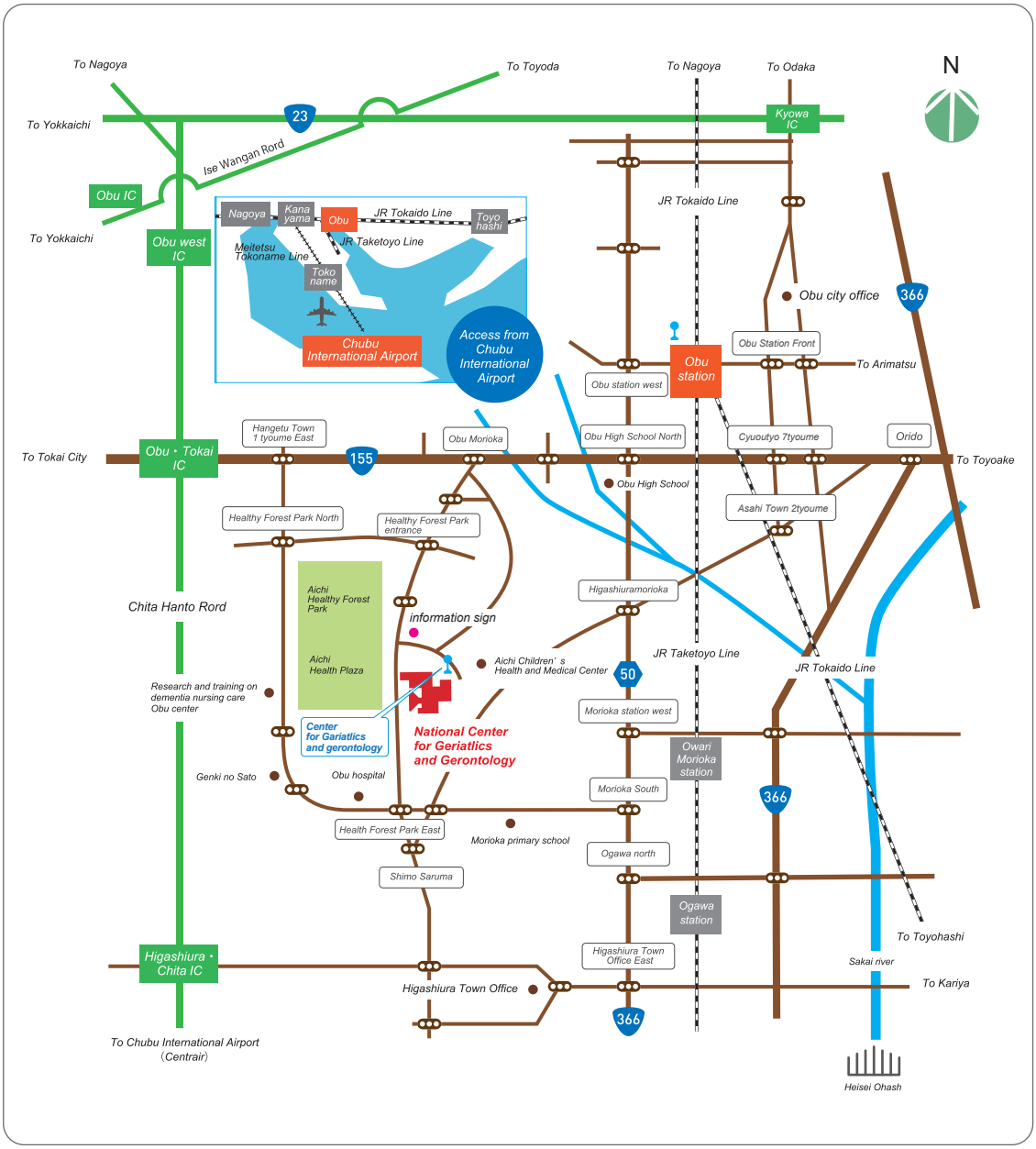



Guide map for National Center for Geriatrics and Gerontology

1 Hospital Building 1 (Outpatient Ward)
2 Hospital Building 2 (Inpatient Ward)
3 Hospital Building 3
4 Hospital Building 4
5 Hospital Building 5
6 West Building
7 Research Building 1
8 Research Building 2
9 Research Building 3
10 Biobank
11 Experimental Animal Facility
12 Education and Innovation Center
P Parking

Access



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National Center for
Geriatrics and Gerontology