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### Smart Ageing International Research Centre



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#### Smart Ageing International Research Center

The Smart Ageing International Research Center was established on 1 October 2009 with the aim of promoting international cooperative research on "Smart Ageing" as explained below. It aims to encourage individuals and societies to cope effectively with the changes brought on by ageing, and to mature intellectually.

In Japan the percentage of elderly people aged 65 years or over was 25.1 % in 2013, an unprecedentedly high percentage, making Japan the world's first super-aged society. In such a super-aged environment, it is necessary to form a society in which each individual can play an active role even as one becomes older, and in which people can share knowledge and wisdom regardless of their age and gender in order to maintain and improve the quality of life of all people and to maintain a healthy society.



Smart Ageing International Research Center



Exercise at Smart Ageing Square



Smart Ageing College Lecture (above) and Seminar (below)



The Center promotes research and development focusing on the following two issues to be resolved to formulate effective countermeasures against a super-aged society at the earliest time possible.

The first issue is the challenges resulting from the longer lifespan of individuals. The Center is developing a system to support a healthy and longer lifespan so that individuals can continue to maintain intellectual stimulation later in life, find their places as an integral member of society, and to maintain and to improve their quality of life, and mental and physical health.

The second issue is the challenges due to the ageing of the whole population. In a super-aged society, elderly people should be considered to be a valuable human resource. It is necessary to develop a social system that promotes their active social engagement. In particular, intergenerational exchange and the transfer of knowledge and wisdom to the later generations, which have been lost with the trend toward the nuclear family, are highly important for the development of human and social sensibilities in younger generations who will bear the future of Japan. The Center will actively create a forum where elderly people can directly communicate with younger generations to pass down their knowledge and wisdom. We hope that the Center can contribute to the creation of a bright future through state-of-the-art Smart Ageing research.

### What is Smart Ageing?

We define Smart Ageing as “all individuals and the societies are maturing intellectually while effectively dealing with the changes associated with ageing”. This concept is a revolutionary paradigm shift away from common negative concepts, such as antiageing, that imply an unwillingness to accept or face the later stage of life.

In general, ageing is considered negatively as the loss of something that people have in their youth or a form of regression. As a result, a false image has been formed that ageing is something like an illness or ugly, and that young people are superior to the elderly in many respects. Consequently, an obviously wrong concept of anti-ageing has been developed. However, ageing is a fact of life; in other words, anti-ageing negates life.

Rather, the concept of Smart Ageing advocates a positive acceptance of the later stages of life and a perspective that views ageing as a series of “developmental stages toward intellectual maturity” as one gets older, resulting in a deeper way of looking at things and broadened views, and thus a more enriched life. We think that ageing means people can grow and become wiser as they reach later stages of life, and that society can evolve into a sustainable structure. We call this concept Smart Ageing. We proposed the concept publicly in 2006.

Generally, an individual's quality of life increases as one grows older compared to when they are young: however, many people tend to lose their sense of purpose in their life when they lose their connection with society, triggered by, for example, retirement, leading to a decrease in their quality of life. However, we believe that quality of life can be increased up until the last moment if one pays careful attention to the following four factors, ie cognitive stimulation, regular exercise, balanced nutrition, and relationship with society, and if a social system to realise this for everyone can be established.



Learning Therapy Practice in the U.S.



Learning Therapy Class at Smart Ageing Square

The results of the research and development at the Center will lead to the realisation of a society in which people can feel enrichment of life as they become older, and they are connected intellectually and are supportive of each other, regardless of age or gender, through regional personal connection.

### **“Three-Inter” Activities**

There are three major activities promoted by the Center: interdisciplinary cooperative research, international collaborative research projects, and intergenerational exchanges. The Center aims to create an area of integrated research unparalleled in the world on the science of ageing through a unique interdisciplinary research plan. With the beneficial involvement of researchers in neuroscience, gerontology, medicine, medical engineering, bioscience, cognitive psychology, sociology, and philosophy, it will cultivate human resources and uncover ways of coping with the problems faced by super-aged societies. The Center will additionally promote active intergenerational exchanges between young researchers and the elderly participating in the Smart Ageing College, described later.

### **Organisation**

The Center is divided into two divisions: the Division of Research and Development and the Division of Strategic Planning.

#### **Division of Research and Development**

This Division consists of three departments with separate research aims.

- The Department of Advanced Brain Science (Prof. Ryuta Kawashima) performs research with the aim of developing techniques for maintaining and improving cognitive functions and mental health.
- The aim of the Department of Biomedical Measurements (Prof. Yoshifumi Saijo) is development and validation of both imaging and sensor technologies for measurements of ageing-related physiological, morphological and/or biochemical changes. Such technologies could elucidate the processes and mechanisms of human ageing.
- The aim of the Department of Electromagnetic Neurophysiology (Prof. Nobukazu Nakasato) is to investigate brain physiology through electromagnetic measurement and stimulation. Ultimately, the department's objective is to develop electromagnetic tools for research and medicine and to promote clinical applications for electromagnetic neurophysiology.

**Division of Strategic Planning** The Division of Strategic Planning (Prof. Hiroyuki Murata) is responsible for planning and operating the Smart Ageing College and the Smart Ageing Square (see below). It also functions to promote collaborative research with international cutting-edge organisations and interdisciplinary collaboration between industry and academia.

The Division is responsible for planning and promoting projects to spread the concept of Smart Ageing and to apply the research results obtained at the Division of Research and Development to society through (1) collaborative research with leading-edge overseas research institutions, (2) industry-university collaboration with companies in different industries, and (3) intergenerational exchanges between elderly and younger students.

The Center is the first Japanese national university that entered into an academic partnership agreement with AARP, the world's largest nonprofit membership organisation for people aged over 50. We sent a graduate student as the first intern for AARP, and co-hosted an international symposium held in Orlando, Florida, in 2010. The Center and AARP jointly promoted the “Smart Ageing Initiative,” which encourages the Learning Therapy, a non-pharmaceutical method to improve dementia, developed by the Center, to spread out in the U.S. Over 1,400 nursing homes and municipalities in Japan, amounting to over 20,000 people, have tried Learning Therapy and attained outstanding results for the improvement and prevention of symptoms of people with dementia. The number of demented people in the U.S. is approximately 5 million, and the demand for the improvement and prevention of dementia is much higher than that in Japan. Therefore, high expectation is placed on Learning Therapy in the U.S.

### **Smart Ageing Square**

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The purposes of the Smart Ageing Square are to create a practical healthy ageing system that enables elderly individuals to maintain and improve their mental and physical health and improve the quality of life through industry-university collaborative research, and to propose such a system to society.

The results of the basic research obtained at the Center will be related to industry through liaison activities at the Division of Strategic Planning, and industry-university collaborative research will be carried out to examine the effect of the healthy ageing system on the Smart Ageing of individuals.

In experimental studies, local residents can directly gather in the area for the industry-university collaborative research allocated within the Smart Ageing Square. This will enable the establishment of a research and development environment that is directly related to the local residents. The Smart Ageing Square aims to establish the new style of industry-university collaboration required in a super-aged society for consistent product development from research and development to the commercialisation of products.

Four factors, ie, cognitive stimulation, regular exercise, balanced nutrition, and engagement to the society, are particularly important to maintain and improve the quality of life of elderly people. The Smart Ageing Square provides the opportunity for local residents who participate in the experimental study to develop a relationship with society.

### **Neurosocioeconomics Study**

Nursing care prevention currently promoted by the Health, Labor and Welfare Ministry in Japan only focuses on improving the function of locomotorium, balance of nutrition, and function of the oral cavity. This approach lacks viewpoints on prevention of dementia and depression as well as on return on investment of preventive care cost. We are anxious that the current care prevention programme cannot follow the predicted increase of dementia population, which will cause hypanthia increase of social welfare cost.

To avoid this, the Center promotes “neurosocioeconomics study”, which reduces the cost of medical and care at present and in the future, and stimulates economic demand of individuals by life intervention, such as muscle training and brain training, which enable older adults to improve their brain function and mental health.

### **Smart Ageing College**

The Smart Ageing College provides a forum where elderly people, graduate students, and young faculty members can get together to learn how to achieve Smart Ageing at the campus of Tohoku University. Approximately one hundred members of the general public, including elderly people, are publicly sought; one-year lecture courses and various seminars of different themes are organised by faculty members and young researchers at Tohoku University. We plan to give outstanding participants the chance to serve as mentors to young researchers.

In this super-aged society, how elderly people fulfil their potential and play active roles in society is particularly important. To this end, the Smart Ageing College aims to serve as an academy where social education for young students is combined with the provision of a field for elderly people to fulfil their potential.

In addition, it also aims to serve as a catalyst for the local community to transform into a “Smart Ageing Community” that can effectively deal with the various problems related to ageing. Therefore, the Smart Ageing College is an innovative project in that it provides social education for young students and utilises the abilities of local residents.

Through the Smart Ageing College, we create a forum where elderly people and the general public can engage in direct exchange with young people, and the elderly people can pass on their knowledge and wisdom to younger generations. With these activities, we will propose a social system for promoting the positive social participation of elderly people, considering them as a valuable human resource.

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