

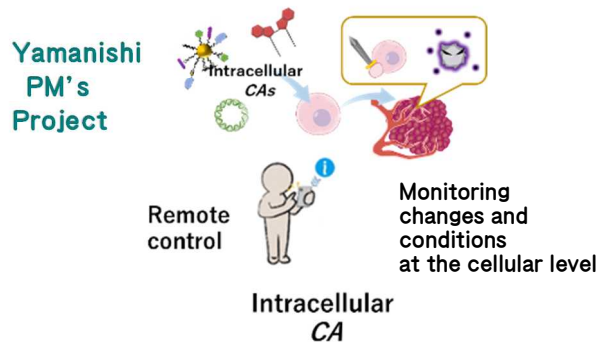
## Creating A Society Whose Citizen's Health is Monitored by Remote Control of Intracellular Cybernetic Avatars

### 1. Position in the program

This project aims to create a society in which the internal environment of the members' bodies is monitored remotely at the cellular level. To enhance the human body's immune system's performance, we plan to develop intracellular cybernetic avatars (hereinafter referred to as intracellular CAs) which can be controlled remotely to monitor citizens' health. If realized, this goal should lead to a higher social infrastructure and a "Secure life" guaranteed health.

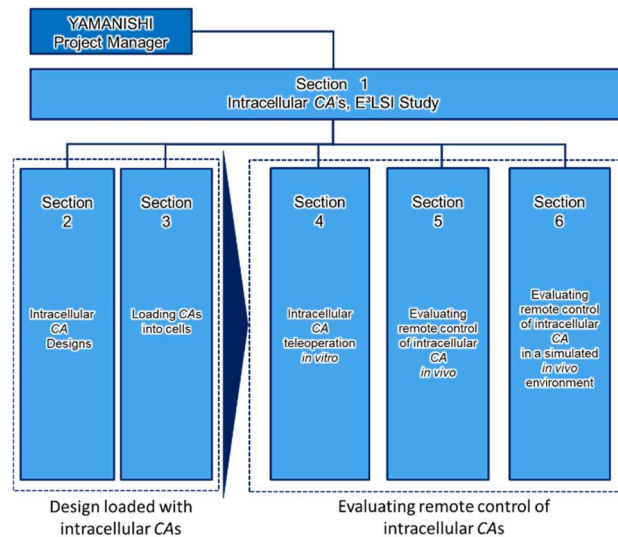
This major transformation of daily life will contribute to Moonshot Goal 1 "Realization of a society in which human beings can be free from limitations of body, brain, space, and time by 2050.

As shown in the figure below, intracellular CAs loaded into cells are controlled remotely from outside the body in order to maintain a good internal environment.



### 2. Overview of the R&D and the Challenges

By 2050, specialists including medical doctors will be able to remotely control intracellular CAs ranging in size from nanometers to micrometers. By improving the ability of doctors and specialists to monitor changes and conditions in our physical condition and constitution, we aim to improve our quality of life and extend healthy life expectancy for everyone. To realize this goal, we will conduct research and development in the following areas:



Research Section 1 **Intracellular CA's, E'LSI Study**

Research Section 2-3 **Design loaded with intracellular CAs :**

The process of designing intracellular CAs and loading them cells

Research Section 4-6 **Evaluating remote control of intracellular**

**CAs :** After designing intracellular CAs and loading them into cells, we will evaluate the cell kinetics *in vitro*, *in vivo*, and *in vivo*-simulated environments to verify the safety of intracellular CAs and how well they can be manipulated through remote control.

We have set goals to be achieved by reverse planning.

By 2025 we plan to develop and evaluate intracellular CAs for testing and removal, and intracellular CAs for markers. Researchers from a wide range of fields are collaborating to develop intracellular CAs.

### 3. Future plans

Once working CAs have been developed, we will test them remotely in a simulated human body environment.

In addition, in order to establish a seamless research support system for industry, academia, and government, we will work to create a consortium system between industry to facilitate brainstorming among experts and researchers in the early stage of research.

Confidence is an important element in Academia-Industry Cooperation.

By making corporate consortiums, we hope to inspire confidence between industry and research, and so achieve results rapidly.

