

●Development Stage

(Fiscal Year 2008–2010)

Chiba/Tokatsu Area

Development of a drug-creation system using next-generation antibodies and diagnostic devices based on advanced platform technologies in the Chiba/Tokatsu area

Chiba Industry Advancement Center

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Framework for Project Promotion

- Project Director.....Toshio Suganuma
- Chief Scientist.....Yoshikazu Ohya
- Science and Technology Coordinator.....Yukio Ito, Toshio Kamiya

Core Research Organizations

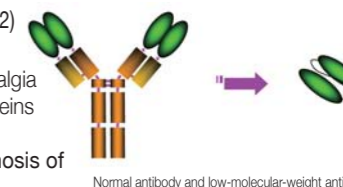
- The University of Tokyo, Chiba University,
- National Institute of Radiological Sciences,
- Chiba Cancer Center

Major Participating Research Organizations

- Industry...Protein Express Co., Ltd., Hisamitsu Pharmaceutical Co., Inc., Medical & Biological Laboratories Co., Ltd., GeneFrontier Corporation, Topcon Corporation, Anima Corporation, Fujinon Corporation, Toshiba Medical Systems Corporation, Konica Minolta Technology Center, Inc., IT companies located in Chiba Prefecture, university-oriented venture BioClues Inc., major pharmaceutical companies (three companies)
- Academia...Chiba University (Research Center for Frontier Medical Engineering, Graduate School of Medicine, University Hospital, Graduate School of Advanced Integration Science), The University of Tokyo (Graduate School of Frontier Sciences, Graduate School of Engineering), Toho University (Sakura Medical Center)
- Government...National Institute of Radiological Sciences, National Cancer Center Hospital East, Chiba Cancer Center, Tokatsu Techno Plaza

City Area Program

- 2) Development of imaging, diagnosis, and therapy technologies using protein probes (Group 2)
- ④Development of tumor-specific diagnostic imaging agents
- ⑤Development of therapeutic low-molecular-weight antibodies for nerve-generation and algalia
- ⑥Development of a diagnostic and therapeutic technique targeting novel membrane proteins



2. Development of low-cost, non-invasive, and high-performance devices for the diagnosis of lifestyle-related diseases (Integrated Project II)

In the Chiba area, excellent results have been obtained from the “Basic Stage” and “Starting Stage” projects, and new technologies have been accumulated based on integrated medical-engineering research. By combining and improving these technologies, a new practicable diagnostic system will be constructed for medical examinations of lifestyle-related diseases. Integrated Project II promotes five sub-themes with the aim of commercializing the technologies at an early stage. A further aim is to develop an integrated diagnosis system using these devices.

- ①Development of a new device for examining arteriosclerosis by vascular pathology and image analysis
- ②Development of a new system for global higher brain function
- ③Development of a new diagnosis system for skin and membranes based on color and spectral imaging
- ④Development of an elasticity and tension measurement system for skin
- ⑤Development of an equipment required for the ultrasonic examination of visceral fat

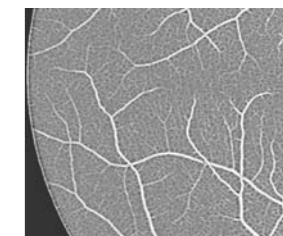


Image of blood vessels in the fundus

Aims of Project

During the “Basic Stage,” a rapid and efficient cell-free translation system was established as a highly developed platform technology for the production of low-molecular-weight antibodies and disease-associated proteins. Highly functional protein-probes and their derivatives applicable to PET imaging, the diagnosis and treatment of cancer, and nerve regeneration, among other uses, will be generated based on this methodology with the aim of establishing bio-industries in the Chiba/Tokatsu area. In addition, an innovative drug-discovery pipeline will be demonstrated by creating next-generation antibodies and novel chemical compounds based on the construction of a library of disease-associated proteins, which will be potential targets for therapeutic medicine.

Similarly, with the development of a measuring system for arteriosclerosis and using a combination of the upgraded original technologies accumulated in this area (including collaborations in the field of medical engineering), we will develop a practicable diagnostic system consisting of five low-cost, non-invasive, and high-performance devices for the medical examination of lifestyle-related diseases. Commercializing these systems at an early stage will contribute to the strengthening of a regional preventive-care network.

Contents of Project

1. Development of a new drug-creation system using a highly-developed platform technology based on the cell-free translation system, and its development for use in therapeutic medicine and diagnosis using low-molecular-weight antibodies (Integrated Project I)

Exploiting the results obtained in the “Basic Stage,” and considering the future direction and vision of the Chiba/Tokatsu area, two projects are planned for the “Development Stage.” In the Tokatsu area, an advanced platform technology for the cell-free translation system (the PURE system), which was developed during the “Basic Stage” starting in 2005, will be advanced to produce a rapid, high-throughput system for the production of antibodies as part of an industry-academia-government collaboration. Emphasizing the technological advantages of the cell-free system (e.g., operating ability, flexibility, and potential for expansion), the joint research project will tackle the creation of artificial antibodies with highly functional and/or novel features—a goal that is unobtainable using conventional antibody-production methods based on living cells. The antibodies obtained using the cell-free system developed in the Tokatsu area will be evaluated in the Chiba area using medical applications (e.g., imaging, diagnosis, and therapy for proven tumor markers and nerve-regeneration factors), with a focus on the medical and pharmaceutical industries. By continuous feedback from ongoing medical validation, the capabilities of antibodies will be improved by enhancing their activities and by integrating useful and artificial functions. Disease-associated proteins (including membrane proteins) will be synthesized using the PURE system, and a library of disease-associated proteins expected to be pharmaceutical targets will be established and combined with an antibody library or chemical-compound library to create next-generation drugs. The project will be carried out by two joint-research teams, and consists of the following six programs.

1) Development of a drug-creation system using an advanced cell-free translation system (Group 1)

- ①Synthesis of various low-molecular-weight antibodies
- ②Cell-free synthesis of target molecules
- ③Establishment of a library of antigens and antibodies for medical applications

PROJECT PLAN CHART

