



Toyama/Ishikawa

To form a center for research and development in preventative and healthcare Life Sciences

Cluster Vision

Based on the industry-academia-government collaboration infrastructure constructed to date by the knowledge cluster initiative in the Toyama and Ishikawa region, we will exploit the area's concentration of diverse manufacturing industries, such as electrical and electronics, machinery, plastics, chemicals and information systems, and of medical and pharmaceutical intellectual assets in the fields of the brain/knowledge and medical care/biotechnology in order to form a center for Life Sciences research and development that will be globally competitive. As well as transmitting the research results to local industries, we will build an international medical equipment and supplies industry. We will also aim to create a broad-based health-related industry from a fusion of elements such as both prefectures' natural environments, agricultural and marine products, tourist industries (hot springs etc.) and food industries.

Project Overview

We plan to further expand and develop on the fruits of the first stage of the knowledge cluster initiative, areas which have earned the Toyama/Ishikawa region global admiration, including the immunodiagnostic instruments of the "Toyama Medical-Bio Cluster" and the results of research into brain function diagnosis by the "Ishikawa High-tech Sensing Cluster." Our plan targets the concept of creating health. Toyama Prefecture traditionally has a strong background in fundamental pharmaceutical technologies, while Ishikawa Prefecture has a background of clinical medicine and industry-academia collaborations in the fields of physics and engineering. We will combine these to produce leading global "development of biotechnological instruments exploiting fundamental pharmaceutical technologies" and "the development of imaging diagnostic instruments."

In the research mentioned above, we aim to apply cutting-edge technology to accelerate the excellent medical and pharmaceutical research being done in the Toyama/Ishikawa region, and also link it with the development and commercialization of bio-instruments (cutting-edge bio-related devices) to build a world-class "Hokuriku Health Creation Cluster."

Research and development programs

- Development of biotechnology equipment that makes the best use of generic healthcare technology
 - Develop of personalized immune therapy system
 - Development of enzyme chips for amino-metabolomics for diagnosis of metabolic diseases
 - Development of Fetal DNA Diagnosis from maternal blood
- Development of imaging diagnosis instrument
 - System development project with NIRS/MEG integrated device for early detection and intervention of autism spectrum disorder
 - Develop new and practical diagnostic technology for site and severity of arteriosclerosis
 - Development of hi-speed microscopy capable of capturing fine structures of live cells
 - Activated magnetometry utilizing SQUID efficacy

Expansion program: The formation of a joint-international R&D Hub under the leadership of Hokuriku

Incubating research results and products that will take off around the world

To date, in Toyama and Ishikawa prefectures, the formation of knowledge clusters of biomedical related initiatives that support "preventive medicine and health enhancement" has been promoted in scientific fields in which the respective prefectures excel. Many of the excellent results cultivated by the First stage clusters have been handed on to the Second stage cluster, which amalgamates both prefectures, and are now being developed to a level where they will establish themselves on the world stage.

To give one example, the development of devices for magnetoencephalographic and magnetocardiographic measurement from the Kanazawa Institute of Technology's cutting-edge MEG (SQUID) technology (with the cooperation of Yokogawa Electric Corporation) has recently brilliantly facilitated joint research with the University of London and the French Centre National de la Recherche Scientifique (National Centre of Scientific Research) into the MEGs of small animals; this research is being done at the University of London, and demonstrates that the project has genuinely reached the global stage. There are other projects too which are very close to such global developments and worldwide strategies. As one project after another approaches maturity, the mutual cooperation between researchers in Toyama and Ishikawa is bearing fruit.

Projects must be original and their results derived from open innovations protected by patents or contracts so that the research results and products can be globally competitive. We will nurture this kind of manufacturing culture and attempt to revive regional companies, as well as sending out the resulting products to make their mark in the world.

Project Director
Yasuhiro Furuichi



Research at the National Institute of Genetics, Roche Laboratories (US), the AGENE Research Institute, etc. 1975, most cited author for "mRNA cap detection"

Cluster Headquarters

- President.....Fuji Shinki (Chairperson of The Hokuriku Industrial Advancement Center)
- Consultant.....Takakazu Ishi(Governor of Toyama), Masanori Tanimoto(Governor of Ishikawa)
- Project Director.....Yasuhiro Furuichi
- Deputy Project Director... Shuichi Nakagawa (Ex-Project Director of Ishikawa High-tech Sensing Cluster) Kihachiro Tobo (Participant of Toyama New Industry Organization)
- Chief Scientist (CS).....Seishi Murakami(Adviser to Kanazawa University)
- Deputy Chief Scientist... Ikuo Saiki (Administration officer and Vice-president of University of Toyama)
- General Adviser.....Yasuo Nannichi
- Research Adviser.....Ryoji Suzuki, Kiyoshi Takatsu
- Science and Technology Coordinator... Yuki Kunioka, Hiroshi Gotou, Isao Hashimoto, Shoichiro Hamano, Yoshikatsu Hirai, Hiroshi Watanabe
- Intellectual Property Manager... Hiroyoshi Nakazato

Core Organization

Hokuriku Industrial Advancement Center

Participating Research Organizations (Bold: Core Research Organization)

Industry...AJINOMOTO Co., Inc., Alfresa Pharma Corporation, Ikeda MOHANDO Ltd., INTEC System Institute, Inc., SC World, Inc., Kyowa Hakko Kirin Co., Ltd., Kracie Pharma, Ltd., KOKANDO co., Ltd, KNC laboratories Co., Ltd., SUNTORY HOLDINGS LIMITED., G-TECH, **SHIBUYA KOGYO CO., LTD**, **Shimadzu Corporation**, SUGINO MACHINE LIMITED, Sumika Chemical Analysis Service, Ltd., Research Institute of Biomolecule Metrology Co., Ltd., Daito Co., Ltd., TSUMURA & CO., Teika Pharmaceutical Co., Ltd., TOA Pharmaceuticals CO.,LTD, TOYAMA CHEMICAL CO., LTD, Nikon Corporation, Nichi-ko Pharmaceutical Co., Ltd., NIPRO, NGK INSULATORS, LTD., Bio Device Technology Co., Ltd, FUJIYAKUJIN Co., Ltd., HOYA CORPORATION, Meiji Yakuin Co., Ltd., Richell Corporation, LEAD CHEMICAL Co., Ltd., Yoshindo Inc., Yokogawa Electric Corporation, BALL Semiconductor Inc., ASAHI ROENTGEN IND. CO., LTD

Academia...**University of Toyama, Toyama Prefectural University, Kanazawa University**, Japan Advanced Institute of Science and Technology (JAIST), **Kanazawa Institute of Technology, Kanazawa Medical University**, Ishikawa Prefectural University, The University of Tokyo, Okayama University, University of London, Peking University, and 28 domestic, 23 foreign universities.

Government...(Domestic) **Toyama Prefectural Institute for Pharmaceutical Research**, Toyama Industrial Technology Center, Industrial Research Institute of Ishikawa, Ishikawa Health Service Association, National Institute of Biomedical Innovation and 15 domestic, 10 foreign institutes

Main Results

Development of a system to collect and analyze nucleated red cells in the blood

The Takabayashi Research Group at Kanazawa Medical University is in the process of developing a minimally-invasive system for DNA analysis from embryonal cells (nucleated red blood cells) which are present in microscopic amounts in the mother's blood. As the first stage, they have successfully created a prototype high throughput nucleated red blood cell collection system.



The system to collect and analyze nucleated red cells in the blood

Development of a cDNA synthesizer that applies the magnetic shift-style plate reaction method

As one part of its development of an individual immunity medical system, the Isobe Research Group at the University of Toyama has successfully created a prototype automated cDNA isolator, a device that is required to analyze the amino acid sequence of antibody molecules produced by each individual antibody-producing cell. This device makes it possible to swiftly and exhaustively analyze individual antibody data.



The cDNA synthesizer applying the magnetic shift-style plate reaction method

