



Toyama Medical-Bio Cluster

Toyama / Takaoka

Creating New Bio-based Industries by Combining Regional Technologies

Cluster Vision

The "Toyama Biomedical Cluster" is developing new diagnostic instruments and "Toyama original" pharmaceuticals with the aim of creating new business by joining the forces of two groups of researchers: a group researching the immune system, enzymatic response, and traditional medicine (the University of Toyama's Faculties of Medicine and Pharmaceutical Sciences and Toyama Prefectural University) and another group researching sensor technology and micro electronic mechanical systems (the University of Toyama's Faculty of Engineering, the Japan Advanced Institute of Science and Technology (JAIST), and the Toyama Industrial Technology Center).

Project Overview

Universities and public research institutes in the region and industries from both inside and outside the prefecture are working together in two areas: the development of diagnostic and treatment systems based on human immune functions and the development of traditional medicine (Kanpo)-based systems for customized diagnosis and treatment in accordance with each patient's unique constitution.

We are developing highly-functional cell chip devices using micromachining technology and antibody screening systems using these chip devices to identify lymphocytes responding to viruses. These developments in turn are fostering the development of diagnostic systems and antibody medicines.

Progress is being made on development of systems to support customized traditional medicine (Kanpo) regimen diagnosis and treatment. These developments are based on proteome analyses of factors, such as proteins in a patient's blood, that have an impact on changes in condition according to traditional Chinese medicine. We have also tied our research to development of natural herbs and remedies.

We plan to develop enzyme chips for early diagnosis of genetic congenital disorders in newborns and we plan to develop technologies for modification and synthesis of useful enzymes as part of pharmaceutical synthesis.

Practical applications planned by this cluster include: DNA chip systems and measurement tools that can detect genetic predispositions for diabetes and other lifestyle-related diseases and next-generation cellular chips that can diagnose and treat immune system functions.

Vice President and Project Director
Yasuo Nannichi, Ph.D.



Yasuo Nannichi is a former Vice President of the University of Tsukuba.

We Aim to Expand from the Biomedical Instrument Industry into Novel Drug Development

As indicated by the moniker "Pharmaceutical Toyama," Toyama Prefecture enjoys a tradition of almost 300 years in the drug industry, which now serves as the basis for growing biomedical research. Toyama Prefecture is also one of the largest industrial zones on the coast of the Sea of Japan. The Toyama Biomedical Cluster takes advantage of these strengths to foster the creation of new industries.

The region has an advantage in two fields: medical/biological technologies from University of Toyama's Faculties of Medicine and Pharmaceutical Sciences and Toyama Prefectural University, and electronic/micromachining technologies being developed by the University of Toyama's Faculty of Engineering, the Japan Advanced Institute of Science and Technology (JAIST), and the Toyama Industrial Technology Center. Applying these strengths, we aim to take part in cutting-edge biomedical engineering research and development, develop and transform new diagnostic/medical treatment tools into marketable products, and further develop antibody medicines and natural medicine preparations for customized treatment based on such technologies.

Two-thousand seven will be the final year for novel drug cluster research. Special efforts are being made to find practical uses for the results of the research conducted thus far and to develop a new biotech industry for Toyama Prefecture based on the combined effort of industries, academic organizations, and the government.

Cluster Headquarters

President.....Takakazu Ishii (Governor of Toyama Prefecture)
Vice President and Project Director...Yasuo Nannichi (Ex-Vice President, Tsukuba)
Chief Scientist.....Atsushi Muraguchi (Vice President, University of Toyama)
SCIENCE and Technology Coordinator...Kyoichi Kobashi, Noboru Takayanagi, Kihachiro Tohbo

Core Organization

Toyama New Industry Organization (TONIO)

Participating Research Organizations (Bold: Core Research Organization)

Industry...Hokuto Scientific Industry Co., Ltd., Sugino Machine, Ltd., Tagakiseiko Co., Tateyama Kagaku Industry Co., Ltd., Tateyama Machine Co., Ltd, Teika Pharmaceutical Co., Ltd., Nippon Gene Co., Ltd., Nippon Genetech Co., Ltd., Daiichi Fine Chemical Co., Ltd., Daiichi Yakuhin Co., Ltd., INTEC Web And Genome Informatics Corp., Cosel Co., Ltd., Toyokako Co., Ltd., Saito Manufacturing Co., Ltd., Richell Corp., SC World Inc., Kracie Pharmaceutical, Ltd., KOKANDO Co. Ltd., Kirin Brewery Co., Ltd., Hitachi Software Engineering Co., Ltd., Tsumura & Co., NanoSystem Solutions Inc., Hioki E.E. Co., Suntory Ltd., Sapporo Immuno Diagnostic Laboratory, NTT Advanced Technologies, Kyowa Kako Co., Ltd., Kyowa Medex Co., Ltd., Toyama Chemical Co., Ltd., Nissan Chemical Industries, Ltd., NS Material Co., Taiyo Kagaku Co. Ltd., VentureLabo Inc., Hiroshima Industrial Promotion Organization
Academia...**Japan Advanced Institute of Science and Technology (JAIST), Toyama University, Toyama Prefectural University**
Government...**Toyama Industrial Technology Center,** Toyama Prefectural Institute for Pharmaceutical Research, Toyama Institute of Health, Toyama International Health Plaza - International Traditional Medical Center, Toyama Prefectural Central Hospital.

Main Results

1. Successful development of a commercial cell screening system

We have successfully developed a commercial cell screening system that uses a cellular chip that can be loaded with several hundred thousand individual cells and screens for individual antigen-specific B-lymphocyte cells. In the near future, we will be able to develop a system in which cells can be comprehensively analyzed.



Cell Chip

2. Successful development of diagnostic methods according to traditional medicine (Kanpo) using proteome analysis

We have successfully developed a way to diagnose patients based on their specific patterns and a way to evaluate the effectiveness of traditional medicine (Kanpo) prescriptions through blood plasma proteome analysis of rheumatic patients who have been diagnosed with "oketsu" [blood stasis/stagnation] according to traditional medicine.



Enlarged photograph of a Cell Chip

3. Establishment of the venture company "SC World Inc."

"SC World Inc.," a biotech venture company that develops antibodies through cellular chip technology that treats individual cells, was established. Our venture, which possesses an adequate share of cellular chip technology, is expected to direct us towards new applications relevant to the wide field of medical equipment and medical discovery.

4. Established 3 antibody related fundamental patents and 4 patents related to resin based microchips received

We have successfully applied for and received 3 patents related to antibody detection methods in mass production of antibodies and we have applied for a patent for an antibody with exceptional ability to neutralize HBV. We have also received patents for resin microchips and successfully commercialized and sold flow chips.



Cell Chip automatic collection equipment

5. Successfully developed a methionine based hydrogen evaporating enzyme

We have developed a methionine hydrogen evaporating enzyme (often utilized in the diagnosis of homocystinuria) that can be used in the diagnosis of 4 different hereditary metabolic disorders. We will work to establish a system that can simultaneously diagnose all those disorders with this enzyme.

