

Creating New Bio-based Industries by Combining Regional Technologies

Overview

The Toyama Medical-Bio Cluster is developing new diagnostic instruments and "Toyama original" pharmaceuticals, with the aim of creating new businesses by joining the forces of two groups of researchers: one group is researching the immune system, enzymatic responses and herbal-medicine (Toyama Medical and Pharmaceutical University, Toyama Prefectural University and others), and another group is researching sensor technologies and Micro-Electro-Mechanical Systems (Japan Advanced Institute of Science and Technology [JAIST], Toyama University, and Toyama Industrial Technology Center).

Cluster Headquarters

- **President** Yutaka Nakaoki (Governor, Toyama Prefecture)
- **Vice President and Project Director**... Yasuo Nannichi (Professor Emeritus, Tsukuba University)
- **Chief Scientist (CS)** Atsushi Muraguchi(Executive Vice President, Toyama Medical University)
- **Science and Technology Coordinators** Kyoichi Kobashi, Noboru Takayanagi, Kihachiro Tohbo

Core Organization

Toyama New Industry Organization (TONIO)

Participating Research Organizations

(Bold: Core Research Organizations)

Industry: ··Hokuto Scientific Industry Co., Ltd., Sugino Machine, Ltd., Tateyama Kagaku Industry Co., Ltd., Nippon Gene Co., Ltd., Nippon Genetech Co., Ltd., Toyama Chemical Co., Ltd., Daiichi Fine Chemical Co., Ltd., Intech Web And Genome Informatics Corp., Cosel Co., Ltd., Toyokako Co., Ltd., Sa to Manufacturing Co., Ltd., Richell Corp., Kanebo, Ltd., Kazusa DNA Research Institute, Tokiwa Phytochemical Co., Ltd., Kirin Brewery Co., Ltd., Hitachi Software Engineering Co., Ltd., Tsumura & Co., Sapporo Immuno Diagnostic Laboratory, NTT Advanced Technologies, Tosoh Corporation

Academia: ··**Japan Advanced Institute of Science and Technology (JAIST), Toyama Medical and Pharmaceutical University, Toyama University, Toyama Prefectural University,** Tokyo University of Pharmacy and Life Science

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.



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

At present, our union of universities, public labs and industries has already produced some results, for example, the world's first "cell chip" which brings revolutionary progress in diagnosis/treatment systems for immune functions. We are applying patents from the results, and harmonizing the prototype instruments with the focused market, to arrange them so as to be commercially available. We will do our best to establish original new bio-industries emerging from Toyama.

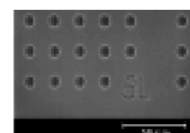
Aiming to Expand from the Bio-instruments Industry to Drug Development

Toyama has 300-years of history in the drug industry, and it also has one of the biggest industrial zones on the Sea of Japan side of the archipelago. Taking advantage of these characteristics, we are working on the Toyama Medical-Bio Cluster project to create new industries.

We have advantages in two fields: medical/biological technologies from Toyama Medical and Pharmaceutical University and Toyama Prefectural University, and electronic/microscopic processing technology from the Japan Advanced Institute of Science and Technology (JAIST), Toyama University, and Toyama Industrial Technology Center. Applying these efforts, we are aiming to develop new diagnostic/treatment technologies and medical instruments, plus more new antibody medicines and natural medicine formulas for customized treatments based on the technologies.



Prototype cell chip



Enlarged photo of cell-chip

Yasuo Nannichi is a former vice president of the University of Tsukuba. He is now a science and technology coordinator of TONIO, and a chief of Toyama Industrial Technology Center.

Outline of the Joint Research by Industry, Academia and Government

Regional universities, public research institutes, and industries from both inside and outside the prefecture are working together to develop diagnosis/treatment systems based on human immune functions, and also natural medicine based systems for customized treatments to suit each patient's physical constitution.

- **Development of diagnosis/treatment systems based on human immune functions, immuno-micro array chips and highly integrated multi-functional chip devices.**
Micro-processing technological multi-functional cell chip devices and antibody screening systems that identify virus-responding lymphocytes by using these cell chips are being developed, which in turn fosters antibody-medicine developments.
- **Development of natural medicine-based tailor-made treatments**
We analyze whole protein expressions in the patient's blood which are affected by the changes in their conditions, and are classified by traditional natural medicine formulas, in order to develop systems which are suited for holistic medical diagnoses for customized treatments.
- **Development of an enzyme chip for diagnosis of inborn errors of metabolism**
Enzyme chips for diagnosis of inborn errors of metabolism are being developed, and a rapid screening system for enzymes used for the synthesis of drug intermediates is also being constructed.
- **Research on DNA/cell chips systems for practical use**
Our planned practical applications are as follows: DNA-chip systems which can detect genetic predispositions, e.g. diabetes and other lifestyle diseases, cell chips for immune function diagnoses, and functional applied-treatment systems.

