

●Development Stage

(Fiscal Year 2006-2008)

# Kurume Area

Development of advanced tailor-made medical care (prevention, diagnosis and treatment) and establishment of Kurume medical bio-cluster through commercialization

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● **Framework for Project Promotion**

- Project Director.....Keiichiro Haga
- Chief Scientist.....Kyogo Itoh (Professor, Kurume University)
- Science and Technology Coordinator.....Yoshifumi Ikeda
- Hidekazu Aratani (Secretary General / NPO Clinical Research Network Fukuoka)
- Kuniaki Tanaka

● **Major Participating Research Organizations**

- Industry: GreenPeptide Co., Ltd., Upwell, Inc., GNI LTD., Chlorella Industry Co., LTD., Omu Milk Products Co., Ltd., Kumamoto Flour Milling Co., Ltd., Fukuoka Soy-Sauce Brewing Cooperation, Fukuoka Institute of Bioindustry and Development Co., Ltd., ISHIKAWA IRON WORKS CO., LTD, Office K Company, Ltd., Genenet Co., LTD., Bisoken Inc., DOJINDO Laboratories, NPO Clinical Research Network Fukuoka, Vessel Inc., GENTEQ CO., LTD., SEIKO ELECTRIC CO., LTD., PENTA LAB., Nihon Millipore K.K., KYUSHU PET FOOD, Meiko Medical Co., Ltd., Bio Health Life, ASAHI Corporation
- Academia: Kurume University, Kyushu University, Fukuoka University, University of Occupational and Environmental Health Japan, Kyushu Institute of Technology, Kyoto University, Kansai Medical University, Kinki University, Yamaguchi University, University of Yamanashi, Shiga University of Medical Science, Kurume National College of Technology, Kurume Institute of Technology
- Government: Biotechnology & Food Research Institute of Fukuoka Industrial Technology Center, Fukuoka Forestry Research and Technology Center, Fukuoka Agricultural Research Center

● **Core Research Organizations**

- Kurume University, Kyushu University,
- Biotechnology & Food Research Institute of Fukuoka
- Industrial Technology Center

● **Aims of Project**

In the Kurume area, the "development of tailor-made medicines and diagnostic agents as well as functional foods for the prevention of diseases" was conducted for three years from FY 2002 to 2005. As a result, many achievements, such as patent applications, technology transfer, prototype development, and the founding of venture companies from universities by promoting joint research led by Kurume University, were realized.

In this project, the development of tailor-made medical care (prevention, diagnosis, treatment) in response to an individual's gene and immune characteristics, as well as the development of functional foods with preventive effects on vascular lesions are carried out through industry-university-government collaboration on the foundation of the achievements of the past three years realized by the Kurume University School of Medicine. Furthermore, a clinical development system that local biotech companies can utilize was organized, which finally lead to the formation of the medical bio-cluster in Kurume. (NPO Clinical Research Network Fukuoka was launched in April 2008.)

In addition, a wide range of feasibility studies is carried out to incubate research seeds and to prove the practical use. Broad industry-university-government networks including collaborations of medical science with engineering and agriculture are further strengthened, as are other studies in joint efforts with other ministries to promote further development.

● **Contents of Project**

(Research and Development)

1. Development of therapeutic peptide vaccine for patients with hepatitis C virus infection

Nonclinical studies and examinations of the manufacture of tailor-made peptide vaccines are conducted. Also, the development of next-generation evolutionary "combined therapy of peptide vaccine/PEG-interferon/ribavirin" and "therapeutic peptide vaccine" for all patients with HCV infection will be clinically studied.

2. Development of tailor-made peptide vaccine against advanced cancer

This project is aimed at the development of tailor-made peptide vaccines against advanced cancer in order to expand the application of immune-activating peptide vaccine, and at translational research with novel peptides, including clinical trials for patients with advanced HLA-A24-positive pancreatic cancer or the recurrence of HLA-A2-positive prostate cancer.

3. Development of novel tailor-made therapeutics for hepato-cirrhosis, using pharmacogenomics

The primary culture method of hepatocytes is established by using liver tissue from patients with hepato-cirrhosis. Gene knockdown by siRNA is conducted to prepare gene expression profile libraries. In addition, this project is also aimed at the development of tailor-made medicine for patients with hepato-cirrhosis following the implementation of nonclinical studies, particularly physico-chemical studies, safety studies, and manufacturing examinations.

4. Screening and development of functional foods with inhibitory effects on the formation of advanced glycation end-products (AGEs)

The vascular-damage-preventing functional foods having an inhibitory effect on intestinal absorption and the formation of AGEs, particularly toxic AGEs, are screened and developed. At the same time, this project is aimed at the development of tailor-made functional foods by screening AGE-sensitive genes using nutrigenomics technology.

(Feasibility studies)

Ten (10) feasibility studies of a wide range of life science research topics are conducted on an annual basis.

● **Main Results**

(Research and Development)

1. Development of therapeutic peptide vaccine for patients with hepatitis C virus infection

Two clinical trials on "the combined therapy of peptide vaccine, PEG-interferon and Ribavirin, and the "therapeutic vaccine available to all HIV patients" were carried out.

2. Development of tailor-made peptide vaccine against advanced cancer

The translational research on progressive HLA-A24-positive pancreatic cancer and recurrent HLA-A2-positive prostate cancer was carried out. In addition, the translational research on peptide vaccines available to cancer patients with all types of HLA was also carried out. Furthermore, the syringe connector, which is a by-product of the research on the progress of hepatitis C and which is able to emulsify vaccine and adjuvant solutions, was commercialized.



GP Syringe Connector™

3. Development of novel tailor-made therapeutics for hepato-cirrhosis by using pharmacogenomics

The primary culture method of hepatocytes was established by using liver tissue from patients with hepato-cirrhosis. Gene knockdown by siRNA was conducted to prepare the gene expression profile libraries. The identification of the target gene or its related genes is now ongoing.

4. Screening and development of functional foods with inhibitory effect on the formation of advanced glycation end-products (AGEs)

A large number of food materials were collected, and their AGE-binding affinities or inhibitory activities on the formation of AGEs were examined. Then their efficacies and safety were tested in rats. These active substances were clarified to lower MCP-1, a vascular disorder marker. Finally, six prototype products, i.e., a staining kit for AGEs in blood or tissue, food containing AGE-binding substances or AGE-binding substance plus apolactoferrin, and creams and lotions containing AGE-binding substance, were manufactured.



Kit for measuring AGEs in blood

Health foods containing AGE-binding substances

Cream containing AGE-binding substances

(Feasibility studies)

Annually ten feasibility studies were carried out. As a result, four commercial products (deodorants for room, car, business or rental uses) and five prototype products (mite-trapping sheet, soybean-related health foods, health-food-making equipment, and small and large tissue specimen preparation equipment) were fabricated.



Room deodorants (Feasibility studies)

