Tokachi Area
(Basic Stage: FY 2005–2007)

『Development of Technology to Add Value to Tokachi Agricultural and Livestock Products Which Increases the Functionality』

Development of functional materials from waste of the starch industry

We succeeded in the production of potato peptides from waste products of the starch industry using advanced scientific technologies developed in the Tokachi Area. The potato peptides lead to improved lipid metabolism and cecal flora in vivo, and can also be used to improve food quality and produce culture medium. Various commodities that use potato peptides are to be developed, with 2.6 billion yen in sales expected in fiscal year 2008.

POTEAJI (potato peptides)

Western Tono Area
(Basic Stage: FY 2005–2007)

『Development of Next-Generation Manufacturing Technology for Ceramic Ware』

Development of inorganic nano-pigment particles for an inkjet-printing decoration system for ceramic ware

Using a hydrothermal synthesis method, we developed inorganic nano-pigment particles of the four primary colors. Ink for inkjet printing systems was prepared by dispersing and stabilizing these pigment particles. Glazing and then firing at 1250°C after applying the inkjet printing to ceramic tile resulted in a high-definition decoration on the tile. Sales of the inorganic pigment ink and the inkjet printing system developed in this project are expected to reach 20 million Yen in 2008.

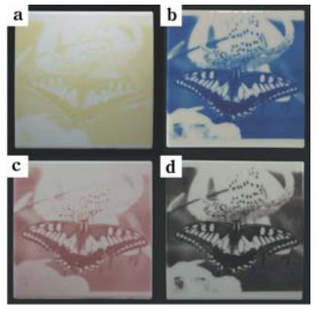


Photo. Tiles decorated in the four primary colors using the new inkjet printing system.

a: yellow
b: cyan
c: magenta
d: black

Toyohashi Area
(Development Stage: FY 2005–2007)

『Development and Application of a Smart Sensing System』

Development of a Metal-Contaminant Detector that is unaffected by aluminum packing or salt

A smart sensing system was developed during the Basic Stage. In the Development Stage, the promising technology was applied to agriculture, an important industry in the region. It was also used to create “precision agriculture” and was applied in the food and agricultural fields.
We developed a metal-contaminant detector for foodstuffs using a High-Tc SQUIDs magnetometer, the “FINE METAL DETECTOR.” The device has been sold to a domestic food manufacturer.
The detector is small and easy to maintain. These activities became the basis for the formation of a “food and agricultural industry cluster.”

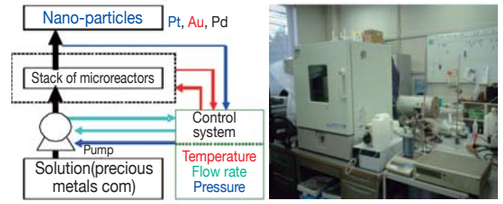
Fine metal detector

Southern Okayama Area
(Development Stage: FY 2005–2007)

『Development of Active Microreactor for Progressive Micro Reacting Process』

The venture company related to this project succeeded in the continuous preparation of precious-metal nano-particles

A venture company was established in conjunction with the collaborative project “The development of a microcatalyst burner apparatus,” and succeeded in producing precious-metal nano-particles using microreactors. This company used the microreactors, which provide a special reaction space consisting of a minute duct and minute air space (tens of microns in size) in three dimensions, and succeeded in the world-first continuous preparation of precious-metal nano-particles of 1.5 nm, which have since been commercialized.



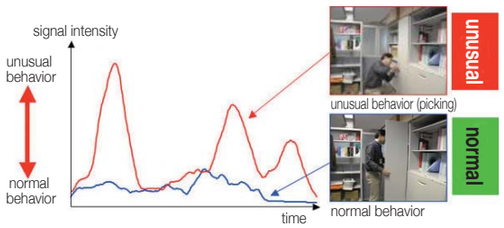
Continuous liquid-phase synthesis system for single nano-particles

Tsukuba Science City Area
(Development Stage: FY 2005–2007)

『Ubiquitous Visual-Information Surveillance System for Safe and Secure Urban Living』

Development of an automatic recognition system for detecting unusual conditions or behavior

We have developed the technology required to recognize motion patterns and to detect unusual behavior using the cubic higher-order local auto-correlation (CHLAC) technology. The technology was commercialized by a collaborating company as a camera system in an elevator cage for detecting unusual behavior. Demonstration tests of a patient-monitoring system for use in hospitals and a camera system for preventing the illegal disposal of waste have been carried out for commercialization. Furthermore, a venture company has been established as part of this project.



Shizuoka Central Area
(Development Stage: FY 2005–2007)

『Creation of a food-science business for overcoming lifestyle-related diseases caused by physical/mental stress』

Establishment of the GABA Stress Research Center

As part of a general project, Professor Yokogoshi of the University of Shizuoka exhibited the stress-mitigation effect of GABA, which has already been proven to reduce blood pressure. Professor Yokogoshi established the GABA Stress Research Center to publicize the beneficial effects of GABA, aiming to improve QOL by reducing worker stress.
Various foods and beverages containing GABA are now on the domestic and international market. Sales of GABA-containing chocolate reached 4 billion yen in 2005, 8.5 billion yen in 2006, and 15 billion yen in 2007.

Nagaoka Area
(Basic Stage: FY 2004–2006)

『Enhancement of Advanced Materials and Development of Green Processing Technology』

Success in the development of a recyclable high-quality and high-strength magnesium alloy in a press

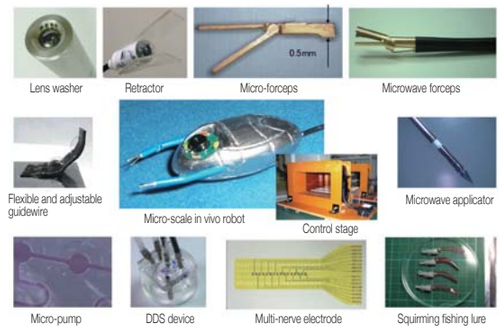
We aimed to develop a Mg alloy with good forming characteristics. We used more Al than in existing alloys, and added Mn.The new alloy shows high strength and high ductility (tensile strength × ductility 7,500 MPa; about 1.5 times greater than that of existing alloys). In addition, the forming performance of existing Al alloy and carbon average steel was obtained at even 200℃ or less. This new Mg alloy with properties of lightness, high strength, and high forming performance is the best structural material for all manner of vehicles (e.g., cars and aircraft). Therefore, this environmentally friendly material is expected by be adopted in many future applications.

Southern Area of Lake Biwa
(Basic Stage: FY 2004–2006)

『Development of an In-vivo Micro-Robot for Diagnosis and Treatment』

Paradigm shift in diagnosis and treatment accelerated by Medicine–Engineering cooperation

By effectively integrating the results of industry-academia-government collaboration and integrated medicine–engineering research in the Southern Area of Lake Biwa, we developed micro-scale in-vivo robots that enable long-term diagnosis and treatment. The research resulted in the development of various micro-devices such as retractors to provide a clear view during surgery and microwave forceps to incise diseased tissue. These products are the focus of Development Stage research with the aim of non-invasive diagnosis and treatment. Some devices have been applied in practical use.



Osaka East Area
(Basic Stage: FY 2004–2006)

『Development of Next-Generation High-Quality Welding Technology』

Enhanced product competitiveness utilizing friction stir welding (FSW)

The application of FSW technology enabled the following achievements in equipment manufacturing:
1. Reduction in the number of modules, 2. Reduction in assembly processes, 3. Weight reductions, and 4. Improved product appearance.
This led in turn to improvements in delivery times (about 10 days or less), cost (about 15% or less), and the value-added component, resulting in greatly enhanced competitiveness in the marketplace.

Preproduction of a "metallic parts supply device" produced by a participating enterprise

Hakodate Area
(Basic Stage: FY 2003–2005)

『Developmental Research for High Value-Added *Kjellmaniella crassifolia Miyabe* (Gagome) and Squid』

We promoted high value-added Gagome and squid, which are special products of the region, and commercialized many products

Based on the Conception of International Fisheries and Ocean City, Hakodate, we focused on Gagome and squid, which are regional fishery resources, and developed reproduction and extraction technologies for functional components.
Many regional companies participated in this project, and 69 foodstuffs were commercially developed up to fiscal year 2007.
An economic benefit of 2,400 million yen was gained by sales of the developed products and increases in the wholesale price of Gagome.

Koriyama Area
(Basic Stage: FY 2002–2004)

『Support for next-generation surgery and development of medical diagnostic apparatus using haptic technology』

Application of haptic technology to next-generation non-invasive or minimally invasive medical and welfare apparatus for patients

The Koriyama Area has achieved considerable success in developing haptic sensing technology to detect the hardness of lesion sites in organs. This technology replaces diagnosis by palpation. Progressing to the Development Stage in 2006, the haptic sensing technology was enhanced and investigated for application to medical devices. Various innovative medical and welfare devices have been developed, including a breast-cancer assessment system and a non-contact tonometer device. The breast-cancer assessment system, a new type of medical diagnosis system that employs ultrasonic and phase-shift technology, demonstrates visually the sense of hardness usually determined via palpation. An ultrasonic palpating-probe device provides the enhanced functioning of the system and its success in imaging hardness.

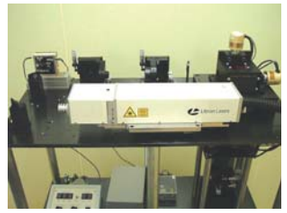
Breast-cancer assessment system

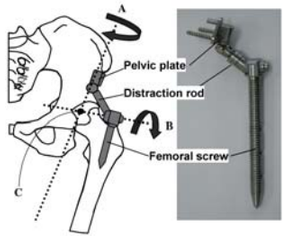
Niigata Area
(Basic Stage: FY 2002–2004)

『Creation and Expansion of a Nanomedicine Industry with the Benefits of Safety, High Function, and Low Cost』

A nanomedicine industry was developed via a medicine–engineering collaboration

Research focused on advancements in nanomedicine and the development of medical instruments and systems, etc. The project succeeded in developing a "load-bearing device for a hip joint" with high strength and long life, a non-invasive "spinal-surgery monitoring system," and a "laser-treatment device for moles" with the benefits of suppressed harmful aftereffects, small size, and low cost.





Kurume Area
(Basic Stage: FY 2003–2005)

『Development of tailor-made medicines & diagnostic agents, and functional foods for the prevention of disease』

A transgenics reagent and lactoferrin-containing cosmetics were commercialized based on research results

We undertook research and development into medicines, diagnostic agents, and bio-tools with the aim of developing the Kurume medical bio-cluster. In the course of developing various products, we commercialized a reagent that introduces a gene with high efficiency into a cell as part of gene functional research or gene therapy. We also efficiently isolated and purified lactoferrin—effective in repressing bacteria or virus growth—from residual materials in producing cheese from milk, and commercialized it as a component in cosmetics.

siRNA transfection reagent

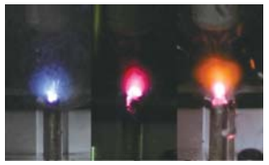
Lactoferrin-containing cosmetics

Matsuyama Area
(Starting Stage: FY 2002–2004)

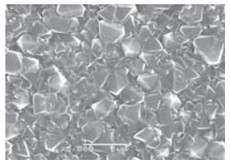
『Innovative Production Technology Using Application Technology for In-liquid Plasma』

Joint research has focused on the industrial application of in-liquid Plasma

Joint research has investigated application technology for in-liquid plasma over several years, leading to fundamental domestic and international patents, with many more patent applications having been submitted. Following completion of the project, several joint research projects have continued, successfully producing silicon carbide film, high-quality diamond-like carbon film, and polycrystalline diamond film. Moreover, this technology received the 40th Ichimura Prize in Technology—Contribution Prize, based on the originality and potential of the in-liquid plasma technology.



Light emitted from in-liquid plasma including metal salts



Diamond synthesized by the in-liquid plasma process

Harima Area
(Basic Stage: FY 2002–2004)

『Development of New Functional Materials Using a Particle Beam Technique』

A Plasma-Based Ion Implantation & Deposition System was released as Utility Equipment

The developed Plasma-Based Ion Implantation & Deposition System, which was awarded the 2nd Japan Manufacturing Grand Prix Excellent Prize, has evolved into fully automatic DLC film-formation equipment based on the efforts of enterprise engineers from participating research institutes in the area. DLC thick films, which are environmentally friendly, safe, and energy-efficient, make it possible to save energy and prolong part life. This equipment is capable of automatically forming DLC films upon large parts, and has attracted interest from the industrial machinery industry and the semiconductor manufacturing industry. The equipment is used to upgrade various electromechanical parts.

Fully automatic DLC Film-Formation Equipment

Western Okayama Area
(Basic Stage: FY 2002–2004)

『Development of a high-performance medical device (stent) for coronary arteries, and entry onto the international market』

Promotion of the development of a high-performance medical device by the continuous evolution of ultra-precision manufacturing technology

The "Micro-Manufacturing Okayama business creation project" is promoted by Okayama Prefecture with the aim of creating an Okayama-based industrial cluster. This project advances the ultra-precision manufacturing technology developed as part of the City Area Program (Basic Stage). A high-performance medical device (stent) for coronary arteries, intended to be competitive on the international market, was created by combining various manufacturing technologies, including design, processing, surface treatment, and evaluation technologies.
It is intended to start selling the device in Europe in September of 2008.