KANSAI SCIENCE CITY

Keihanna "Human L-cube" Cluster

Outline of the Project

In the 21st century, the society must place greater importance on "human". To this end, we propose the concept of a "Human L-Cube" characterized by the three "L" keywords of Life Science (life, health, welfare, environment), Living (lifestyle, culture, recreation, home), and Learning (education, lifelong study, life experience). Here, "technologies that support a rich and fulfilling life through advanced IT and genomics" will improve the quality of life and act as a trigger for diversifying industry and revolutionizing its structure. With this in mind, we are actively engaged in the creation of intelligent cluster.

Members of the Headquarters

○President	MIZUNO Hiroyuki
○Project Director	NOYORI Masaharu
○Research Director	OGASAWARA Naotake (Prof., Nara Institute of Science and Technology)
○Vice Research Director	WATANABE Yoshiaki (Prof., Doshisha Univ.)
○Science and Technology Coordinator	ITOH Kenichi
	MISUMI Haruo

Central Project Organization

Keihanna Interaction Plaza Incorporated

Core Institute(s)

Nara Institute of Science and Technology,
Doshisha Univ.,
Osaka Electro-Communication Univ.

Participants

Industry…RITE, KYOCERA, ATR, PIN CHANGE, OMRON, TOSHIBA ELECTRONIC ENGINEERING, KONAMI, Millennium Gate Technology

Institute…Nara Institute of Science and Technology, Doshisha Univ. Osaka Electro-Communication Univ.

Government… Nara Prefectural Agricultural Experiment Station, Nara Prefectural Institute for Hygiene and Environment

Main Researchers

OGASAWARA Naotake (Prof., Nara Institute of Science and Technology)
YOKOTA Akiho (Prof., Nara Institute of Science and Technology)
TANIHARA Masao (Prof., Nara Institute of Science and Technology)
WATANABE Yoshiaki (Prof., Doshisha Univ.)
YOSHIDA Masaki (Prof., Osaka Electro-Communication Univ.)
TSUSHIMA Katsuhide (Prof., Osaka Electro-Communication Univ.)

Outline of Researches

●Development of Genomic Analysis Technology

This research aims to develop systems for acquiring new useful proteins and for advancing food production through DNA analysis of plants and microorganisms, and technology for diagnosing infectious diseases, cancer, etc. Specific objectives include the enhancement of fundamental technology for genomic analysis,estimation of genetic functions,and industrialization of DNA array analysis through development of integration software, acceptance of analysis orders, etc.

[Nara Institute of Science and Technology, Nara Prefectural Institute for Hygiene and Environment, RITE, Hagihara Farm Co.,Ltd., Millennium Gate Technology Co.,Ltd.]

●Development of Plant Production Systems Featuring High-value-added Protein

The objective of this research is to synthesize high-value-added protein for medical purposes utilizing the ability of plant leaves to make synthesis protein. If this can be achieved in crops of leafy vegetables like lettuce and spinach (in contrast to past technologies) , it will be possible to produce proteins for medical use in a safe and inexpensive manner.

[Nara Institute of Science and Technology, Nara Prefectural Agricultural Experiment Station, RITE, CTI Co.,Ltd.]

●Technology Development for Medical Materials Merging Genome Information and Materials Science

The aim here is to use genome information to optimize amino-acid sequences and structures in proteins that promote the regeneration of bones and nerves and to thereby synthesize new proteins and peptides with superior functions. Another objective is to employ nano-level organic/inorganic hybrid technology to create materials that can regenerate bones, nerves, etc .

[Nara Institute of Science and Technology, Kyocera Corporation, Toyobo Co.,Ltd., Sanwa Cornstarch Co., Ltd., Centmed Inc., Ezaki Glico Co.,Ltd.]

●Application of Advanced Man-Machine-Interface Technologies to Future Household Appliances

The role of this work is to develop new technologies for advanced security systems, home 3D cinema, artificial hands, ultrasonic headphones, and other future household appliances. This will be accomplished by applying neural functions, skeletal models of human hands and fingers, quantification of sensitivity, ultrasonic bone conduction, speech recognition, and other functions of living organisms plus communications network technologies such as parallel and distributed evolutionary computation .

[Doshisha Univ., ATR, DoGA Corporation, PIN CHANGE Co.,Ltd., GK Kyoto Inc., NTT Advanced Technology Corporation, Rion Co.,Ltd., BIOMEDICA Co.,Ltd., Micronix Inc., Institute of Sensor Device Development, TOSHIBA ELECTRONIC ENGINEERING CORPORATION, TEC GIHAN Co.,Ltd., OMRON Corporation, Diamedical System, Co.,Ltd.]

●Development of Health/Welfare Engineering Technology to Improve QOL

This research will undertake the development of health-and-welfare devices to help the elderly and physically challenged independent lives. Development targets include advanced artificial hands, equipment aiding the playing of musical instruments using tongue-movement recording equipment, communication tools for indicating one's desire, and health management systems.

[Osaka Electro-Communication Univ., UnionGear Co.,Ltd., Furusawalab Appliance Inc., NABCO Ltd.]

●Development of Learning/Experiencing Support Technology

This research aims to develop systems that can simplify the production of content that enables video-based interactive learning. It will develop equipment that enables authors to input data using common-sense methods, software (authoring tools) that simplify the conversion of input signals to applications, and related databases.

[Osaka Electro-Communication Univ., KONAMI CORPORATION, Nippon System Development Co.,Ltd. , FOR-A COMPANY Ltd., GK Kyoto Inc., PIN CHANGE Co.,Ltd., Nirvanatechnology Inc.]

Expected Results

○Early check system for plant pathogen infection using DNA chips
○Safe and inexpensive proteins for medical use from plant leaves
○Artificial bones, skins, and nerves prepared from materials having self-regeneration effects
○Hearing aids without using the ear
○Lighting systems giving necessary illumination to necessary locations
○Communication systems using the tongue
○Systems for creating educational content easily and inexpensively with great power of expression