

Chapter 2 Strategic Priority Setting in S&T

Section 1 Promotion of Basic Research

Basic research, which spawns human wisdom and serves as a source of knowledge, accumulates as an asset for the whole of humankind and is built upon steady and serious inquiry into the truth based on numerous trials and errors. Additionally, because it is often the unusual discoveries and inventions that result in the greatest leaps in knowledge, it is important to foster innovation. Basic research consists of two types: Type-1 basic research that is conducted based on the free ideas of researchers in S&T (Academic research); and Type-2 basic research, which aims at future applications based on policies. Both types of basic research should be promoted continuously and extensively with consideration given to the significance of each type.

For the reasons mentioned above, universities are conducting basic research utilizing the Grants-in-Aid for Scientific Research for Type-1, and “JST Basic Research Programs” and other competitive funds for Type-2, while securing fundamental expenses with government subsidies for national university corporations, financial aid for private educational institutions, and so on.

Section 2 Priority Setting in R&D for Policy-oriented Subjects

According to the 3rd Basic Plan, in order to maximize the effects of the governmental R&D expenditure, “Investment in Tomorrow,” life sciences, information and telecommunications, environmental sciences, and nanotechnology/materials are labeled as the four priority fields to be promoted and are to be the fields prioritized for key investment, while energy, manufacturing technology, infrastructure, and frontiers as the four fields to be promoted for adequate investment. MEXT finalized the Sectoral Promotion Strategy toward selection and concentration of investments as well as achievement of results during the period of the Basic Plan. In the Strategy, 237 projects were chosen as important R&D projects that should be worked on by the government. After research targets and achievement goals were specified for each project, 62 strategically prioritized S&Ts were chosen as the subject of selective investments. According to the Strategy, R&D projects were promoted while ensuring thorough selection and concentration of the subjects including the strategically prioritized S&T for selective investments in each of eight fields after a strict evaluation of R&D work on the Key Technologies of National Importance.

1 Life Sciences

Life sciences shed light on the complex and delicate mechanisms of the phenomenon of life in living creatures, and, when applied, lead to significant medical development and solutions to food and environmental problems—contributing greatly to the enhancement of people’s lives and to a nation’s economic prosperity.

In the Sectoral Promotion Strategy of life sciences field the following seven types of strategically prioritized S&T are indicated as the S&T fields to which investment should be focused within the next five



years. MEXT and other ministries are primarily implementing R&D activities that are related to the strategically prioritized S&T.

(1) Basic and fundamental research projects supporting life science studies as a whole

1) S&T for the reconstruction of complex systems of life

a) Promotion of research on genome sciences

Based on the completion of a precise decoding of the human genome and the outcomes of genome function analysis, MEXT started an innovative study program to decipher life programs (cell innovation)—focusing primarily on cancer cells—through the utilization of a next-generation sequencer in 2009. In addition, MEXT is making efforts to steadily promote R&D for innovative medical technologies using individual genetic information.

The Ministry of Health, Labour and Welfare (MHLW) is promoting R&D to establish preventive methods, diagnosis, and treatments for diseases, and to develop innovative medicines by locating the genes linked to major diseases in elderly individuals, such as dementia, cancer, diabetes, hypertension, asthma, etc.

The Ministry of Economy, Trade and Industry (METI), with utilizing the private sector vitality, is conducting a functional analysis and development of a tool (the technologies of informatics and highly sensitive quantitative analysis) designed to elucidate functional RNA.

b) Promotion of analysis of protein structures and their functions

Proteins are the fundamental molecules that constitute life of all living creatures. The analysis of their structures and functions are indispensable for future industrial applications to medicine, pharmaceuticals, food, the environment, and so on.

Although extremely difficult given the limitations of current technology, MEXT is implementing the “Targeted Proteins Research Program,” which makes the most of the existing foundation for protein analysis to analyze the structures and functions of proteins selected for their indispensability to academic study and industrial development.

c) Promotion of brain science

It is hoped that, accomplishments in the field of brain science, improvements in the quality of social life and medicines will be achieved and new technologies and industries will be created.

MEXT is promoting research activities in RIKEN while utilizing the “Strategic Research Program for Brain Sciences (SRPBS)” and other competitive funds to prioritize research being conducted in the field of brain science. In addition, since it is necessary to strategically promote the studies of brain science and to return the outcome of those studies to society, in June 2009, Council for Science and Technology (CST) at MEXT organized their first recommendation regarding the fundamental conception and promotion of policy toward brain science research from a long-term perspective. In FY 2010, it is also promoting a new research to elucidate the brain functions that support the health of our mind and body and uncover the mechanisms that deviate from what are considered to be healthy from the view of “interaction of molecular bases and environmental factors” by focusing on the life of a human being.

MHLW is conducting research to clarify the pathogenesis and to develop treatment methods for mental

illnesses, including neuromuscular disorders, Parkinson's disease, Alzheimer's disease, high cortical dysfunction, schizophrenia, depression, etc.

d) Promotion of research on allergies and immunology

RIKEN is conducting basic research on diseases related to allergies and immunology. It has concluded a pact for joint research with the Sagami National Hospital in an effort to promote effective research through the partnership of basic and clinical research. In addition, a research is conducted to develop a treatment drug for hay fever caused by cedar pollen which is said to be a national malady.

(2) R&D projects that contribute to the "To Live a Better Life" field

2) Clinical and translational research

a) Development of research environments and structures to put drugs and medical devices into practical use

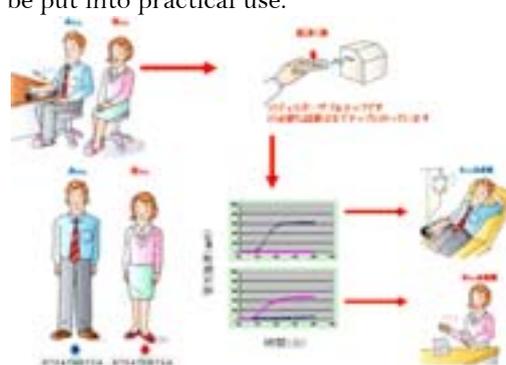
In the Cabinet office, the MEXT, the MHLW, and the METI, in order to overcome factors that disrupt the development of innovative technologies, "Super Special Consortia for supporting the development of cutting-edge medical care" ("Super Special Consortia" System) have been promoted to test a program to allocate research funds in integrated and efficient ways and to exchange opinions with regulatory authorities from the developmental stages to enhance the development and practical application of advanced regenerative medicine, drugs, and medical devices.

In addition, the Council for Science and Technology Policy (CSTP) has implemented "Program to support elimination of the bottlenecks of R&D related to systems for acceleration of the commercialization of achievements by health research [Literal translation]" funded by the Special Coordination Funds for Promoting Science and Technology for FY 2010 and supporting the swift commercialization of innovative medical supplies by collecting and accumulating basic data for evaluating the effectiveness and safety in R&D institutions.

MEXT, in partnership with MHLW, METI, and other government offices, is also promoting the "Assistance Program to Promote Translational Research" to develop assistance centers for universities with excellent translational research achievements that can be put into practical use.

b) Activities to realize Tailor-Made Medicine

To provide optimal medical care (Tailor-Made medicine) for individuals, MEXT utilizes bio-banks, which manages blood samples taken from patients as well as clinical information to implement a "Project for realizing medical care according to individual genetic information (The Second term)" to help clarify the links between genetic information and diseases that may have a significant impact on people's health. In addition, RIKEN is attempting to cooperate with this project by promoting research that will help elucidate the causes of diseases.



Flow of using SNPs analyzing system in medical scenarios

With this fully automated SNPs analytical diagnostic system (joint development with Toppan Printing, Co.), it is possible to make a highly accurate SNP determination within 45 minutes from a drop of blood.

Source; RIKEN



c) Promotion of research on development, differentiation, and regeneration science.

Research in the fields of development, differentiation, and regeneration aims to clarify mechanisms related to cell differentiation in a variety of tissues and internal organs that form and maintain the body. This is the foundation of the regenerative medicine, and in recent years, research on iPS cells and stem cells have been developed rapidly, and the technology to create ES cells has been established.

MEXT is promoting research in order to apply the results of basic research toward clinical medicine so that it can achieve the goals set forth in the “iPS cells research road map” (MEXT, June 2009). It also develops centers in which research on iPS cells and other stem cells will be implemented in the “Project for Realization of Regenerative Medicine (The II Term),” which is based on the “Revised Comprehensive Strategy for Accelerating the iPS Cells Research” [literal translation] (decided by the Minister of MEXT, Jan 2009). In addition, the JST is also conducting basic research with JST Strategic Basic Research Programs, as well as at RIKEN and other locations.

In addition, concerned government offices are working together to develop research structures and to maintain necessary research funding to work on the projects concerned with securing and managing intellectual property.

d) Promotion of research on molecular imaging

Molecular imaging is a technique used to visualize the molecular mass and functions of molecules in living bodies.

MEXT is implementing the “Molecular Imaging Strategic Promotion Research Program” to promote application of molecular imaging technology into early medical care and by forming a research structure that enables collaboration of the research bases for exploring new ingredients for pharmaceutical drugs and for PET diagnosis with universities, hospitals, and companies, are conducting collaborative research and development to demonstrate its technology.

The MHLW is promoting a development of medical device focused on non-invasive/minimally invasive treatment by applying nano-technology and is also conducting research device and technology that enable innovative imaging diagnosis for diseases such as cancer.

The METI is implementing the “Comprehensive Research and Development Project on Ultra Early Detection and Treatment Devices for Cancer” to develop highly sensitive/high precision image diagnosis system that enables precise diagnosis by providing the information that is necessary for a course of treatment such as shape of the cancer, its location, and degree of malignancy.

e) R&D that promotes efficiency of the drug discovery process and practical utilization of its accomplishments

METI is conducting R&D of basic technologies to accelerate the discovery of new drugs by utilizing genetic information, including a technology to clarify the mechanisms of diseases at the genetic level utilizing full-length human cDNAs (an advantage of Japanese technology), a technology to create drugs with clarified disease mechanisms, a technology to make the drug discovery process more efficient by utilizing the structural information of film proteins that play important roles in the living bodies and a technology to analyze epigenetic genome modification with high precision. In addition, METI is also conducting R&D to create new antibodies that will be usable in antibody drugs and to enable antibodies to



be refined with higher efficiency. Furthermore, to make the process of evaluating effectiveness and safety of drugs more efficient, METI is conducting R&D of drug discovery tools utilizing stem cells such as iPS cells.

f) Development of new medical technologies and systems in collaboration with the private sector and clinical research institutions

METI is establishing coordinated partnerships with ventures and other companies in the private sector, as well as with clinical institutions, to deliver research achievements in a variety of technological fields while also developing new medical technologies that will reduce the burdens on patients and medical staff. It is also promoting work aimed at hastening the practical application of medical technology and the dissemination of that technology.

3) The targeted therapies and other innovative cancer treatment technologies

Based on the “Third Term Comprehensive 10-Year Strategy for Cancer Control” (Ministers’ Decision on July 2003, MEXT and MHLW), the “Cancer Control Act” (enacted in April 2007), and the “Basic Plan to Promote Cancer Control Programs” (Cabinet Decision of June 2007), new preventive methods, diagnosis, and treatments utilizing the research results are under development to shed more light on the nature of cancer.

MEXT has established the Working Group for Cancer Research strategies in the CST’s Subdivision on R&D Planning and Evaluation to discuss issues related to the research and summarized a report (July, 2010) on proposals regarding mid to long term measures as well as measures that should be taken immediately to enhance cancer research.

In addition, the National Institute of Radiological Sciences is conducting research in heavy-ion cancer therapy, which is expected to provide innovative treatments for types of cancer that are otherwise difficult to treat. Based on the achievement obtained by the research of the Institute and other institutions, a downsized heavy-ion cancer therapy facility was installed in Gunma University and the treatment is conducted.

MHLW is conducting translational research, which provides widespread application based on the achievements of research conducted to shed light on the nature of cancer. It also engages in joint research on multicenter clinical studies to establish standard therapies for cancer care, research on maintaining or enhancing the quality of care palliative care and recuperation, research on understanding the current state and providing information about the cancer, and research on policy issues, such as the development of an organizational framework to promote equalization of regional gaps.

METI is implementing the “Comprehensive Research and Development Project on Ultra Early Detection and Treatment Devices for Cancer,” a project that develops devices that detect microscopic-stage cancer which has, up till now, been difficult to detect, and which can accurately diagnose the level of malignancy, etc. required to implement the optimal medical care, as well as develop treatment devices that preserve the structure and functions at the affected area and maximally reduce the physical burden to patients. In addition, METI is also conducting research and development on base technologies including highly sensitive analytical technology and information processing technology that are necessary for the development of new pharmaceutical drugs and for cancer diagnosis that are targeted at epigenetic



genome modification.

4) S&T for Overcoming Emerging and Reemerging Infectious Diseases

Currently, there are increasing international social concerns regarding newly discovered infectious diseases and infections that appear to be under control only to violently re-emerge (emerging/re-emerging infections).

MEXT is implementing the “International Network for Infectious Diseases Research Promotion Program” to accumulate fundamental knowledge and provide training for human resources, etc. on measures against infectious diseases at overseas research centers established in eight countries in Asia and Africa at 12 locations.

MHLW is conducting research activities focusing on emerging and re-emerging infections, animal-derived infectious diseases, diagnostic technology for infectious disease prevention, on-site surveys, and measures against international infections, and, since there is a pressing need for measures to be taken for emerging and re-emerging infections, measures include both domestic and international collaborations. The National Institute of Infectious Diseases (NIID) is also conducting research on a wide range of infectious diseases. In particular, research is being directed toward the new influenza viruses, against which most people do not have immunity. The Ministry is promoting research in preparation for future outbreaks of influenza (H1N1) 2009, which broke out in April 2009, and for other new influenzas that may emerge from the highly pathogenic avian influenza which still exists as a source of widespread concern.

The CSTP has designated and implemented “Urgent Research for Measures against Foot and Mouth Disease” as “Promotion of Measures to Address Important Political Issues with Mobility” funded by the Special Coordination Funds for Promoting Science and Technology for FY 2010.

(3) R&D Issues That Contribute to the Fields of “Better Eating” and “Better Lifestyle”

5) S&T to produce and supply safe food that will enhance international competitiveness

a) Research on microbial, animal, and plant genomes in the fields of food and environment

As the science of genomes has developed, the structures and functions of plant genomes have becoming more and more clear. It has been anticipated that these achievements may help improve our eating habits by controlling plant functions.

RIKEN has been conducting research to enhance productivity in terms of quantity and quality through clarification of genome functions of model plants, such as *Arabidopsis thaliana*.

The Ministry of Agriculture, Forestry and Fisheries (MAFF) is accelerating the process of clarifying genetic functions with focused fixed on the problems of food, environment, and energy. These problems are thought to be of particularly high importance, and the Ministry has implemented research to create high-yield crops, crops resistant to harsh environments, plants that purify the environment, huge biomass plants, and other plants that can help solve the aforementioned problems. The achievements of studies on genomes are also applied to food related micro-organisms, domestic animals and insects, and studies are being conducted for the purpose of creating new demand and innovation for food production technologies. In addition, development of production technologies for seeds that do not respond well to artificial cultivation continue to be promoted, and, in order to achieve our food self-sufficiency ratio goals, domestic agricultural products are under development, including feed with innovative properties in terms of quality

and processability. Livestock production technologies are also being developed for high quality meat, etc.

In addition, based on the “Drastic Reform with Effective and Agile Movements for BT innovation in Japan (Dream BT Japan)” (Public-Private Council on Promotion of Biotechnology (BT) Strategy decision in December 2008), they are working on promotion of biotechnology as part of a collaboration between industry, academia, and government.

b) R&D in relation to ensuring food safety, securing procurement, and obtaining consumers’ trust

The Japanese public’s concern toward “food” is high and ensuring food safety and securing procurement is an important issue. MHLW is promoting research on new hazards, survey and research for establishing standards, and R&D for establishing official assays in relation to additives, contaminants, chemicals, pesticide residues, microorganisms, Bovine Spongiform Encephalopathy (BSE), health food, food applying modern biotechnologies, etc., to enhance measures regarding food safety and to improve technologies required to fulfill food hygiene regulations. The achievements from such research are then incorporated in risk management measures. In addition, it conducts research on health crisis management, such as food poisoning and food terrorism.

MAFF is working on developing technologies to elevate the accuracy of the quarantine measures and to enhance its efficiency to reduce the economical loss of livestock farmers and the potential risk of zoonosis, including avian flu, BSE, etc. to humans. In addition, it is developing technologies to reduce risk in the processes of production, distribution, and processing of farm products in relation to hazardous chemicals, harmful microorganisms, etc. It is also working on development of technologies to prevent false food labeling and methods to evaluate functionality of unprocessed food by means of nutrigenomics and other methods.

6) Production of materials utilizing biofunctions and S&T for improving the environment

MAFF is working on the development of assessment methods for soil organisms using eDNA (environmental DNA) and has developed a standardized soil sampling method, a base technology and an analytical method for soil micro-organisms.

METI is working on development of technologies to produce high value-added materials, such as highly functional proteins, etc., in a closed system using plant functions, technologies to produce useful substances for industrial raw materials, etc., utilizing functions of plants and microorganisms, and technologies of highly efficient bio-treatment for industrial wastewater and other, etc. through microbial group control and other methods.

(4) Issues in relation to development of structures for life science research

7) Arranging a world-class foundation for life sciences

a) Developing bio-resources

Bio-resources are important for the purpose of not only preservation of biological genetic resources but also for opening up new fields for research activities, so it is necessary to work on development, collection, preservation, and supply from a national perspective.

MEXT is conducting the “National Bio-resource Project” to develop a system to systematically collect, preserve, and supply the important bio-resources that need to be arranged strategically by the national government related to animals and plants for research the building blocks of life science studies.



MAFF is implementing the agriculture, forestry, and fisheries gene bank project to collect, preserve, evaluate, and supply genetic resources for the industries of agriculture, forestry, and fisheries. It also preserves and offers DNA and other genome resources of rice plants, etc.

As projects of METI, the National Institute of Technology and Evaluation, which is a core institution of Japan with genetic resources including microorganisms, is searching, collecting, and preserving the genetic resources while organizing the related information (systematic positions, sequence information, genetic information, etc.) to provide for R&D and industrialization activities. In addition, based on the Memorandum of Understanding (MOU) between METI and Asian countries, METI is promoting collaborative research, as well as working actively to promote exchanges between the countries in the “Asia Consortium,” established to preserve microbial resources and use them sustainably and implementing biological genetic resources in Asia through with Asian countries based on biodiversity treaties.

b) Promotion of bioinformatics

It is important to promote development of a comprehensive database for biological information and of bioinformatics, an integrated field of life science and IT (information technology), as means to utilize DNA base sequence data, protein structure data, and gene expression data, which are created abundantly as a result of life science research in recent years.

MEXT has been working on integration of life science databases while starting the “Integrated Database Project” to enhance usability of life science databases in Japan. In view of continuous use and maintenance after completion of the project (FY 2011 or thereafter), the gradual transfer will be run in coordination with JST Bioinformatics Research and Development (BIRD), which is working on enhancement, standardization, and expansion of the database and development of genome analysis tools.

MHLW collects and preserves genes and cell lines cultured from human or animal cells, which are necessary for medical and pharmaceutical research. It also collects, preserves, and supplies medicinal plants and enhances disease animal models.

MAFF implements the “Agriculture, Forestry and Fisheries-related Genomic Information Integrated Database,” in which highly usable database is under development integrating the information on genomes and genes of agricultural or fishery products, such as rice, silkworms, livestock, etc., to be offered to researchers and breeders in universities or in companies in the private sector.

METI implements the “Integrated Database Project,” in which the data from the research on public funding related to METI are integrated for use by various industries.

In addition, the Life Science Project Team for Integrated Database Task Force Meeting [literal translation] at the CSTP released a report in April 2009 on how the centers that provide functions expected by users should be permanently arranged; such as inputting new information into the database, and maintenance and management of the data, to prevent data and database collected and created in each project from scattering, and to promote further effective use of the data.

(Efforts on Environmental Health of Children)

It has been pointed out that in recent years, environmental risks to children might have dramatically increased. The Ministry of the Environment started a large-scale long-term cohort survey “Census related to child health and environment (Japan Eco & Child Study)” on 100,000 groups of parents and children

since FY 2010 in order to clarify the effects of chemical substances in the environment to child health. Biological samples including blood, cord blood, and breast milk were collected and preserved from the participants (pregnant women) and analyzed and follow up surveys with questionnaires until the child is thirteen years of age are also carried out.

The National Institute of Environmental Studies operates as a core center and analyzes the data and samples and oversees the overall coordination of the survey. The National Center for Child Health and Development serves as a medical support center and provides medical support, while 15 designated regional unit centers selected from public participation carry out follow up surveys of unborn children and recruitment of participants. FY 2010 was the first year of its operation and it was engaged in the management of implementation structure at universities and medical institutions across the country. It initiated the recruitment of participants at the end of January 2011.

The knowledge gained by this study is to be utilized to realize the preservation of child health and a sense of security and safe environment for bring up the child through the enhancement of risk management of chemical substances. In addition, data and biological samples collected from the 100,000 groups are expected to contribute to the preservation of international competition related to base research of Japan as a common ground for medical and health research.

(Efforts to Conduct Animal Experiments in a Proper Manner)

The “Act on Welfare and Management of Animals” was revised in June 2005 as lawmaker-initiated legislation, and the concept of 3Rs (Replacement, Reduction, and Refinement) was indicated in relation to animal experiments.

In addition, the same act defines that the Minister of the Environment shall determine the standards for animals for experiments, while distinguishing the terms “experimental animals,” “animal experiments,” etc. On April 28, 2006, the “Standards Relating to the Care and Management of Laboratory Animals and Relief of Pain (Care and Management Standards)” were announced. MEXT, MHLW, and MAFF have settled integrated basic guidelines for research institutions under their control for the purpose of proper implementation of animal experiments based on the guidelines.

(Efforts Related to the Issues of Bioethics)

Although its usefulness is recognized, the recent rapid development of life science may bring about new bioethical problems involving human dignity and human rights. Thus, concerned ministries have been imposing necessary regulations.

In relation to human ES cell research, in February 2009, the Bioethics and Biosafety Commission of the Council for Science and Technology (CST) based on its basic policy concluding that the creation of germ cells from human ES cells should be approved, carried out investigations on the conditions and procedures, revised the “Guidelines on the Derivation and Distribution of Human Embryonic Stem Cells” (MEXT public notice No. 86) and the “Guidelines on the Utilization of Human Embryonic Stem Cells” (MEXT public notice No. 87) and newly established the “Guideline for research to create germ cells from Human iPS cells or Human Stem Cells” (MEXT public notice No. 88, decided on May 20th 2010).

Regarding assisted reproduction technology research, according to the “Basic Policy on the Handling of Human Embryos,” which was organized by the CSTP, MEXT and MHLW have jointly carried out



investigations into the conditions and procedures involved when a gamete produces the embryo and organized in April 2009 the report “Guideline for Creation and Uses of Germ Cells from Human ES Cells.” In December 2010, the “Ethical Guideline related to assisted reproduction technology research of Human Embryos” was newly established (MEXT/MHLW public notice No. 2 of April 1st 2011).

(Efforts to secure safety in life science)

The technology of genetic modification creates new genetic combinations that do not exist in nature and it is applied not only to basic biological research but also to a wide range of fields, including drug production and crop improvement. Regarding the use of genetically modified plants, etc., necessary regulations have been implemented to prevent negative influence to biodiversity, based on the “Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms” (Act No. 97 of 2003). The clinical research for establishing genetic therapy has been promoted adequately following the “Guidelines for Gene Therapy Clinical Research” (MEXT/MHLW public notice No. 2 of 2004).

The major research projects in life science in 2010 are indicated in [Table 2-2-1](#).

● Table 2-2-1/ Major Subjects in Life Sciences (FY 2010)

Gov't office	Research institutions, etc.	Research subject
Cabinet Office		-Research on Technology to Evaluate influence of food on health
Ministry of Finance	National Research Institute of Brewing (NRIB)	-R&D operations related to life science
Ministry of Education, Culture, Sports, Science and Technology (MEXT)		-Strategic Research Program for Brain Sciences (SRPBS) -Program to promote assistance to translational research -Project for realizing medical care according to individual genetic information (The Second Term) -Project for realization of regenerative medicine -Molecular imaging research strategic promotion program -Initiative for research on innovative protein and cells analysis -International Network for Infectious Diseases Research Promotion Program -National Bio-resource Project -Integrated Database Project
	RIKEN	-Comprehensive research project on brain science -Research project on plant science -Comprehensive research project on immunity and allergy sciences -Research project on genome medical science -Comprehensive research project on development and regenerative sciences -Science research project on molecular imaging -Bio-resource project -Project on fundamental research fields for life sciences
	Japan Science and Technology Agency (JST)	-Project on bioinformatics promotion center
	National Institute of Radiological Sciences	-Research in heavy-ion cancer therapy -Research on molecular imaging
Ministry of Health, Labour		-Infrastructure promotion research project for new drug creation -Research project for 3rd term comprehensive strategy for cancer control

and Welfare (MHLW) Ministry of Agriculture, Forestry and Fisheries (MAFF)		-Research project for emerging and re-emerging infectious diseases, including new flu
		-Development of technologies to provide steady farm products of low cost and good quality for processing and distributors -Development of Japanese-style animal feeding technology by feeding large amounts of roughage -R&D for establishing resource-saving agriculture by recycling local resources -Development of technologies for eel seedling aquaculture -Development of technologies for assessing characteristics of soil organisms by clarifying soil microbial aspects -Comprehensive technological development for creation of new markets to utilize the animal genome -Development of new production systems using IT for training human resources -Building integrated database for agricultural and fishery biological genome information -Development of technologies for highly efficient risk management for avian flu, BSE, etc. -Development of technologies to clarify characteristics of hazards in the processes of production, distribution, and food processing in a systematic way -Development of basic technologies for securing reliability of displays on food and farm products and for analyzing their functionality -New genome project for agricultural deployment -Project on promoting the research on agriculture and health commercialization. -Project on developing a new technology for regulatory science
Ministry of Economy, Trade and Industry (METI)	National Institute of Agrobiological Sciences	-Operations of gene banks
	New Energy and Industrial Technology Development Organization (NEDO)	-Development of technologies to promote translational research to bridge basic research to clinical research -Development of biological basic technologies to assist in acceleration of genome drug discovery -Development of technologies to create antibodies with new functions -Development of technologies to utilize glycan functions -Development of biological diagnosis integrating technologies to realize individualized medical care -Development of basic technologies for a new pharmaceutical drug creation utilizing the mechanism of Epigenetic genome modification -Integrated database project -Cancer Early Detection/Treatment Device Research and Development Project" [Literal Translation] -Development of basic technologies for sophisticated production using plant functions -Development of basic technologies for environmentally friendly production using microbial functions -Development of basic technologies to promote application of stem cells for industrialization
	National Institute of Advanced Industrial Science and Technology (AIST)	-Analyzing molecular basis for symbiotic evolution of endocellular bacterial symbionts -Development of new genetic resource from unknown microorganisms -Analyzing molecular structures of circadian clock in mammals -Creation of bioluminescent protein and its application to medical use -Development of communication device using EEG