

(2) Table separate from the "List of Categories, Areas, Disciplines and Research Fields for FY2011 Grants-in-Aid for Scientific Research"

○ List of Disciplines and Research Fields with a Time Limit

Area	Detail	Item Number	Set Period
Quantum beam science	<p>Quantum beams are beams that show both wave-like and particle-like properties. They come in wide range of energies, wavelengths, and types, such as electromagnetic beams (laser beams, X-rays, gamma-rays), lepton beams (electrons, positrons, muons, neutrinos etc.), and hadron beams (protons, neutrons, mesons, ions). Recently the usage of these many different types of quantum beams is advancing rapidly, not just in basic science, but also in medical and industrial fields. The R&D of quantum beam sources and the application of these beams is important for the advancement of accelerator physics and surrounding fields. Such efforts will also lead to the realization of the technological foundation required in fields ranging from fundamental science to its applications. This grant aims to support research projects that will lead to developing the technological foundation, such as new technology to generate beams, new accelerating mechanisms for making accelerators smaller, and new analysis methods to diagnose the structure and properties of materials, which will be necessary to a wide range of fields.</p>	9034	FY2008 – FY2011
Children studies (Studies of environment on children)	<p>The quality of the physical, human, and socio-cultural environment surrounding children (from infancy through youth) has deteriorated as a result of urbanization, the impact of information technology, the declining birthrate, and changes in the local community, and it has various influences on the body and the psychology of children. The conservation and restoration of a good environment for young people from the viewpoint of nurturing them should be a socially, as well as academically, important task.</p> <p>The environment surrounding children has been studied in wide-ranging research fields such as pedagogies, childcare studies, psychology, pediatrics, public health, child psychiatry, neurosciences, physical education, architecture, urban engineering, environmental science, robotics, and cognitive science. However, now the need for a fusion-type research incorporating divergent disciplines is apparent. This program promotes research on the environmental problems surround children which would, from an interdisciplinary perspective, study the influence of environment on young peoples bodies and psychology, by organizing various studies such as those of architecture and engineering on the physical environment (so-called“hardware”), and those on education and human, and socio-cultural environments (“software”).</p>	9036	
Medical Physics/ Radiological Technology	<p>“Medical Physics / Radiological Technology” is a research area in which physical and technological issues within radiology are explored. In recent years, various medical technologies based on radiation physics including radiation therapies using particle beams and a number of diagnostic technologies such as molecular imaging, are developed and have become widely used in a short period of time. Together with the rapidly growing needs for radiation therapies and diagnostic imaging, basic research which supports these fundamental technologies are very important in the expanding field of radiology. At the same time, such basic research supports development of technologies and human resources which will be necessary in a wide range of fields from basic to clinical application, including medical imaging engineering, radiation therapy, heavy particle therapy, nuclear medicine, and radiation protection. Although this field primarily aims clinical application toward radiology, the academic foundation and techniques are positioned to be in the fields of science and engineering. Therefore, researches where fundamental technologies which will cover a wide range of fields from science and engineering to medicine, and researches where new research area will be established will be expected.</p>	9037	FY2009 – FY2011
Biomass energy	<p>Due to environmental issues and a sudden rise in fossil fuels, research on biomass energy is now expected worldwide to be developed as one of the alternative energies. The major research in such fields involves biomass conversion to biofuels, technologies for thermal recycling, development of sustainable biomass production technologies, and establishment of cycling system of regional agriculture and biomass energy. In addition, fundamental research relevant to synthesis/structure/function of biomass resources is included. Furthermore, also included is research on life cycle impact assessment by increasing biomass energy production and socio-scientific research such as effects on dietary and poverty issues. Projects by young researchers on free and bottom-up thinking basis are also very much welcomed.</p>	9038	

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Social symbiosis and exclusion	<p>Since the 1980s, the spread of social exclusion, social inequality, etc. and social justice as a socio-political response to these problems have become a major challenge in developed countries. In Japan, since the mid-1990s, problems of income disparity and social inequality, and then in the 2000s, the poverty issue became major public concerns. Not only fatherless families, disabled persons and the aged, who have been the object of attention since long before, but also the spread of poverty and social exclusion across a broader spectrum of the population such as, for example, younger people and children, and, in addition to general socio-economic inequality, even the disparity in medical treatment and health have been increasingly highlighted. This area includes theoretical research on the social accumulation and spread of poverty and social exclusion, inequality and other matters, the grasping of the actual circumstances, and the measurement and the estimate of their influences. Moreover, concerning the question how society tackles these issues, this area also includes research on policies responding to actual social exclusions and to the mechanisms that generate social exclusion, and analysis of legal systems in relation to these issues. In addition, any synchronic and diachronic comparative research projects, such as empirical researches on the actual circumstances of social disparity, inquiries on the policy trends and on the revision of legal systems in developed countries, studies on the poverty issues in developing countries, and various historical studies are all important. JSPS is expecting researches that will contribute significantly to the development of this field.</p>	9040	
Design science	<p>For the sake of the welfare of humanity and the enrichment of human life, the science of design opens an appropriate pathway for exciting and potentially transformational technology. The science of design has as its research object machines and tools, furniture, space, construction, cities, regions, culture, welfare and care, media, information-processing equipment, information content, drama, etc., in short, all the phenomena that support and enrich human living space. For the science of design, a fusion of knowledge that transcends a wide range of disciplines, starting from design research, which concerns design as such, to design engineering, modeling engineering, architecture, landscape engineering, sciences of living, anthropology, cognitive science and psychology, ergonomics, medical science and hygienics, sensory science, sensory engineering, information science, acoustics, computer science, social science, art science, etc., is necessary. Consequently, the science of design requires a broad based inter-disciplinary approach encompassing disciplines ranging from arts and social sciences to science and technology, as well as aesthetics and ethics. This area has as its object the individual elements of the phenomena that make up our living spaces, the collectivity and organization of these elements, and the combination of these elements and societies that consist of various cultures. For this area, JSPS is expecting ambitious and creative research originating from an alliance of disciplines that transcends traditional disciplines, and consists of a merger of humanities-fields, science-fields and arts-fields. The aim of this research is the creation of a bright future for mankind.</p>	9041	FY2010 — FY2012
Mechanobiology	<p>The cells that make up a living body are being exposed to a variety of mechanical stimuli that are caused not only by gravitation, but also by the movement of skeletal muscles and smooth muscles of internal organs in the body. At the same time the cells sense these stimuli and respond to them. That this mechanism is essential for the functional maintenance of the living body is, of course, clear from auditory sense and the sense of touch, and also when one considers amyotrophy of astronauts and osteoporosis. Moreover, excessive mechanical stimuli (elevated blood pressure) cause severe diseases, such as arterial sclerosis, cardiac failure, etc. On the other hand, with the growth, division, alteration of shape and movement of the cell, the occurring forces are fed back, and the functions of the cells regulate themselves. It is considered that insufficiencies of cells lead to developmental anomalies and cancer. In this way, the cell's capacity of reception of and response to mechanical stimuli is a core function that supports life, and is a fundamental and highly important subject of research not only for the development of basic biology, but also for the development of astromedicine, regenerative medicine, medical engineering, dentistry and engineering, and agriculture. JSPS is expecting research that aims at the creation of new academic fields, by integrating related research, and by making the mechanism of sensing of, and responding to mechanical stimuli that living bodies and cells possess, the pivotal axis of the research.</p>	9042	

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Bioethics	<p>“Bioethics” is the field which mainly treats ethical aspects of life. However, it is an interdisciplinary field which not only treats various humanity fields, such as philosophy, ethics, sociology, law, economics, politics, cultural anthropology and history of technology but also overcrossing with a number of scientific fields such as biology, bio-science, anthropology, genetics, public health, pharmacology, basic medicine, clinical medicine , forensic medicine and nursing.</p> <p>Bioethics was founded in the USA in the 1970s, and its importance has been acknowledged widely throughout the world, especially in an era where genetic engineering, biotechnology and state-of-the-art medical technology are rapidly developing.</p> <p>In this field, many problems such as informed consent, medical decision making, abortion, genetic diagnosis, surrogate birth, brain death and transplantation, euthanasia and death with dignity, terminal care, ethics in nursing, human clone research, animal experimentation, genetic modification and so on are left unsolved. We sincerely hope that many ambitious researchers will endeavor in these areas of study.</p>	9043	
Tourism Studies	<p>The academic development of tourism studies complements the policy of promoting Japan as a tourism-oriented country from a scientific viewpoint. Until now, interdisciplinary scientific research on tourism has been carried out from diverse perspectives, such as, for example, “ecotourism”, “green” tourism, health tourism, “new” tourism (such as, for example, industrial and cultural tourism), the economic effects of tourism, the influence of tourism on regional communities and culture, town development and regional promotion through tourism, international tourism policy, the behavior and psychology of tourists, etc. These research topics have been extensively studied, in an interdisciplinary way, in every area of science, such as business administration, commercial science, economics, geography, sociology, psychology, civil engineering, urban engineering, architecture, environmental studies, etc. In each area, research activities on tourism have intensified.</p> <p>Nevertheless, in order to further the development of tourism studies academically, it is necessary to harmonize these dispersed research areas through interdisciplinary study.</p> <p>In this area, JSPS expects to promote the research activities ranging from basic theory concerning the original development of tourism studies to various kinds of applied research, in addition to the promotion of expansive research that entails a practical and academic approach, and that contributes to the development of those economic and social sectors engaged in tourism.</p>	9044	FY2011 — FY2013
Reliable environmental measurement methods	<p>In order to understand totally the relation between life and earth environment and to continue the reliable environment of the earth, it is required to develop a new measurement methods based on a new metrology. In this field, new measurement methods are developed to understand a safe life, a food safety, a medical safety, and a reliable environment. Especially, a super selective and wide dynamic range analytic method, a mobile and energy-saving measurement instrument, an imaging technique, super-selective analytical reagents, a new detection method of bio-related micro particle such as virus and pollen are highly required.</p> <p>In order to achieve the reliable environmental measurement methods, a wide approach is expected from medical, agricultural, pharmaceutical, environmental fields, in addition to scientific and engineering fields.</p>	9045	
epigenetics	<p>The regulation of gene expression is not achieved exclusively by the nucleotide sequence. The expression of genetic information is regulated by stable and yet plastic control mechanisms collectively referred to as epigenetics, that is, chemical and structural modifications of chromatin composed of genomic DNA and interacting proteins such as histones. Currently, epigenetics is a major research focus in the life sciences because of its demonstrated involvement in a wide variety of biological phenomena including embryogenesis, tissue-specific gene expression, genome imprinting, aging, tumorigenesis, neurodegenerative diseases and somatic cell cloning.</p> <p>JSPS is expecting ambitious research projects along these lines, which go beyond the frameworks of biological science disciplines such as genomics, molecular biology, cell biology, biochemistry, developmental biology, genetics and neuroscience, with the goal of elucidating the basic principles of epigenetics (operating principles, regulatory mechanisms and breakdown) commonly observed in the above-mentioned biological phenomena.</p>	9046	

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Integrated Nutrition Science	<p>Nutrition science has contributed greatly to health promotion and improvement of physical strength/shape through the understandings of physiology, nutrients, and metabolism necessary for growth and maintenance of life. However, new issues such as overeating, food satiation, lifestyle-related diseases, stress, and aging, have been emerged. Recent advances in life science and analytical informatics technology enabled new approaches in this field: molecules, cells, laboratory animals to human population can now be included for research design. In order for such expansion in nutrition science to accelerate, establishment of a cross-sectoral research community beyond the existing frame, including eating habits studies, applied health science, food science, and clinical medicine is required.</p> <p>The goal of this new research field is to contribute toward maintaining/promoting health, preventing diseases, and potentiating therapeutic effects in the complex and diverse modern society. A broad range of studies with aim to build the platform of nutritional science and put the accomplishment into practice is encouraged.</p> <p>Nutrition science has contributed greatly to health promotion and improvement of physical strength/shape through the understandings of physiology, nutrients, and metabolism necessary for growth and maintenance of life. However, new issues such as overeating, food satiation, lifestyle-related diseases, stress, and aging, have been emerged. Recent advances in life science and analytical informatics technology enabled new approaches in this field: molecules, cells, laboratory animals to human population can now be included for research design. In order for such expansion in nutrition science to accelerate, establishment of a cross-sectoral research community beyond the existing frame, including eating habits studies, applied health science, food science, and clinical medicine is required.</p> <p>The goal of this new research field is to contribute toward maintaining/promoting health, preventing diseases, and potentiating therapeutic effects in the complex and diverse modern society. A broad range of studies with aim to build the platform of nutritional science and put the accomplishment into practice is encouraged.</p>	9047	FY2011 — FY2013
Regenerative medicine	<p>Human beings are composed of many organs and various types of cells within. These cells must self-renew themselves even after birth as well as during development, to maintain the homeostasis of the organ and to maintain their life against various environmental stresses. Regenerative medicine intends to repair and regenerate the damaged tissue/organ by manually controlling the self-renewing system, which resides endogenously in the organisms. Three-step approach, which includes in vitro, in vivo, and translational researches, is required for clinical application of the regenerative medicine. Identification of the cell-type specific differentiation factor and the establishment of the cell-type specific protocol for effective differentiation and purification system using somatic stem cells, embryonic stem (ES) cells, and induced pluripotent stem (iPS) cells are the important goals of in vitro researches. Thereafter, in vivo approaches using laboratory animals is important to establish the method to deliver the cells and to keep them alive and functional at the damaged lesion, in order to re-organize the damaged organ within the living organisms. To reach the final goal toward the clinical application, in vitro and in vivo findings should be gathered and translated into clinical medicine. Immunologic problem, such as rejection, or the differences in the organ size between experimental animals and humans are the challenges that should be solved in translational researches.</p> <p>Development of tissue engineering technology is one of the helpful candidates for solving those problems. Regenerative medicine is expected to become a new hope for the patients of refractory disorders such as heart diseases and neurodegenerative diseases. Moreover, regenerative medicine could reduce the inflated healthcare cost, which is becoming a big economic issue in the advanced country, by improving the quality of life of the elderly in the graying society. We are eager for the challenging proposals that would greatly advance this field.</p>	9048	

(Note 1)

This table, in combination with the main table, applies only to “Scientific Research (C)”, screening division “General”.

(Note 2)

The set period is the fiscal year when the call for proposals is organized. Notwithstanding the set period, research projects of 3 to 5 years are being sought.