Research Center Network for Realization of Regenerative Medicine

Japan Science and Technology Agency

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Overview

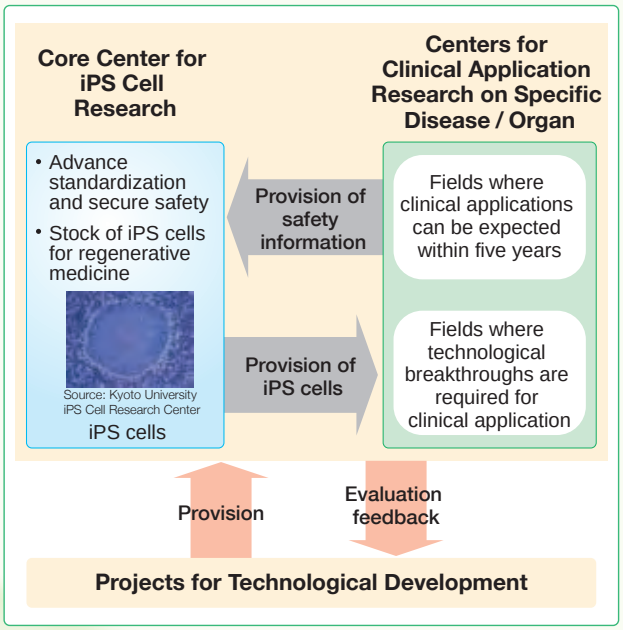
In regenerative medicine using iPS cells, a field where international competition is intensifying, JST promotes research and development for accelerating clinical applications, elucidating pathogenic mechanisms, and conducting drug discovery.

Core Center for iPS Cell Research
Centers for Clinical Application Research on Specific Disease/Organ
Projects for Technological Development

The Core Center for iPS Cell Research aims to build a stock of high-quality, safe iPS cells for use in regenerative medicine.

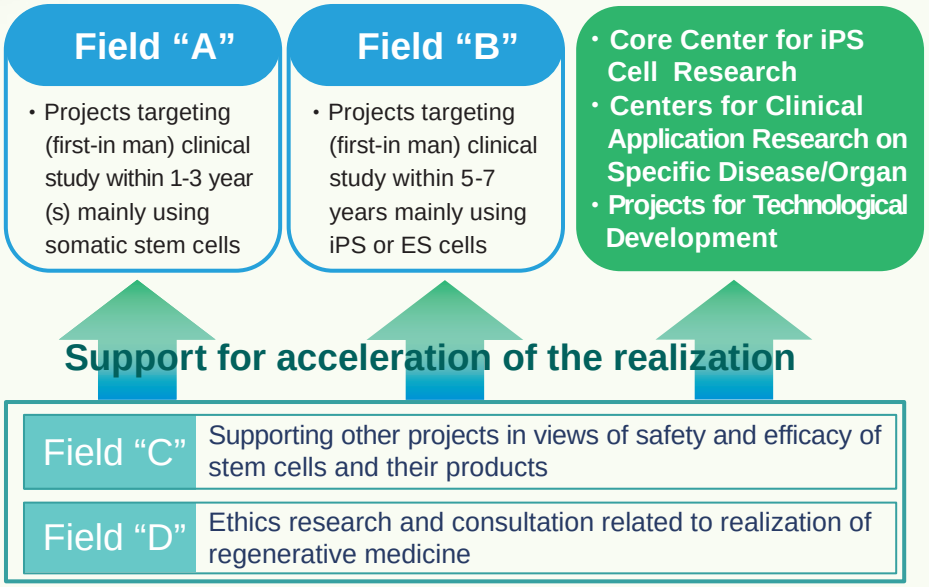
The Centers for Clinical Application Research on Specific Disease/Organ will perform research and development necessary for clinical applications in specific important diseases and organs, using iPS cells created by the Core Center for iPS Cell Research.

The Projects for Technological Development aim at technology development to expand the range of clinical applications of iPS cells and realize more advanced regenerative medicine while collaborating with the Centers.



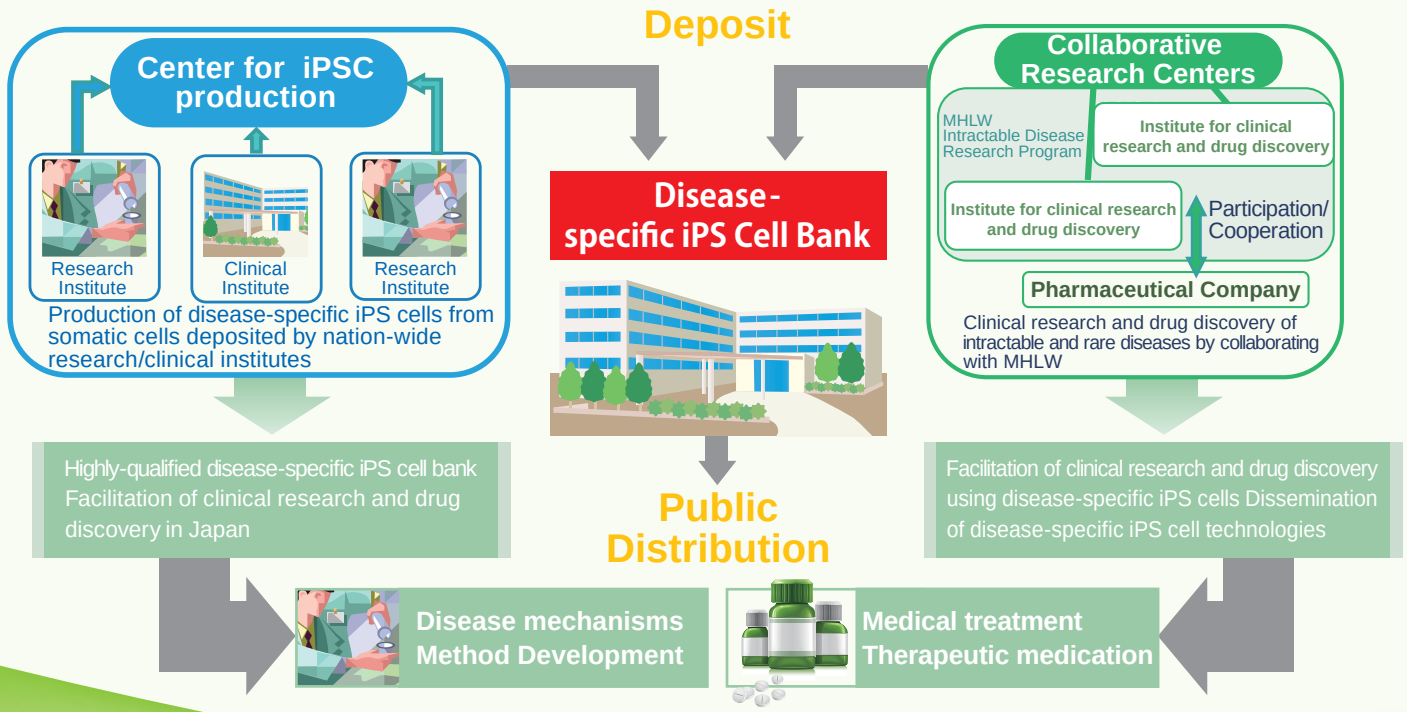
Highway Program for Realization of Regenerative Medicine

The Program aims at the earliest realization of regenerative medicine, where multiple ministries and agencies concerned support different phases.



The Program for Intractable Disease Research utilizing Disease-specific iPS Cells

The Program produces iPS cells from cells of patients. The iPS cells are used to elucidate pathogenic mechanisms, and to conduct drug-discovery research.



Research Centers/Projects

◆ Core Center for iPS Cell Research

First Year	Center	Director of the Center
FY2013	Center of Excellence in Development of iPS Cell Stock for Regenerative Medicine	Shinya Yamanaka (Director and Professor, Center for iPS Cell Research and Application, Kyoto University)

◆ Centers for Clinical Application Research on Specific Disease/Organ【Type A】

First Year	Center	Director of the Center
FY2013	Regenerative medicine for spinal cord injury and stroke using neural precursor cells of iPS cell origin	Hideyuki Okano (Professor, School of Medicine, Keio University)
FY2013	Development of cell replacement therapy using iPS cell-derived neural cells against Parkinson's disease and stroke	Jun Takahashi (Deputy Director and Professor, Center for iPS Cell Research and Application, Kyoto University)
FY2013	Research and development center for clinical application of complex tissue formation technologies to restore visual function	Masayo Takahashi (Project Leader, Center for Developmental Biology, RIKEN)
FY2013	Center for the development of myocardial regenerative treatments using iPS cells	Yoshiki Sawa (Professor, Graduate School of Medicine, Osaka University)

◆ Centers for Clinical Application Research on Specific Disease/Organ【Type B】

First Year	Center	Director of the Center
FY2013	Center for development of mucosal regenerative therapies for inflammatory bowel diseases using cultured intestinal epithelial stem cells	Mamoru Watanabe (Professor, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University)
FY2013	Center for development of innovative technologies for metabolic organs using induced pluripotent stem (iPS) cells	Hideki Taniguchi (Professor, Graduate School of Medicine, Yokohama City University)
FY2013	Center for development of cancer immunotherapy technology by regenerating natural killer T-cells (NKT cells)	Haruhiko Koseki (Group Director, Center for Integrative Medical Sciences, RIKEN)
FY2013	Center for development of regenerative therapies for cartilage diseases using induced pluripotent stem (iPS) -cell-derived chondrocytes	Noriyuki Tsumaki (Professor, Center for iPS Cell Research and Application, Kyoto University)
FY2013	Center for development of next-generation pancreatic islet transplantation methods based on induced pluripotent stem (iPS) cell technology	Atsushi Miyajima (Professor,Institute of Molecular and Cellular Biosciences, The University of Tokyo)

◆ Projects for Technological Development

First Year	Title	Principal Investigator
FY2013	Development of cell transplantation methods for refractory muscle diseases	Shin'ichi Takeda (Director, Translational Medical Center, National Center of Neurology and Psychiatry)
FY2013	Development of new diabetes treatments using human induced pluripotent stem (iPS) cells	Yoshiya Kawaguchi (Professor, Center for iPS Cell Research and Application, Kyoto University)
FY2013	Development of automated 3D suspension culture technology for its practical application in regenerative medicine	Katsumi Nakashima (Senior Manager, Marketing Division, Kawasaki Heavy Industries, Ltd.)
FY2013	Development of organ regeneration techniques and new transplantation methods, using stem cell packaging	Yuko Kitagawa (Professor, School of Medicine, Keio University)
FY2013	Development of culture substrates for stem cells	Kiyotoshi Sekiguchi (Professor, Institute for Protein Research, Osaka University)
FY2013	Generation of functional kidney cells and tissues from human induced pluripotent stem (iPS) cells towards development of regenerative medicine strategy for chronic kidney disease	Kenji Osafune (Professor, Center for iPS Cell Research and Application, Kyoto University)
FY2013	Establishment of a transplantable immunotolerant-cynomolgus macaque colony, and application to regenerative medicine	Kazumasa Ogasawara (Professor, Dept. of Pathology, Shiga University of Medical Science)
FY2013	Quantum-switching in vivo theranostics for induced pluripotent stem (iPS) cell differentiation and carcinogenesis	Yoshinobu Baba (Professor, Graduate School of Engineering, Nagoya University)
FY2013	Development of technology for rapid quantification of the heterogeneity of induced pluripotent stem (iPS) / differentiated cell populations with both single-cell and whole-transcriptome resolution	Itoshi Nikaido (Unit Leader, Advanced Center for Computing and Communication, RIKEN)
FY2013	Development of induced pluripotent stem (iPS) cell bulk culture platform for use in regenerative medicine	Hiromichi Kumagai (Fellow, Kumagai Fellow Laboratory, Research Center, Asahi Glass Co.,LTD.)
FY2013	Methods of cell-transdifferention technology based on defined factors, in order to regenerate heart function	Jun Takeuchi (Associate Professor, Institute of Molecular and Cellular Biosciences, The University of Tokyo)
FY2013	Development and commercialization of technologies for rapid, efficient, high-quality, and large-scale production of a variety of differentiated cells from pluripotent stem cells	Minoru Ko (Professor, School of Medicine, Keio University)
FY2013	Development of novel quality-evaluation techniques for regenerative medical agents derived from induced pluripotent stem (iPS) cells and somatic stem cells	Tomohiro Morio (Professor, Dept. of Pediatrics and Developmental Biology, Tokyo Medical and Dental University)
FY2013	Development of induced pluripotent stem (iPS) cell technologies utilizing pigs and other large mammals	Yutaka Hanazono (Professor, Division of Regenerative Medicine, Center for Molecular Medicine, Jichi Medical University)
FY2013	Development of human induced pluripotent stem cell culture apparatus toward mass manufacturing of regenerative medicine products	Katsuhisa Matsuura (Associate Professor, Institute of Advanced Biomedical Engineering and Science, Tokyo Women's Medical University)
FY2013	Development of inductive technologies for three-dimensional ectodermal organs including teeth, exocrine glands and other ectoderm-derived organs through regulations of epithelial and mesenchymal interactions	Takashi Tsuji (Team Leader, Center for Developmental Biology, RIKEN)
FY2013	Construction of resources for cell system-control gene expression for regenerative medicine	Naoki Goshima (Team Leader, Molecular Profiling Research Center for Drug Discovery, National Institute of Advanced Industrial Science and Technology)

FY2013	Development of methods for differentiation induction and transplantation of hypothalamic and pituitary hormone-producing cells, using human induced pluripotent stem (iPS) cells	Hidetaka Suga (Clinical Assistant Professor, Nagoya University Hospital, Nagoya University)
FY2013	Development of techniques for maintenance and amplification of hepatic stem/precursor cells derived from human induced pluripotent stem (iPS) cells toward hepatocyte transplantation	Hiroyuki Mizuguchi (Professor, Graduate School of Pharmaceutical Sciences, Osaka University)
FY2013	Development of angiogenesis control techniques for regenerative medicine	Nobuyuki Takakura (Professor, Research Institute for Microbial Diseases, Osaka University)

◆ Highway Program for Realization of Regenerative Medicine

Field A **Projects targeting clinical study in the short term**

First Year	Title	Principal Investigator
FY2012	Bone and cartilage regeneration using magnetic targeting system of magnetically labeled bone marrow mesenchymal cells	Mitsuo Ochi (Professor, Graduate School of Biomedical and Health Sciences, Hiroshima University)
FY2011	Development of methods for treating age-related macular degeneration by transplantation of retinal pigment epithelial (RPE) cells derived from induced pluripotent stem (iPS) cells	Masayo Takahashi (Project Leader, Center for Developmental Biology, RIKEN)
FY2011	Meniscal regeneration in the knee using synovial stem cells	Ichiro Sekiya (Director, Center for Stem Cell and Regenerative Medicine, Tokyo Medical and Dental University)
FY2011	Clinical application of corneal endothelial regenerative medicine by means of cultured human corneal endothelial cell transplantation	Shigeru Kinoshita (Professor, Graduate School of Medical Science, Kyoto Prefectural University of Medicine)
FY2011	Development of a less invasive liver regeneration therapy using cultured human bone marrow derived cells	Isao Sakaida (Dean and Professor, Graduate School of Medicine, Yamaguchi University)

Field B **Projects targeting clinical study in the medium to long term**

First Year	Title	Principal Investigator
FY2012	Development of and clinical studies on platelet preparations based on induced pluripotent stem (iPS) cell techniques	Koji Eto (Professor, Center for iPS Cell Research and Application, Kyoto University)
FY2011	Development of corneal regenerative treatment methods using iPS cells	Koji Nishida (Professor, Graduate School of Medicine, Osaka University)
FY2011	Establishment of regenerative therapies for severe heart failure by transplantation of iPS cells-derived cardiomyocytes	Keiichi Fukuda (Professor, School of Medicine, Keio University)
FY2011	Clinical research on human embryonic stem (ES) cell formulations for treatment of congenital metabolic disorders giving rise to severe hyperammonemia	Akihiro Umezawa (Deputy Director, Research Institute, National Center for Child Health and Development)

Field C **Supporting other projects in views of safety and efficacy of stem cells and their products**

First Year	Title	Principal Investigator
FY2011	Support for research and development with the aim of early-stage realization and overseas expansion of regenerative medicine	Akifumi Matsuyama (Director, Research on Disease Bioresources, Platform of therapeutics for rare disease, National Institute of Biomedical Innovation)

Field D **Ethics research and consultation related to realization of regenerative medicine**

First Year	Title	Principal Investigator
FY2011	Research on the ethical, legal and social implications related to regenerative medicine	Kaori Muto (Professor, Department of Public Policy, The Institute of Medical Science, The University of Tokyo)

◆ The Program for Intractable Diseases Research utilizing Disease-specific iPS cells

Center for iPSC production **Production of disease-specific iPS cells from somatic cells deposited by nation-wide research/clinical institutes**

First Year	Title	Principal Investigator
FY2012	Fundamental research to promote establishment of disease-specific induced pluripotent stem (iPS) cells	Shinya Yamanaka (Director and Professor, Center for iPS Cell Research and Application, Kyoto University)

Collaborative research **Clinical research and drug discovery of intractable and rare diseases**

First Year	Title	Principal Investigator
FY2012	Development of in vitro models with high-quality differentiated cells and tissues aiming at the pathogenesis and therapy for refractory diseases of the nervous and visual systems	Haruhisa Inoue (Professor, Center for iPS Cell Research and Application, Kyoto University)
FY2012	Research on intractable neurological diseases using disease-specific induced pluripotent stem (iPS) cell technology	Hideyuki Okano (Professor, School of Medicine, Keio University)
FY2012	Elucidation of the pathology of hereditary myocardial diseases, and development of treatment methods, using induced pluripotent stem (iPS) cells	Hiroyuki Morita (Acting Principal Investigator) (Project Associate Professor, Graduate School of Medicine, The University of Tokyo)
FY2012	Research on refractory musculoskeletal diseases using disease-specific induced pluripotent stem (iPS) cells	Junya Toguchida (Professor, Institute for Frontier Medical Sciences and Center for iPS Cell Research and Application (Deputy Director), Kyoto University)
FY2012	Establishment of disease-specific induced pluripotent stem (iPS) cells derived from refractory blood and immunological disease patients, and development of new medical treatment	Tatsutoshi Nakahata (Professor and Deputy Director of Center for iPS Cell Research and Application, Kyoto University)

Senior Program Director/Program Director(PD)/Program Officer(PO)

The Senior Program Director oversees the Network for efficient management as a whole, with flexible operations across Centers, Programs and Projects.
Program Directors and Program Officers oversee each of the Centers, Programs and Projects to assure timely progress toward research goals, whereby providing advice to research plans, enhancing collaboration between researchers, sharing research outputs and information within the Network.

Research Center Network for Realization of Regenerative Medicine		
Senior Program Director	Hidehiko Saito	Honorary Director, National Hospital Organization Nagoya Medical Center

Core Center for iPS Cell Research Centers for Clinical Application Research on Specific Disease/Organ (Type A/B) Projects for Technological Development		
PD	Hidehiko Saito	Honorary Director, National Hospital Organization Nagoya Medical Center
PO	Chihiro Akazawa	Professor, Graduate School of Health Care Sciences, Tokyo Medical and Dental University
PO	Takeo Katakura	Visiting Researcher,Division of Cell-Based Therapeutic Products, National Institute of Health Sciences

Highway Program for Realization of Regenerative Medicine		
PD	Ryosuke Takahashi	Professor, Graduate School of Medicine, Kyoto University
Associate PD	Mineo Kurokawa	Professor, Graduate School of Medicine, The University of Tokyo
PO	Takayuki Aoi	Designated Professor, Graduate School of Medicine, Kobe University

The Program for Intractable Diseases Research utilizing Disease-specific iPS cells		
PD	Shigeki Kuzuhara	Professor, School of Nursing, Suzuka University of Medical Science
PO	Kenichiro Kobayashi	Head of laboratory, Department of Pediatric Hematology and Oncology, Research Institute National Center for Child Health and Development
PO	Chihiro Akazawa	Professor, Graduate School of Health Care Sciences, Tokyo Medical and Dental University
PO	Kentaro Yoshimatsu	Senior Scientific Advisor, Eisai Product Creation Systems, Eisai Co., Ltd

Contact Us

Japan Science and Technology Agency (JST)
Department of Regenerative Medicine
K's Gobancho
7, Gobancho, Chiyoda-ku, Tokyo, 102-0076 Japan
Phone: +81-3-5214-8427 Fax: +81-3-5214-7810
E-Mail：saisei-nw@jst.go.jp
http://www.jst.go.jp/saisei-nw/en/

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