Keio University Graduate School of Medicine

- ***Stem Cell Medicine and Immunology Research Group***
- ***Cancer Research Group***

The Keio University Graduate School of Medicine boasts an excellent staff in these research fields. Their activities are supported by **the 21st Century Center of Excellence (COE) Program** of the Ministry of Education, Culture, Sports, Science and Technology of Japan.

Keio University is one of the Japan's leading private universities. Established in 1858 by Yukichi Fukuzawa (1835~1901), a pioneer figure in Japan's modernization, Keio now has nine faculties and ten graduate schools, with over 30,000 students. *www.keio.ac.jp/index-en.html*

Stem Cell Medicine and Immunology Research Group

www.coe-stemcell.keio.ac.jp

COE Program Title: Basic study and clinical application of human stem cell biology and immunology: Approaches based on the development of experimental animal models.

Program Leader: Hideyuki Okano
(Professor and Chairman of Physiology)

Research Program of COE: The COE program will be characterized by **I)** incorporation of basic biology, taking advantage of *Drosophila* genetics, into the medical area, **II)** development of *in vivo* experimental medicine using human cells and original animal models of human disease, and **III)** application of the results by the University Hospital that possesses state-of-the-art clinical capabilities. It will also establish an evaluation system that will enable the maintenance of high-level studies by introducing research projects.

Education Program of COE: The objective of the Education Program is to set up an education system and center to continuously foster and produce the next generation of excellent medical investigators according to the following activities.

- Monthly unpublished data presentations "COEX" for exchanging among young investigators and promotion of joint research
- "Bioethics Course" Seminars
- Improvement of a teaching assistant (TA) and research assistant (RA) system
- Fostering human resources with an international perspective
- A flow cytometry core facility as a stem cell isolation and support facility; training courses centered on stem cell biology will be held.

Members of COE : Basic study and clinical application of human stem cell biology and immunology

Members (Department)	Research Activity
Hideyuki Okano (Physiology)	Development and regeneration of CNS
Yasuo Ikeda (Internal Medicine)	Megakaryocyte development and platelet production
Toshio Suda (Cell Differentiation)	Mechanisms for the maintaining of "stemness"
Shigeo Koyasu (Microbiology and Immunology)	Studies on regulatory mechanisms of the immune system
Yasunori Okada (Pathology)	Extracellular metabolism in tissue repair and destruction
Yoshiaki Toyama (Orthopedic Surgery)	Neural stem cell transplantation for the injured spinal cord
Toshifumi Hibi (Internal Medicine)	Therapy of inflammatory bowel disease
Keiichi Fukuda (Advanced Cardiac Therapeutics)	Regeneration of cardiomyocytes
Masayuki Amagai (Dermatology)	Immunopathological mechanism of an autoimmune skin disease
Tatsuji Nomura (CIEA)	NOG mice and Marmosets as animal model for human disease
Norikazu Tamaoki (CIEA)	Disease model using NOG mouse reconstituted by human cells
Koichi Matsuo (Microbiology and Immunology)	Bone remodeling: interaction between osteoblasts and osteoclasts
Yasunori Yoshimura (Obstetrics and Gynecology)	Stem cell biology in the reproductive organ
Takao Takahashi (Pediatrics)	Development of cerebral cortex
Takayuki Ohira (Surgery)	Surgical treatment for involuntary movement disorders
Makoto Handa (Blood Center)	Basic and clinical researches for cell therapy using blood
Masataka Kuwana (Advanced Medical Research)	Selective immunotherapy for autoimmune diseases
Jun Hashimoto (Radiology)	Quantitative assessment of regional function of organs
Michisuke Yuzaki (Physiology)	Molecular mechanism of synapse reorganization in adnlt brain
Suketaka Momoshima (Radiology)	MRI-diagnosis of neural diseases
Yumi Matsuzaki (Physiology)	Isolation and transplantation of tissue-specific stem cells

Cancer Research Group

www.coe-cancer.keio.ac.jp

COE Program Title: Establishment of individualized cancer therapy based on comprehensive development of minimally invasive and innovative therapeutic methods.

Program Leader: Masaki Kitajima (Dean of Graduate School of Medicine)

Research Program of COE: Our goal is the formation of one of the world's leading state-of-the-art cancer therapy centers capable of strategically developing translational research that make full use of multidisciplinary treatment.

To achieve this goal, basic and clinical research is performed at the Center for Integrated Medical Research and at the University Hospital equipped with a GMP grade cell / vector production room, endoscopic / robot-assisted surgery training room, clinical sample preservation room, medical engineering room, along with up-to-date common research facilities.
The following 3 areas of research are integrated through monthly research meetings: Area 1: Establishment of diagnostic methods that enable individualized therapy (Leader: Michiie Sakamoto), Area 2: Development of minimally invasive therapy that integrates advanced technologies (Leader: Masaki Kitajima), Area 3: Development of new treatment methods (Leader: Yutaka Kawakami).

Education Program of COE: To train basic investigators capable of understanding clinical problems and clinicians who grasp new concepts for innovative cancer therapies, a cancer medicine curriculum that includes broad fields of cancer research ranging from the basics to clinical practice is provided.
The followings are currently being established to improve educational environment; an on-campus intramural LAN network; a teacting assistant (TA) and research assistant (RA) system; graduate education liaison by mutual recognition of course credits; graduate school liaison with off-campus research institutions; collaboration with the related industries through the Center's Research Park system; practical learning of the intellectual property and commercialization process; and international teleconferences and symposia.

The School of Medicine was established in 1917 inviting renowned microbiologist Shibasaburo Kitasato to be Dean. Keio has been involved in numerous areas of frontier research and is renowned for its wide-ranging exchange with scholars from overseas. **The Keio University Hospital** is one of the largest hospitals in Japan, handling 4,000 patients daily.

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Members of COE : Establishment of individualized cancer therapy based on comprehensive development of minimally invasive and innovative therapeutic methods

Member (Department) *area leader	Research activity
Michiie Sakamoto* (Pathology)	Comprehensive molecular analysis for cancer progression
Sadakazu Aiso (Anatomy)	Molecular mechanisms of cell differentiation
Shiro Nozawa (Obstetrics and Gynecology)	Diagnosis and treatment for gynecological cancers
Yusuke Tanigawara (Pharmacy)	Pharmaco-kinetics, -dynamics and -genomics
Tetsuro Kubota (Surgery)	Cancer chemosensitivity
Hirofumi Fujii (Radiology)	Minimally invasive diagnosis using radiopharmaceuticals
Masaki Kitajima* (Surgery)	Individualized minimally invasive treatments
Yasuhide Morikawa (Surgery)	Robotics and haptics for minimally invasive surgery
Kazuo Nakazawa (System Design Engineering)	Development of surgical manipulators
Ryohei Yozu (Surgery)	Minimally invasive cardiac surgery
Yuko Kitagawa (Surgery)	Minimally invasive treatments based on sentinel node concept
Hiroshi Nagata (Internal Medicine)	Diagnosis and therapy for lymph node metastasis
Tunenori Arai (Applied Physics)	Photodynamic diagnosis and therapy
Sachio Kuribayashi (Radiology)	CT-guided cryoablation, MRI diagnosis of metastatic lymph nodes
Koichi Kobayashi (Surgery)	Tumor oxygenation by artificial oxygen carrier for therapy
Yutaka Kawakami* (Advanced Medical Research)	Immunotherapy and gene therapy
Takeshi Kawase (Surgery)	Immuno-gene therapy for brain tumors
Masahiro Kizaki (Internal Medicine)	Molecular targeted therapy for hematological malignancies
Masaru Murai (Urology)	Molecular targeted therapy for urological malignancies
Masakazu Ueda (Surgery)	Cancer cell targeting therapy