

2016 - 2017
Graduate School of Biostudies, Kyoto University
Doctoral Program in “Global Frontier in Life Science”
Guidelines for International Student Admissions

Philosophy and Admission Policy of the Graduate School of Biostudies

The field of life sciences is transforming and evolving into an advanced branch of science that will build a future for humans. With this global trend as a backdrop, the Graduate School of Biostudies was established in 1999 as Japan’s first independent graduate school of biostudies with the aim of creating one of the world’s top research institutions and developing bioscientists who will lead the next generation in the biostudies field. With a set of such basic units of life as “cells,” “molecules,” and “genes” as a common language, the Graduate School of Biostudies is home to innovative research and education activities where concepts about diverse organisms and the environments that sustain them are integrated to create new values concerning the future and respect for life.

In response to diverse, social demands that call for an increasingly sophisticated and complex life sciences field, the Graduate School of Biostudies strives to develop the following human resources:

- 1) Researchers who explore and discover the basics of life, pursuing the cutting-edge field of biostudies at the highest level in the world;
- 2) Researchers and highly skilled engineers who contribute to society at public and private research institutions, endeavoring to protect the global environment and maintain human health, well-being, and fulfillment; and
- 3) Educators and highly skilled practitioners who possess broad knowledge of diverse vital phenomena of living organisms and contribute to society through education, industry, mass media, and the public sector.

In April 2011, the Graduate School of Biostudies launched “Global Frontier in Life Science”, a new educational program as a part of K.U. PROFILE (Kyoto University Programs for Future International Leaders: <http://www.opir.kyoto-u.ac.jp/kuprofile/e/index.html>). This program, “Global Frontier in Life Science”, is held entirely in English, including the entrance examinations, lectures, experiments and discussions.

The Graduate School of Biostudies seeks international as well as domestic students who hope to join this program. In particular, the School welcomes those who show a respect for life and a desire to create a comprehensive and cutting-edge area within the life sciences field beyond existing disciplinary boundaries.

Admission examinations for the Doctoral program in “Global Frontier in Life Science” consist of a documentation screening and an oral examination (interview) to evaluate applicants’ knowledge of their field, research competency, logical thinking skills, and the ability to discuss science in English. **Please note that applicants are NOT required to be physically present in Japan for the examination.**

The academic year starts on October 1, 2016 or April 1, 2017.

I. “Global Frontier in Life Science”

The Graduate Schools of Biostudies and Medicine offer “Global Frontier in Life Science”, a joint educational program for Doctoral and Master’s students as part of K.U. PROFILE (Kyoto University Programs for Future International Leaders: <http://www.opir.kyoto-u.ac.jp/kuprofile/e/index.html>). This program, “Global Frontier in Life Science”, is held entirely in English, including the entrance examinations, lectures, experiments, and discussions. In the Doctoral program, these two graduate schools hold independent entrance examinations for this program, and accept up to ten applicants in total.

II. Division/Laboratories and Enrollment

The Graduate School of Biostudies consists of two divisions, which are made up of 40 laboratories. Details of each laboratory are described on pp. 10-17 of these guidelines and the Graduate School of Biostudies’ website (<http://www.lif.kyoto-u.ac.jp/>). Applicants can apply for only one laboratory. **Thus, applicants must contact the lab head and fully discuss potential research activities and availability before filing the application.**

III. Eligibility Requirements for Applicants

Only persons currently falling into one of the following categories, or anticipated to do so as of September 30, 2016, will be eligible to apply:

- (1) Those who have a master's degree, a master's-level professional degree, or a juris doctor (JD) degree
- (2) Those who have completed a program equivalent to the Graduate School's master's program or professional degree program in a foreign country
- (3) Those who, by taking relevant courses via a correspondence program offered by a school in a foreign country, have completed a program equivalent to the University's master's program or professional degree program
- (4) Those who have completed a graduate school program (i.e., one that is equivalent to the University’s master's program or professional degree program) of a foreign university that is accredited under the educational system of the respective foreign country as offering graduate school programs and which is designated by the Minister of Education, Culture, Sports, Science and Technology (hereinafter referred to as the "Minister")
- (5) Completion of a curriculum at the United Nations University (under the provisions of Paragraph 2 of Article 1 of the Act on Special Measures Incidental to Enforcement of the Agreement between the United Nations and Japan regarding the Headquarters of the United Nations University, Act No. 72 of 1976), and receipt of a degree equivalent to a Master’s Degree.
- (6) Applicants who have passed a Qualifying Examination (QE) or equivalent assessment at an institution in another country, and are recognized by Kyoto University as having academic ability on a par with or higher than that of a person with a master's degree. SEE IV. Eligibility Screening under Requirement (6))

- (7) Those who have been designated by the Minister (Notification No.118 [1988] of the Ministry of Education)
- i) Those who have graduated from a university and who have subsequently spent at least two years conducting research at a university, research institute, or other such institution, and are recognized by the Graduate School as having a scholastic ability on par with or higher than that of those with a master's degree for achievement of said research.
 - ii) Those who have completed sixteen years of school education by attending classes in a foreign country or by taking correspondence courses of a school in a foreign country, and who have subsequently spent at least two years conducting research at a university, research institute, or other such institution, and are recognized by the Graduate School as having a scholastic ability on par with or higher than that of those with a master's degree for achievement of said research.
- (8) Those who are recognized by the Graduate School as having a scholastic ability on par with or higher than that of those falling into (1) above as a result of the individual eligibility screening, and who have reached 24 years of age, including those who have graduated from a six-year university.

IV. Eligibility Screening under Requirement (6)

Those who intend to apply under requirement (6) above are subject to screening prior to acceptance of their applications. Please contact the Student Affairs Section (Kyomu gakari) of the Graduate School of Biostudies to request that the designated application form for preliminary eligibility screening to be sent at any time, but no later than April 14 (Thu), 2016. The documents below must be submitted to the Student Affairs Section (Kyomu gakari) of the Graduate School of Biostudies by 5:00 pm, April 21 (Thu), 2016.

When mailing, use registered mail and mark "For eligibility screening for application to Doctoral Program in Global Frontier in Life Science" in red on the envelope. The required documents must be received by 5:00 pm, April 21 (Thu), 2016. The eligibility screening results will be sent to the applicant by e-mail as soon as the decision is made, at the latest on May 11 (Wed), 2016.

Documents to be submitted for Eligibility Screening under requirement (6)

(1) Eligibility Screening Application Form	Use the designated form.
(2) Certificate that the Applicant has passed the examination	Please submit the notarized copy of original document endorsed by the president registrar of the examining institution.
(3) Documents which detail the examination procedure and qualifying criteria of the Qualifying Examination (QE) or equivalent assessment	Any format is acceptable.
(4) Academic transcript of a program equivalent to a master's program	Please submit the original of the document

which the applicant has completed	
(5) The curriculum details of a program equivalent to a master's program which the applicant has completed	In the application form, write down the e-mail address for receiving screening results.

V. Eligibility Screening under Requirement (7) or (8)

Applicants filing under eligibility requirement (7) or (8) above are required to contact the Student Affairs Section (Kyomu gakari), to obtain the following documents for preliminary eligibility screening at any time, but no later than April 14 (Thu), 2016 and submit them by April 21 (Thu), 2016. The eligibility screening results will be sent to the applicant by e-mail as soon as the decision is made, at the latest on May 11 (Wed), 2016.

Documents to be submitted for eligibility screening under requirement (7) or (8)

(1) Eligibility Screening Application Form	Use the designated form.
(2) Academic transcript	Submit an academic transcript prepared and sealed by the university that you last attended. (The transcript does not need to be sealed if it is made of a material that prevents photocopying.)
(3) Research progress report	Use the designated form. Present a brief, objective statement on the progress of your research in your field of specialization.
(4) Details of previous studies or letter of recommendation	Submit details of previous studies in the designated format and sealed by the institution to which you belong. Those who cannot receive said certificate of details, such as graduates from a six-year university or those who are expected to graduate from a six-year university by September 30, 2016, can submit a letter of recommendation prepared in the designated format and sealed by a research supervisor.
(5) E-mail address for receiving screening results	In the application form, write down the e-mail address for receiving screening results.

VI. Application Fee

Application fee: 10,000 yen

Payment period: From May 12 (Thu) to May 19 (Thu), 2016

Only payments marked as made within this period will be valid; those made outside this period will be invalid. Those who are expected to complete Graduate Schools' master's programs in Kyoto University do not have to pay the application fees.

Note: In the event that the principal household supporter of applicant was afflicted by the east Japan great earthquake in the Disaster-Relief-Law application area in March, 2011 and can receive the "certificate of victim", etc., the applicant may be exempted from the admission fee. Contact the Student Affairs Section (Kyomu gakari) by May 6 (Fri), 2016, if it is applicable.

[Payment method]

1. Payment by Credit Card (only for applicants residing outside Japan).

Applicants residing outside Japan should pay the application fee (10,000 yen) with your JCB, AMEX, VISA, or Master Card. It is possible to use a card which carries a name different from that of the applicant. (i.e., applicant's parents). Please access the following web site and follow the instructions (<https://e-shiharai.net/english/>). The "Application Completed" page must be printed out and submitted.

2. Payment by bank transfer (only for applicants residing inside Japan).

Applicants residing inside Japan should pay the application fee (10,000 yen) by bank transfer with the following procedures.

- 1) **Enter the applicant's name in the appropriate spaces (three spaces) on the Application Fee Payment Request Form (available upon request via regular mail). Take the form to a bank without separating any of its portions (payment through the post office or Japan Post Bank is not available) and make your payment. Please note that payment via ATM or the Internet is not accepted.**
- 2) No transfer fee is charged if payment is made at the head office or a branch office of Sumitomo Mitsui Banking Corporation. If payment is made at any other bank, you shall be responsible for the cost of transfer.
- 3) After making your payment, make sure that the bank's receipt seal is stamped on the "Evidence of Application Fee Payment" and the "Application Fee (and Transfer Fee) Receipt" returned from the bank. Paste the Evidence of Application Fee Payment (left portion) on the "Form for Affixing Evidence of Application Fee Payment." Please retain the copy of the Application Fee (and Transfer Fee) Receipt with revenue stamp attached for your records.

Note: Once received, application fees will not be refundable under any circumstances.

VII. Application Documents

(1) Admission application form, photograph card, examination card	Use the provided form. Fill in the blanks and paste a photo to each of the two indicated places. Make sure the photos present your full-face and frontal view, without a hat or cap, and are taken within the past three months.
(2) Title of research project and its outline	Provide the title and a summary of the research project that you have conducted on one or two sheets of A4-or letter-size paper. The writing must be written horizontally (in English).
(3) Research Achievement (Questions for Application Screening)	Use the provided form. Fill in the boxes in the designated form. Do not exceed to write expanding the original size of the boxes. The sizes are fixed. Please write in Times New Roman 12 point.
(4) Academic transcript	Submit an academic transcript prepared and sealed by the graduate school that you are currently attending or have graduated from. Those who have been recognized as being eligible to apply by the eligibility screening process do not have to submit the transcript. (The transcript does not need to be sealed if it is made of a material that prevents photocopying.)
(5) Certificate of completion (or certificate of expected completion)	Submit a certificate of (expected) completion prepared by the graduate school that you belong to or have graduated from. Those who have graduated from a six-year university need to submit a graduation certificate (or certificate of expected graduation) prepared by the university.
(6) Graduation certificate	Submit a copy of your graduation certificate (e.g., diploma) prepared by the university or faculty you have graduated from.
(7) Recommendation letters	Written by the applicant's supervisors in the university.
(8) A valid score for IELTS or TOEFL	Unnecessary for English-native speakers (Please contact the Student Affairs Section in advance.)
(9) Evidence of Application Fee Payment Form	Applicants residing outside Japan: After paying your application fees via internet, the "Application Completed" page must be printed out and submitted. Applications will not be accepted if payment could not be confirmed. Applicants residing inside Japan: After paying your application fees at a bank, paste the Evidence of Application Fee Payment with the bank's receipt seal stamped. Applications will not be accepted if no receipt seal is stamped on the Evidence of Application Fee Payment form.

Note: Those who are expected to complete a master's programs in a graduate school of Kyoto University do not need to submit this form.

(10) Application approval	<p>Applicants belonging to a governmental or private organization who wish to be admitted to the Graduate School while taking administrative leave from their organization need to submit the form provided indicating approval for submitting an application and prepared by the department director or the organization's representative.</p> <p>Applicants belonging to a governmental or private organization who do not submit the approval will not be admitted until after they quit the organization, even if they have passed the enrollment examinations.</p> <p>*The application approval form will be provided upon request.</p>
(11) Address for further communication	<p>Use the designated forms.</p> <p>For further communication on the examination results and the enrollment procedures, clearly write your name, address and post code (for March 2016) on the designated form.</p> <p>*If you change your address after applying, you must promptly inform the new address to the Student Affairs Section (Kyomu gakari) of the Graduate School of Biostudeis.</p>

VIII. Application Procedures

Applicants must prepare a packet of all necessary admission application documents and submit it to the address shown on pp.9. When mailing the packet, use registered mail and write "Admission Application Form for the Graduate School of Biostudies Doctoral program of Global Frontier in Life Science" in red ink on the front of the envelope.

IX. Application Period

The application period is from May 12 (Thu) to May 20 (Fri), 2016.

When submitting in person: office hours are 9:00 a.m. – 12:00 p.m. and 1:00 p.m. – 5:00 p.m. When mailing the application documents, ensure that the application documents are delivered by 5:00 p.m. on May 20 (Fri), 2016.

Note that the admission application form will not be accepted if the Evidence of Payment for Application Fees with the bank's receipt seal stamped is not pasted on the Form for Affixing Evidence of Payment for Application Fees.

X. Examination Schedules

May 30 (Mon) ~ June 10 (Fri)	Documentation Screening Only successful applicants who pass the screening of the admission documents will be able to take the interview (Oral Examination).
June 20 (Mon) ~ July 15 (Fri)	Interview (Oral Examination) The interview date and method* will be arranged individually after the decision is made. *e.g. Skype or other protocols

XI. Announcement of Successful Applicants

The list of successful applicants is scheduled to be posted on a bulletin board on the 1st floor of the South Campus Research Bldg. (Faculty of Medicine Bldg. G) at approximately 5:00 p.m., July 27 (Wed), 2016. Simultaneously, the same list will be posted on the web site of the Graduate School of Biostudies (<http://www.lif.kyoto-u.ac.jp/e/>). Telephone inquiries about the selection results shall not be accepted.

XII. Admission Fee and Tuition

Admission Fee 282,000 yen (tentative)

Note: Those who are expected to complete a Master's program in a graduate school of Kyoto University do not need to pay this fee.

The admission fee amount may be revised at the time of enrollment.

Tuition 267,900 yen for the first semester (annual tuition: 535,800 yen)

Note: The tuition amount may be revised at the time of enrollment or later.

XIII. Notes

- (1) After the application is accepted, no changes are allowed in any of the application items. Furthermore, once received, application fees will not be refundable under any circumstances.
- (2) Applicants with physical disabilities (degree of physical disability as stipulated in the enforcement ordinance of the School Education Law) who require special arrangements for taking examinations or attending courses should immediately contact the Student Affairs Section (Kyomu gakari).
- (3) **For applicants residing inside Japan:** To request **the Application Fee Payment**

Request Form or the **Admission Guidelines**, write your post code, address, and name on a self-addressed 240 mm x 332 mm-sized envelope, and affix 250-yen postage to the self-addressed envelope. Write “Request for **Application Fee Payment Request Form**” or the **Admission Guidelines of the Graduate School of Biostudies’ Doctoral program of Global Frontier in Life Science** in red ink on the front of an envelope, place the self-addressed envelope inside, and send it to the address where the application is to be sent (see below). The **Application Fee Payment Request Form** or the **Admission Guidelines** will be sent together with an outline of the Graduate School of Biostudies.

- (4) The instructions for enrollment procedures will be emailed and sent by an international courier to each successful applicant in late July 2016. For those who will enroll in April, 2017, they will be informed in early February, 2017.

[Handling of Personal Information]

Personal information provided in application documents will be handled in accordance with “Kyoto University’s Rules regarding the Protection of Personal Information.”

<**Where to Send Your Application**>

Student Affairs Section (Kyomu gakari) of the Graduate School of Biostudies,
Kyoto University
Yoshidakonoe-cho, Sakyo-ku, Kyoto 606-8501, Japan
Phone: +81-75-753-9424
Fax: +81-75-753-9229
E-mail: 150kyomu@adm.lif.kyoto-u.ac.jp

December, 2015

Graduate School of Biostudies, Kyoto University
<http://www.lif.kyoto-u.ac.jp/e/>

Research Fields and Contents of Research – December, 2015

Division of Integrated Life Science		
Laboratory	Faculty members	Contents of the research
Chromosome Transmission	Y. Nakaseko	<p>Our research is focused on the cell cycle regulation of eukaryotic cells. Using fission yeast as a model system, regulation of chromosome segregation and separation during mitosis has been studied. We are trying to identify individual genes involved in these steps and to elucidate the functional networks of these genes.</p> <p>Email: nakaseko@lif.kyoto-u.ac.jp</p>
Gene Biodynamics	H. Shiraishi	<p>We investigate the growth, morphogenesis, and evolution of photosynthetic microorganisms. We currently focus on developing molecular genetic tools for the analysis and genetic manipulation of an alkalophilic filamentous cyanobacterium <i>Arthrospira</i> (<i>Spirulina</i>).</p> <p>Email: siraisi@lif.kyoto-u.ac.jp</p>
Cell Cycle Regulation	F. Ishikawa T. Miyoshi M. Sadaie	<p>This laboratory focuses on the question how eukaryotic chromatin dynamically responds to various stresses during the cell cycle, differentiation, aging, and cancer development. We specifically dissect cellular responses to telomere dysfunction, low-dose environmental stresses, and genome insertion of retrotransposon. These efforts will shed light on how cancer cells acquire malignant phenotypes in the clonal evolution.</p> <p>Email: fishikaw@lif.kyoto-u.ac.jp</p>
Cell Recognition and Pattern Formation	T. Uemura T. Usui Y. Hattori	<ol style="list-style-type: none"> 1. Nutri-developmental biology 2. Neuroscience <p>We are interested in mechanisms that control animal development and behaviors in response to two categories of environmental inputs: nutrition and sensory stimuli. We are studying genetic programs for dietary responses of ecologically distinct <i>Drosophila</i> species that have different dietary preferences. We are also focusing on how developing neurons cope with nutritional restriction by using one subclass of <i>Drosophila</i> somatosensory neurons. By using the</p>

		<p>same neuronal subclass, we are dissecting operating principles of neuronal circuits that evoke selective behavioral outputs in response to sensory stimuli. To conduct these studies, we introduce a variety of molecular, cellular, genomic, imaging, and physiological approaches.</p> <p>Email: tauemura@lif.kyoto-u.ac.jp</p>
Signal Transduction	E. Nishida Y. Miyata M. Kusakabe	<p>Elucidation of signal transduction pathways that regulate cell proliferation, cell differentiation, developmental processes, and life span</p> <p>Email: nishida@lif.kyoto-u.ac.jp</p>
Plant Molecular Biology	T. Kohchi R. Nishihama S. Yamaoka	<ol style="list-style-type: none"> 1. Photomorphogenesis and environmental regulation of plant development 2. Comparative genomics and molecular genetics with the liverwort, <i>Marchantia polymorpha</i> 3. Genomic and post-genomic analyses of <i>Marchantia polymorpha</i> <p>Email: tkohchi@lif.kyoto-u.ac.jp</p>
Biosignals and Response	M. Nagao T. Kambe Y. Miyamae	<ol style="list-style-type: none"> 1. Screening for discovery of bioactive natural products. 2. Elucidation of the cellular functions of zinc transporters, ZIPs, and ZnTs <p>Email: mnagao@kais.kyoto-u.ac.jp</p>
Applied Molecular Microbiology	H. Fukuzawa T. Yamano M. Kajikawa	<p>We are focusing on the molecular bases of biological functions of photosynthetic microorganisms contributing to production of food, carbon-neutral renewable bio-energy and industrial materials, and also to environmental remediation by photosynthesis. Especially we employ a green alga, <i>Chlamydomonas reinhardtii</i>, as a model eukaryotic microorganism using its genome information, mutants, and molecular or biochemical techniques. The current projects are (1) Molecular characterization and modification of the carbon-concentrating mechanism supporting photosynthetic carbon fixation, energy production, and cell proliferation, (2) Elucidation of regulatory network systems controlling photosynthesis by sensing environmental factors including changes of levels in CO₂ concentration and light, (3) Elucidation and engineering of metabolic pathways for production of neutral lipids, hydrocarbons, and carbohydrates</p>

		<p>under specific culture conditions, (4) Molecular control and signaling of sexual reproduction by nutrient starvation.</p> <p>Email: fukuzawa@lif.kyoto-u.ac.jp</p>
Molecular Biology of Bioresponse	T. Katayama S. Masuda T. Kato	<p>1. Our aim is to decipher the molecular mechanism underlying the symbiotic relationship between gut microbes and host, and to develop food-and health-oriented application research.</p> <p>2. To elucidate the mechanism of mRNA processing, export and quality control in the nucleus in human and its industrial applications.</p> <p>Email: takane@lif.kyoto-u.ac.jp</p>
Plant Developmental Biology	T. Araki M. Endo M. Niwa	<p>We are interested in molecular mechanisms underlying plant responses to the environment. Plants have evolved plastic developmental programs, with both a genetic and epigenetic basis, to adapt their sessile mode of life to a changing environment. Using an angiosperm, <i>Arabidopsis thaliana</i> and a liverwort, <i>Marchantia polymorpha</i> as model systems, we are investigating:</p> <p>(1) regulation of growth phase transition (especially, flowering) and aging in response to environmental and endogenous signals, (2) long-distance systemic signaling in control of development, (3) tissue-specific roles of circadian clock for optimal environmental responses, (4) sexual reproduction processes, and (5) origin and evolution of regulatory systems for plastic development.</p> <p>Email: taraqui@lif.kyoto-u.ac.jp</p>
Plasma Membrane and Nuclear Signaling	S. Yoshimura M. Kumeta	<p>Our laboratory studies dynamic properties of proteins and large protein complexes in cellular environments by using a variety of techniques in biochemistry, molecular biology and cellular biology, in combination with nano-technology and computational simulation. Specific research topics include: (1) structural dynamics of flexible and repetitive proteins in intracellular environments, (2) in vivo imaging of assembly and disassembly of a large protein complex, (3) single-molecule imaging of higher-order architectures of nucleoprotein complexes.</p> <p>Email: yoshimura@lif.kyoto-u.ac.jp</p>

Genome Maintenance	T. Matsumoto K. Furuya	<p>The spindle checkpoint is a unique negative feedback that converts/amplifies a physical signal sensed by kinetochores (attachment of the spindle and/or tension), and regulates the timing of sister chromatid separation for equal chromosome segregation. Mad2, a signal carrier of this feedback, plays a vital role in the spindle checkpoint. It is specifically localized at unattached kinetochores that are the origin of the checkpoint signal. Mad2 targets CDC20 and inhibits its activity to promote sister chromatid separation. We study Mad2, a central player of the spindle checkpoint, to reveal mechanisms which regulate the activity of Mad2.</p> <p>Email: tmatsumo@house.rbc.kyoto-u.ac.jp</p>
Nanobiology	Y. Harada	<p>Using a highly sensitive optical microscope system, individual protein molecules, labeled with a fluorescent dye or micrometer-sized bead, are visualized and their location and movement are measured in real time with high precision and sensitivity in order to elucidate their dynamics.</p> <p>Email: harada-g@icems.kyoto-u.ac.jp</p>
Developmental Neurobiology	M. Kengaku	<p>We study the molecular and cellular mechanisms of cortical lamination and functional wiring of neurons in the brain. We also aim to develop imaging techniques for real-time observation of molecular and cellular dynamics controlling cell motility in the developing brain.</p> <p>Email: kengaku@icems.kyoto-u.ac.jp</p>
Molecular and Cellular Immunology	T. Fujita H. Kato	<p>Virus infections such as influenza A epidemic and Chronic Hepatitis B virus infection are still important diseases, and outbreaks of newly emerging viruses are serious problems for modern society. Higher animals, including humans, are genetically equipped with mechanisms, collectively known as innate immunity, to counteract viral infections. The purpose of our project is to clarify the molecular mechanism underlying antiviral innate immunity regulated by RIG-I, a cytoplasmic sensor for viral RNA, and to develop new diagnostic and therapeutic tools for viral infections.</p> <p>Email: tfujita@virus.kyoto-u.ac.jp</p>

Developmental Dynamics	R. Kageyama T. Otsuka T. Kobayashi	We analyze the molecular mechanism of embryonic development by using imaging, optogenetics and transgenic mouse technologies. We evaluate mathematical modeling to understand the principles of developmental dynamics. Email: rkageyam@virus.kyoto-u.ac.jp
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Division of Systemic Life Science		
Laboratory	Faculty members	Contents of the research
Single-Molecule Cell Biology	N. Watanabe S. Yamashiro H. Mizuno	By using high-resolution live-cell fluorescence Single-Molecule Speckle (SiMS) microscopy and our new multi-target high-density labeling super resolution microscopy IRIS, we are trying to bridge the gap between molecular behavior and cell/body functions including mechanotransduction, cancer invasion, tissue remodeling and drug response. E-mail: watanabe.naoki.4v@kyoto-u.ac.jp
Bioimaging and Cell Signaling	M. Matsuda M. Imajo N. Komatsu	We are visualizing the growth signal transduction cascades in living cells by using probes based on the principle of Foerster resonance energy transfer (FRET). The FRET biosensors are extremely powerful to visualize the spatio-temporal regulation of signal transduction networks within cells and to analyze the activities of individual cells within tissues. These FRET videos are also processed to extract parameters that characterize the property of each signaling molecule. We use these parameters obtained in living cells to build kinetic simulation models of growth signal transduction cascades. Email: matsudam@lif.kyoto-u.ac.jp
Molecular and Cellular Biology	S. Yonehara K. Sakamaki K-K. Lee	Our main research project is to understand 1) the intracellular signal transduction mechanism of cell death including apoptosis and caspase-independent novel types of cell death, and 2) the biological significance/physiological role of cell death and cell death-regulating molecules that play a key role in tumorigenesis or the immune system. Email: yonehara@lif.kyoto-u.ac.jp
Molecular Cell Biology and	F. Matsuzaki	1. To study mechanisms by which cell polarity and asymmetric division generate cellular diversity.

Development		<p>2. To explore genetic and epigenetic programs, which neural stem cells undertake for brain development and maturation, using mouse and Drosophila as model organisms.</p> <p>Email: fumio@cdb.riken.jp</p>
	T. Imai	<p>We are interested in how chromosomes behave in time and space to archive correct chromosome segregation during meiosis in mammalian oocytes. Taking advantage of our live imaging technology, we conduct comprehensive quantitative analysis of the chromosome dynamics.</p> <p>Email: imai@cdb.riken.jp</p>
	T. Kitajima	<p>We are interested in how chromosomes behave in time and space to archive correct chromosome segregation during meiosis in mammalian oocytes. Taking advantage of our live imaging technology, we conduct comprehensive quantitative analysis of the chromosome dynamics.</p> <p>Email: tkitajima@cdb.riken.jp</p>
Molecular Neurobiology	M. Negishi H. Katoh	<p>Molecular mechanisms of neuronal functions, especially the regulation of neuronal cell morphology by G proteins.</p> <p>Email: mnegishi@pharm.kyoto-u.ac.jp</p>
Genetics	T. Igaki S. Ohsawa M. Enomoto	<p>Our research focuses on the molecular basis of cell-cell communication that governs tissue growth, homeostasis, and cancer. We take advantage of the powerful genetics of Drosophila.</p> <p>Research subjects:</p> <ol style="list-style-type: none"> 1. Mechanism of cell competition 2. Genetic basis of tissue growth regulation 3. Molecular basis of tumor progression and metastasis <p>Email: igaki@lif.kyoto-u.ac.jp</p>
Functional Biology	K. Kakizuka H. Imamura N. Sasaoka	<p>Using animal models of human diseases, such as neurodegenerations, cancers, and obesity-related diseases, and using metabolic imaging techniques, we aim to elucidate molecular bases of such diseases and develop new strategies to cure or prevent them.</p> <p>Email: kakizuka@lif.kyoto-u.ac.jp</p>
Chromosome Function and Inheritance	P. Carlton	<p>We study how genetic information is correctly maintained and passed on through cell divisions. Combining molecular genetic approaches with</p>

		<p>advanced microscopy and quantitative imaging, we focus on mechanisms of chromosome pairing and recombination in meiosis in the nematode <i>C. elegans</i>, as well as epigenetic modification of chromatin during the mammalian DNA damage response.</p> <p>Email: pcarlton@icems.kyoto-u.ac.jp</p>
Cell Regulation and Molecular Network	M. Sugita D. Morita	<p>Host immune responses to lipid antigens in cancer and microbial infection.</p> <p>Email: msugita@virus.kyoto-u.ac.jp</p>
Viral Oncology	K. Tomonaga M. Hijikata T. Honda	<p>The main purpose of this laboratory is to clarify the molecular mechanisms of pathogenesis caused by the infection of RNA viruses. Molecular and cellular biological analyses of the viral life cycle and effects of viral infection on cellular events are under investigation.</p> <p>Email: tomonaga@virus.kyoto-u.ac.jp</p>
Cell Division and Differentiation	F. Toyoshima S. Matsumura Y. Oda	<p>Alignment of the cell division axis along the predetermined cortical cues plays an essential role in asymmetric stem cell division, cell differentiation, stem cell self-renewal and embryogenesis. Our group seeks to explore the molecular mechanisms underlying the determination of cell division axis in both culture cells and mammalian tissues. We are interested in how these mechanisms contribute to cell differentiation and tissue homeostasis.</p> <p>Email: ftoyoshi@virus.kyoto-u.ac.jp</p>
Genetic Information	A. Shimizu	<p>The major goal of research in this laboratory is to understand the molecular and cellular mechanisms underlying highly systemic functions of living things, such as immune and neural systems. For this purpose, structure and regulation of genetic information responsible for such systemic functions are being analyzed using model animals, for example transgenic or gene-disrupted mice. Our research is focused on the following subjects:</p> <ol style="list-style-type: none"> 1. Analysis of molecular mechanisms and regulation of chromatin modification, gene expression, gene rearrangements and RNA processing during lymphocyte differentiation. 2. Making and characterization of mouse models of immunodeficiency or autoimmune disease by introduction of, or targeted disruption of interleukin,

		<p>immunoglobulin or other genes.</p> <p>3. Analysis of molecular and cellular mechanisms for lymphocyte mobility and formation of the Immune-microenvironment during development and the immune reaction.</p> <p>Email: shimizu@virus.kyoto-u.ac.jp</p>
Bio-functions Biomaterials	Y. Tabata M. Yamamoto J. Jo	<p>Elucidation of bio-functions and research & development of biomaterials for life-science and medicine.</p> <p>Email: yasuhiko@frontier.kyoto-u.ac.jp</p>
Cellular and Molecular Biomechanics	T. Adachi Y. Inoue Y. Kameo	<p>We aim to clarify the mechanisms by which cells sense mechanical stimuli and regulate their activities in tissue adaptation, regeneration and stem cell differentiation in morphogenesis. Based on multiscale biomechanics, our group is involved in the integrated biomechanics and mechanobiology researches of modeling and simulation combined with experiments, focusing on mechano-biochemical couplings in the system dynamics.</p> <p>Email: adachi@frontier.kyoto-u.ac.jp</p>