Symposia

**Symposium 1 : Current Fronteers in Cell and Developmental Biology**

DATE: June 7 (Thu) 16:10-18:40 Room A
Chairpersons: Akihiro Harada (Osaka Univ.)
Shigeo Hayashi (RIKEN BDR)

With the rapid development of big data sciences, biological science that has been driven by the question-driven approach is now facing the challenge of setting new goals of broader perspective. In this symposium we invited distinguished speakers active at the forefront of cell and developmental biology covering from biogenesis of cellular organelles to morphological evolution of animal forms. He hope this opportunity serves audience to look back the past achievements and to explore future challenges.

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<td>16:10-16:15</td>
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<td><strong>S01-01</strong> 16:15-16:43</td>
<td>Deconstruction and reconstruction of cell polarity networks</td>
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<td>Fumio Motegi\textsuperscript{1,2,3}, Ziyin Han\textsuperscript{1,3}, Ravikrishna Ramanujam\textsuperscript{1}, Shyi-chyi Wang\textsuperscript{1}, Tricia Yu Feng Low\textsuperscript{1}, Yen Wei Lim\textsuperscript{1,3}, Peng Zhao\textsuperscript{1,3} (Temasek Life-sciences Laboratory\textsuperscript{1}, Mechanobiology Institute\textsuperscript{2}, Department of Biological Sciences, National University of Singapore\textsuperscript{3})</td>
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<td><strong>S01-02</strong> 16:43-17:11</td>
<td>Toward understanding the molecular mechanism of sexual fate decision in murine germ cells.</td>
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<td>Yumiko Saga (National Institute of Genetics)</td>
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<td><strong>S01-03</strong> 17:11-17:39</td>
<td>Cellular mechanisms to make mitochondria: pathways and machineries</td>
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<td>Toshiya Endo (Kyoto Sangyo University)</td>
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<td><strong>S01-04</strong> 17:39-18:07</td>
<td>Development and evolution of a novel musculoskeletal pattern in the turtle</td>
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<td>Shigeru Kuratani (Laboratory for Evolutionary Morphology, RIKEN Center for Biosystems Dynamics Research)</td>
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<td><strong>S01-05</strong> 18:07-18:35</td>
<td>The tight-junction apical complex: A new point of view that increases our understanding of epithelial barriers and biological systems</td>
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<td>Sachiko Tsukita (Osaka University)</td>
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<td>18:35-18:40</td>
<td>Closing remark</td>
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Symposium 2: Organelle Biology Reloaded

DATE: June 7 (Thu) 16:10-18:40 Room B
Chairpersons: Hiderou Yoshida (Univ. of Hyogo)
                 Ken Sato (Gunma Univ.)

Organelles are one of the central issues in cell biology. In this symposium, speakers will talk about the novel concepts of cell biology including functional zones of the organelles and contact sites between organelles and also present mechanisms for spatiotemporal control of organelle functions depending on the cell situation (This symposium is co-organized with a Grant-in-Aid for Scientific Research on Innovative Areas of MEXT “Organelle Zone”).

16:10-16:12 Introduction

S02-01 16:12-16:33 Evolutionary Perspective on the ER exit site structure
○Kota Saito (Department of Biological Informatics and Experimental Therapeutics, Graduate School of Medicine, Akita University)

S02-02 16:33-16:54 SFT-4, a cargo receptor homolog, is required for ER exit of solubule proteins including lipoproteins
Keiko Saegusa¹, Miyuki Sato¹, Katsuya Sato¹, Nobukatsu Morooka¹, Taichi Hara¹,², ○Ken Sato¹ (Gunma University¹, Waseda University²)

S02-03 16:54-17:15 Organelle zones undergoing posttranslational modification
○Satoshi Goto (Rikkyo University)

S02-04 17:15-17:36 Organelle Zone: Autoregulation of the proteoglycan glycosylation zone by the Golgi stress response
○Hiderou Yoshida (University of Hyogo)

S02-05 17:36-17:57 Rab knockout projects unveil new insight into functions of Rabs in membrane traffic
○Mitsunori Fukuda (Lab. of Membr. Trafficking Mech., Grad. Sch. of Life Sci., Tohoku Univ.)

S02-06 17:57-18:18 Dynamics of mitochondrial membranes and genome for mitochondrial quality control.
Azusa Ota, Takaya Ishihara, Tadato Ban, ○Naotada Ishihara (Inst. Life Sci., Kurume Univ.)
Syntaxin 17 regulates the localization and function of PGAM5 in mitochondrial division and mitophagy.

© Kohei Arasaki, Mitsuo Tagaya (Tokyo. Univ. Pharm. & Life Sci.)

Closing Remarks.
Symposium 3: Using Non-mammalian Model Organisms for Human Disease Study and Drug Screening

DATE: June 7 (Thu) 16:10-18:40 Room C
Chairpersons: Tetsuya Takeda (Okayama Univ.)
Motomichi Doi (AIST)

Mammals such as rodents are most commonly and widely used model organisms to study human diseases and to identify potential therapeutics. However, several experimental approaches using non-mammalian models are also advantageous compensating for the mammalian systems. For some kinds of diseases, non-mammalian organisms can be more suitable models than mammals for the understanding of disease onset at the cellular-level or for a large-scale drug screening. In this symposium, we will focus on recent approaches using non-mammalian organisms including yeast, C. elegans, Drosophila and small fishes that shed light on cellular and/or developmental pathogenesis of various diseases including prion transmission, neurological diseases, autisms and cancer. We would like to discuss their features and advantages in comparison to the mammalian systems in this symposium.

S03-01 16:10-16:35  A cryptic local structure in a host yeast prion protein regulates cross-species prion transmissibility
○Motomasa Tanaka¹, Toshinobu Shida¹² (RIKEN CBS¹, Tokyo Institute of Technology²)

S03-02 16:35-17:00  Single-cell imaging analyses in C. elegans revealed a marked temporal difference between chromatin alterations mediated by ASD causative genes and gene expression for neuronal maturation
○Yoichi Shinkai¹, Masahiro Karamochi², Motomichi Doi¹ (National Institute of Advanced Industrial Science and Technology (AIST)¹, The University of Tokyo²)

S03-03 17:00-17:25  Challenging the rare intractable neurological diseases by Drosophila models
○Masamitsu Yamaguchi (Advanced Insect Research Promotion Center, Kyoto Institute of Technology)

S03-04 17:25-17:50  Elucidating pathogenesis of Parkinson's disease with various fish model
○Hideaki Matsui (Niigata University)
S03-05  17:50-18:15  Exploring host-tumor metabolic interactions using *Drosophila*.
©Susumu Hirabayashi\(^1,2\) (Metabolism and Cell Growth Group, MRC London Institute of Medical Sciences\(^1\), Institute of Clinical Sciences, Faculty of Medicine, Imperial College London\(^2\))

S03-06  18:15-18:40  Zebrafish-Based Systems Pharmacology and Precision Medicine
©Toshio Tanaka\(^1,2\) (Department of Systems Pharmacology, Mie University Graduate School of Medicine\(^1\), Mie University Medical Zebrafish Research Center\(^2\))
# Symposium 4: From Cooperative Multicellular Behavior to Tissue Morphogenesis

**DATE:** June 7 (Thu) 16:10-18:40 Room D  
**Chairpersons:** Erina Kuranaga (Tohoku Univ.)  
Tsuyoshi Hirashima (Kyoto Univ.)

Tissue morphogenesis is achieved as integration of various cellular behaviors, such as cell migration, apoptosis, and differentiation. Many recent studies have identified constituent cellular behaviors and critical genetic factors underlying the tissue morphogenesis. However, it has not been fully understood how such cellular behaviors organize functional tissue structures by integrating mechanical and chemical regulations in developing organisms.

In this symposium, we invite seven speakers who tackle this issue by various approaches, and discuss mechanisms bridging from cooperative multicellular behavior to tissue morphogenesis.

| **S04-01** 16:10-16:35 | Mechanical competition induces cell elimination through compaction driven ERK downregulation  
○ Romain Levayer, Léo Valon, Florence Levillayer (Institut Pasteur, Department of Developmental and Stem Cell Biology) |
|----------------------|-----------------------------------------------------------------|
| **S04-02** 16:35-17:00 | Mechanical impact of apoptosis in tissue homeostasis  
○ Yusuke Toyama¹,² (Mechanobiology Institute, National University of Singapore¹, Department of Biological Sciences, National University of Singapore²) |
| **S04-03** 17:00-17:18 | Mechanical regulation of folding and tubulogenesis of *Xenopus* neural plate  
○ Makoto Suzuki¹, Yasuhiro Inoue², Naoto Ueno¹ (National Institute for Basic Biology¹, Institute for Frontier Life and Medical Sciences, Kyoto University²) |
| **S04-04** 17:18-17:36 | Spatiotemporal control of actomyosin contractility by planar cell polarity pathway during vertebrate convergent extension  
○ Asako Shindo¹, Yasuhiro Inoue², John B Wallingford³, Makoto Kinoshita¹ (Nagoya Univ.¹, Kyoto Univ.², Univ. of Texas³) |
| **S04-05** 17:36-18:01 | Spatial coordination of cell fates in the epidermal stem cell pool  
○ Kyogo Kawaguchi (HMS) |
**S04-06 18:01-18:15**  Asymmetric cellular behavior shaping the early heart tube.
○Hinako Kidokoro¹², Gary C. Schoenwolf², Yukio Saijoh² (National Cerebral and Cardiovascular Center Research Institute¹, Univ. of Utah²)

**S04-07 18:15-18:40**  Permissive and Instructive Activities of the FGF and Nodal pathways control Cardiac Progenitor Cell migration during Zebrafish heart morphogenesis.
Meagan Grant¹, Victoria L. Patterson¹, Makoto Suzuki², Daniel T. Grimes¹, Jessica R. Williams¹, ○Rebecca D Burdine¹ (Department Molecular Biology, Princeton University, USA¹, National Institute for Basic Biology, Japan²)
Symposium 5: Developmental Biology in Stem Cell Research and Regenerative Medicine

DATE: June 8 (Fri) 16:00-18:30 Room A
Chairpersons: Hideyuki Okano (Keio Univ. School of Medicine)
Kiyokazu Agata (Gakushuin Univ.)

TBA
In 2006, Yamanaka’s group developed iPS cell technologies. Since then, there is an emerging interest in the stem cell research into the field of medical science and basic biology. Application of stem cell research is not restricted to regenerative medicine, but disease modeling/drug development and cancer immunotherapy are becoming its very important targets. In the basic biology, stem cell research, particularly iPS cell technology is being applied to i) in vitro organogenesis using organoid, ii) human embryology, iii) human-animal chimera, iv) evo-devo research and v) human reproductive biology. Namely, the re-union of stem cell research and developmental biology is becoming increasingly hot. Topics in this field will be presented and discussed in this symposium.

16:00-16:05 Introduction

**S05-01** 16:05-16:30 Regeneration, Stem Cells and Medicine
○Kiyokazu Agata (Dept. Life Sci., Gakushuin Univ.)

**S05-02** 16:30-16:45 *In vivo* reprogramming of postmitotic neocortical neurons into different neuronal subtypes
○Koji Oishi, Kazunori Nakajima (Keio University School of Medicine)

**S05-03** 16:45-17:10 In vitro and in vivo cell dynamics analysis of iPSC-derived neural crest cells from CHARGE patients harboring CHD7 mutations reveals deficit in defective delamination, migration and motility of CHARGE syndrome
○Hironobu Okuno¹, Francois Renault Mihara¹, Shigeki Ohta¹, Kimiko Fukuda², Kenji Kurosawa³, Wado Akamatsu⁴, Tsukasa Sanosaka¹, Jun Koyama¹, Kanehiro Hayashi¹, Kazunori Nakajima¹, Takao Takahashi¹, Joanna Wysocka⁵, Kenjiro Kosaki¹, Hideyuki Okano¹ (Keio University School of Medicine¹, Tokyo Metropolitan University², Kanagawa Children's Medical Center³, Juntendo University School of Medicine⁴, Stanford University School of Medicine⁵)
S05-04  17:10-17:35  Kidney Organoids for Disease Modeling and Regenerative Medicine
  ○Ryuji Morizane¹²³ (Harvard Medical School¹, Brigham and Women’s Hospital², Harvard Stem Cell Institute³)

S05-05  17:35-18:00  Modeling of Human Neurological/Psychiatric Disorders using iPS cells and Transgenic Non-Human Primates
  ○Hideyuki Okano (Keio University School of Medicine)

S05-06  18:00-18:25  Generation of “whole organ” by interspecies organogenesis
  ○Tomoyuki Yamaguchi (University of Tokyo, The Institute of Medical Science)

  18:25-18:30  Concluding remarks
Cell-cell junctions are membrane-associated subcellular machineries distributed in the metazoan lineage, which are required for the cells organizing a morphogenetically and physiologically active tissue. The functions of cell-cell junctions include adhesion, mechanical force transmission and sensing, and diffusion barrier. We are prone to simply imagine that ancient single-celled organisms successfully assembled to initiate an epithelium-like multicellular system. However, growing knowledge about molecular bases of cell-cell junctions in extant metazoans and relevant genetic components in extant non-metazoans suggests that the non-metazoan/metazoan transition was not as simple a process as we have thought. There are different categories of junctions that have been defined based on structure, function, and molecular composition. The respective junction types are composed of products of specific genes that have distinct evolutionary histories. Some “junctional” genes might have “non-junctional” prehistories. It is also important to note that junctional systems might have evolved and diversified even after the separation of the metazoan lineage from non-metazoan organisms. This symposium aims to discuss the origins of the structure and function of metazoan cell-cell junctions as well as the origins of the diversity of the junctional systems among metazoans.

Sponsored by: JT Biohistory Research Hall

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<td>S06-02</td>
<td>16:03-16:27</td>
<td>Nanoscale Architecture of Cadherin-based Cell Adhesions</td>
<td>Pakorn Kanchanawong (National University of Singapore)</td>
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<td>S06-03</td>
<td>16:27-17:06</td>
<td>Synergistic interaction among actin filaments, ZO-1 and alpha-catenin</td>
<td>Satoshi Urayama, Chiyoko Kobayashi, Akira Nagafuchi (Nara Med. Univ.)</td>
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<td>S06-04</td>
<td>16:42-17:06</td>
<td>Molecular dissection of septate junctions in the Drosophila midgut</td>
<td>Yasushi Izumi, Mikio Furuse (Div. of Cell Structure, NIPS, Dept. of Phsiol. Sci., Sch. of Life Sci., SOKENDAI)</td>
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S06-04  17:06-17:36  The origin of the animal epithelium
○Monika Abedin Sigg, Nicole King (UC Berkeley)

S06-05  17:36-17:51  Cell-cell junctions sequester Dia1 and Dia2 from the contractile ring to ensure successful epithelial cytokinesis.
○Tomohito Higashi¹², Ann L. Miller² (Fukushima Medical University¹, University of Michigan²)

S06-06  17:51-18:15  The origin of cell adhesion and communication: a view from unicellular holozoans
○Hiroshi Suga¹, Mitsuhiro Fukushima¹, Takaaki Kai¹, Katsutoshi Aono¹, Naoto Kunimura¹, Seitaro Denbo¹, Kojiro Tokiyasu¹, Hiroaki Konishi¹, Iñaki Ruiz-Trillo² (Faculty of Life and Environmental Sciences, Prefectural University of Hiroshima, Japan¹, Institute of Evolutionary Biology, CSIC-UPF, Spain²)

S06-07  18:15-18:30  Evolution of structural mechanisms of homophilic adhesion at the adherens junction in metazoans
○Hiroki Oda¹², Shigetaka Nishiguchi³¹² (JT Biohistory Research Hall¹, Osaka Univ.², Olympus Corp.³)
The body surface is essential for maintaining homeostasis under a wide range of environmental conditions, as well as a physiological alteration of the body. The mechanism by which the body surface acts as a multi-functional organ depends on the interactions between epithelial cells and diverse types of cells, such as mesenchymal cells, immune cells and pigment cells. This symposium focuses on a topic in vertebrate body-surface, and discusses the mechanisms that generate this dynamic organ and how it maintains homeostasis, and how it is declined in aging and diseases.

**S07-01** 16:00-16:25 Live imaging of skin immune responses to external stimuli
Kenji Kabashima (Kyoto University)

**S07-02** 16:25-16:50 Lipoquality control by the phospholipase A2 family in the skin
Makoto Murakami (Graduate School of Medicine, The University of Tokyo)

**S07-03** 16:50-17:15 Cutaneous retention of *Staphylococcus* agr quorum-sensing promotes atopic dermatitis development
Yuumi Matsuoka-Nakamura (Chiba University)

**S07-04** 17:15-17:40 Identification of normal and cancer stem cells by the multicolor lineage tracing method
Hiroo Ueno (Department of Stem Cell Pathology, Kansai Medical University)

**S07-05** 17:40-18:05 The epidermal cell communications in homeostasis and gestation period
Fumiko Toyoshima (Institute for Frontier Life and Medical Sciences, Kyoto University)

**S07-06** 18:05-18:30 Melanosome transfer and dynamics of plasma membrane of melanocytes during skin pigmentation in the chicken embryonic skin
Ryosuke Tadokoro, Kazuki Kousaka, Yoshiko Takahashi (Department of Zoology, Graduate School of Science, Kyoto University)
Symposium 8: APDBN Symposium

DATE: June 8 (Fri) 16:00-18:30 Room D
Chairpersons: King-Lau CHOW (Hong Kong University of Science and Technology, Hong Kong)
Mitsuru Morimoto (RIKEN BDR)

This session sponsored by APDBN highlights the adoption of diverse experimental platforms by developmental biologists in this region to address important biological questions, from regeneration to degeneration, from organ integrity to dorsal ventral patterning and how polarity impacts a multitude of organ formation processes in model systems. It showcases how a full range of biochemical, cellular, molecular and genetic tool kits have been exploited to reveal the mystery of organ development in animals.

Sponsored by: Asia Pacific Developmental Biology Network

S08-01 16:00-16:25 Tracing the origins of regenerating neuromasts in zebrafish lateral line
○Shyh-Jye Lee, Meng-Ju Lin (Department of Life Science, National Taiwan University)

S08-02 16:30-16:55 grainyhead - e-cadherin axis constitutes a failsafe mechanism to maintain epidermal integrity by preventing cell extrusion
Manda Phatak, Shruti Kulkarni, Nazma Anjum, Aditya Mulay, ○Mahendra Sonawane (Tata Institute of Fundamental Research)

S08-03 17:00-17:25 Regulation of mitosis and organ development by Verthandi/Rad21 and PP2A in Drosophila
Lee-Hyang Kim, ○Kwang-Wook Choi (Korean Advanced Institute of Science and Technology)

S08-04 17:30-17:55 Crack the code of non-coding RNA during motor neuron development and disease
○Jun-An Chen (Institute of Molecular Biology, Academia Sinica)

S08-05 18:00-18:25 Wnt Regulation of Planar Cell Polarity in Development
○Bo Gao¹, Wei Yang¹, Lisa Garrett², Di Feng¹, Gene Elliott², Yingzi Yang³ (School of Biomedical Sciences, Li Ka Shing Faculty of Medicine, The University of Hong Kong¹, National Human Genome Research Institute, National Institutes of Health², Department of Developmental Biology, Harvard School of Dental Medicine³)
Epigenetics is defined as the study of heritable changes in gene expression that do not involve changes to the underlying DNA sequence. Epigenetic change can occur under natural condition, but might be influenced by several factors including age, the environment/lifestyle, and disease state. Therefore, epigenetics is related to various biological events. In this symposium, we discuss epigenetic events from different views from single cell level to organism context and try to understand mechanisms of how epigenetic changes are involved in various biological events.

S09-01 16:00-16:30 Epigenetic regulation on centromere specification and kinetochore assembly
○Tatsuo Fukagawa (Osaka University)

S09-02 16:30-17:00 Chromatin modification dynamics during gene activation in living cells and embryos
○Hiroshi Kimura (Cell Biology Center, Institute of Innovative Research, Tokyo Institute of Technology)

S09-03 17:00-17:35 Transcriptional control in time and space
○Nadine Vastenhouw (MPI of Molecular Cell Biology and Genetics)

S09-04 17:35-17:55 Establishment of the three-dimensional genome structure during vertebrate embryogenesis
○Ryohei Nakamura¹, Yuichi Motai¹, Masahiko Kumagai¹, Haruyo Nishiyama¹, Neva C. Durand², Erez Lieberman Aiden², Shinichi Morishita¹, Hiroyuki Takeda¹ (University of Tokyo¹, Baylor College of Medicine, USA²)

S09-05 17:55-18:30 A 3D Code in the Human Genome
○Erez Lieberman Aiden (Baylor College of Medicine & Rice University)
The breakthrough originated from identification and cloning of fluorescent proteins allows us to visualize cellular and molecular functions. The fluorescent probes and advanced microscopes provide a new tool for quantification of protein diffusion and enzymatic activity at the subcellular and single-cell level. Further, the recent advent of optogenetics enables the manipulation of cellular signaling, molecular function, gene expression and genome by using light. In this symposium, we cover a range of topics on live cell imaging and optogenetics used in cellular and developmental biology.

Sponsored by: Grant-in-Aid for Scientific Research on Innovative Areas — Platforms for Advanced Technologies and Research Resources “Advanced Bioimaging Support (ABiS)“

S10-01 16:00-16:25 Multiplexed imaging of signal transduction in cell proliferation and apoptosis.
○Kazuhiro Aoki¹, Gembu Maryu²,¹, Haruko Miura²,¹ (Nat. Inst. for Basic Biology¹, Kyoto University²)

S10-02 16:25-16:50 Local and mutual regulations between Wnt and planar cell polarity propagate global coordination of cell polarity through the tissue.
○Yusuke Mii¹,², Ritsuko Takada¹, Makoto Matsuyama³, Shinji Takada¹,² (NIBB¹, Sokendai², Shigei Medical Research Institute³)

S10-03 16:50-17:15 Illuminating information transfer in genetic oscillators by optogenetics
○Akihiro Isomura¹,² (Japan Science and Technology Agency, PRESTO¹, Institute for Frontier Life and Medical Sciences, Kyoto University²)
**S10-04 17:15-17:35**  Optogenetic reconstitution reveals that Dynein-Dynactin-NuMA clusters generate cortical spindle-pulling forces as a multi-arm ensemble.
○Tomomi Kiyomitsu¹, Toyoaki Natsume², Masato T Kanemaki², Masako Okumura¹ (Nagoya University¹, National Institute of Genetics²)

**S10-05 17:35-18:00**  Optical control of the genome
○Moritoshi Sato (Graduate School of Arts and Sciences, The University of Tokyo)

**S10-06 18:00-18:25**  Optical manipulation and imaging of signaling molecules in dendritic spines of neurons
○Hideji Murakoshi (National Institute for Physiological Sciences)