

The Course of Developmental Biology and Regenerative Medicine

Special Lecture "Tokuron" on Developmental Biology and Regenerative Medicine I

(Compulsory: 2 credits)

Subject Code 22140

Course director : Hideaki Tanaka (Developmental Neurobiology TEL: 373-5292) hitanaka@kumamoto-u.ac.jp

Instructors : Akira Nagafuchi (Cellular Interactions TEL: 373-6606) naga-san @kumamoto-u.ac.jp
Minetaro Ogawa (Cell Differentiation TEL: 373-6591) ogawamin@kumamoto-u.ac.jp
Kenji Shimamura (Brain Morphogenesis TEL: 373-6583) simamura@kumamoto-u.ac.jp
Teru Ogura (Molecular Cell Biology TEL: 373-6578) ogura@gpo.kumamoto-u.ac.jp
Yuji Yokouchi (Pattern Formation TEL: 373-6621) yokouchi@kumamoto-u.ac.jp
Ryuichi Nishinakamura (Kidney Development TEL: 373-6615) ryuichi@kumamoto-u.ac.jp
Satomi Tanaka (Kidney Development TEL: 373-6617) stanaka@kumamoto-u.ac.jp
Mitsuyoshi Nakao (Medical Cell Biology TEL: 373-6800) mnakao@gpo.kumamoto-u.ac.jp

【Objectives】

Developmental and regenerative medicine aims at curing diseases by revealing molecular mechanisms of organ development. In this course, you learn basic concepts and techniques used in this field. This course serves as introductory for those in the Course of Developmental Biology and Regenerative Medicine, and will also be useful for those in other programs, as you obtain essential knowledge of cell differentiation and growth, cell adhesion and cell-cell interactions essential for the organogenesis, body patterning, developmental mechanism of organogenesis derived from ectoderm, endoderm and mesoderm and the molecular basis of epigenetic cell regulation in development and human diseases.

【Content Description】 Following topics including the most recent progresses will be shown and discuss in addition to reading original papers.

- Cell adhesion, cell-cell interactions, growth factors
- Body plan and patterning
- Development and regeneration of the nervous system
- Brain regionalization
- Development of hematopoietic stem cells
- Mechanisms of vascular development
- Kidney development and regeneration
- Liver development and regeneration
- Cell lineage and developmental regulation of the nematode *C. elegans*
- *C. elegans* as a model for human diseases
- Epigenetic cell regulation in cell differentiation and transformation

【Keywords】

See course description, cadherin, cell sorting, adhesion specificity, neural induction, axis formation, knockout mice, polarization and asymmetric cell division, programmed cell death, RNA interference, life span and aging, disease model, epigenetics, gene expression, chromatin, development and regeneration, stem cell, cancer, organogenesis, regionalization.

【Class Style】 PowerPoint and/or OHP will be used in the lectures, and active participation in the discussion is encouraged. Reports are considered for those who are regularly absent for unavoidable reasons.

【Textbooks】 Textbooks are not specified, and handouts will be distributed.

【Recommended Readings】

- "Essential Developmental Biology" (2nd edition by Slack JMW.) Blackwell Publishing (2005)
- "C. ELEGANS II" (ed. D.L. Riddle, T. Blumenthal, B.J. Meyer, & J.R. Priess) CSHL Press (1997)
- "Hematopoiesis: A Developmental Approach" (edited by Leonard I. Zon) Oxford University Press (2001)

【Office Hour】

If you have any questions on topics or schedule of the classes, please contact the instructors listed above.

【Evaluation for Grades and Credits】

Grading will be based on active class participation, paper summaries, and the final report.

【Lecture Schedule】 Please also refer to the timetable shown in the Section 5

Session	Date & time	Instructors	Topics
1 .	Oct 15 (Thu) 4th period	Akira Nagafuchi	Finding of cell adhesion molecule, cadherin
2 .	Oct 22 (Thu) 4th period	Akira Nagafuchi	Purification and analysis of cadherin
3 .	Oct 29 (Thu) 4th period	Minetaro Ogawa	Development of the hematopoietic system
4 .	Nov 05 (Thu) 4th period	Minetaro Ogawa	Development of hematopoietic stem cells
5 .	Nov 12 (Thu) 4th period	Kenji Shimamura	Neural induction and regionalization
6 .	Nov 19 (Thu) 4th period	Teru Ogura	Cell lineage and developmental regulation of the nematode <i>C. elegans</i>
7 .	Nov 26 (Thu) 4th period	Teru Ogura	<i>C. elegans</i> as a model for human diseases (No Lecture)
8 .	Dec 03 (Thu) 4th period	Yuji Yokouchi	Body patterning
9 .	Dec 10 (Thu) no schedule		Annual meeting of biochemistry and molecular biology
10 .	Dec 17 (Thu) 4th period	Hideaki Tanaka	Neural network formation
11 .	Dec 24 (Thu) 4th period	Hideaki Tanaka	Regeneration of nervous systems
12 . eE-L	Jan 07 (Thu) 4th period	Ryuichi Nishinakamura	Molecular mechanisms of kidney development
13 .	Jan 14 (Thu) 4th period	Satomi Tanaka	Development of primordial germ cells
14 .	Jan 21 (Thu) 4th period	Mitsuyoshi Nakao	Epigenetic medicine I
15 .	Jan 28 (Thu) 4th period	Mitsuyoshi Nakao	Epigenetic medicine II

4th period : 15:00-16:30