

[Keywords] Pharmacology, Signal transduction, and Molecular imaging

[Academics] Akihiko Tanimura, Akihiro Nezu

[Course aims]

The Research Basis in Pharmacology course focuses on understanding the molecular mechanisms for controlling cellular functions by bioactive substances including neurotransmitters, hormones, and medicinal drugs. Receptors and ion channels are the most important targets for drugs, and thus students will study the cellular and molecular events in receptor-mediated responses. In addition, students will learn basic laboratory techniques for the functional analysis of cellular functions. This course also exposes students to advanced fluorescent techniques for visualizing the dynamics of cellular messengers (such as Ca²⁺), receptors, and enzymes in live cells.

[Course objectives]

The goals of this course are for the student to be able to:

- 1) Learn about the molecular mechanisms underlying receptor-mediated responses.
- 2) Understand the effects of drugs on intracellular signal transduction in different types of cells.
- 3) Learn basic research techniques, including cell culture, biochemical analyses, and molecular biology techniques.
- 4) Learn advanced analytical techniques for live cell imaging and confocal microscopy.
- 5) Construct and customize one's own assay system.

[Course content]

Class	Theme	Content	Academics
1	Classroom lectures	on the effects of drugs on receptors, and intracellular signaling.	Akihiko Tanimura Akihiro Nezu
2	Laboratory course will be focused on understanding cellular functions,	1) Basic laboratory techniques (such as cell-culture, western blotting). 2) Molecular biology techniques (such as RT-PCR, vector construction, and gene transfer). 3) Expression and purification of recombinant proteins.	Akihiko Tanimura Akihiro Nezu
3	Laboratory course aimed at live cell imaging using green fluorescent proteins,	1) Techniques in confocal microscopy. 2) Techniques for live cell imaging using cultured cells.	Akihiko Tanimura Akihiro Nezu

[Class implementation method]

Combination of face-to-face learning and distance learning

Class implementation depends on the implementation policy of each department (graduate school) or school.

[Grading policies]

Your overall grade for this class will be decided based on class attendance, presentation, and reports.

[Textbook]

Students will be informed about the textbook.

[Reference book]

Same as above

[Preparation for course]

Students must understand the course objectives, and prepare well for the classes.