

[Academics] Akihiko Tanimura, Akihiro Nezu

[Course aims]

The Research Basis in Dental Pharmacology course focuses on understanding the mechanism regulating salivary gland function. Saliva plays a critical role in the maintenance of oral and dental health, and salivary secretion is known to be impaired by the effects of various medicines, stress, Sjogren's syndrome, and radiation therapy to the head and neck area. Students are expected to study the cellular and molecular events underlying the mechanisms of normal and impaired salivary secretion. In addition, students will learn useful techniques for basic research and functional analyses of the salivary glands using in vitro systems and animal experiments.

[Course objectives]

The goal of this course are for students to be able to:

- (1) Explain the molecular mechanisms of salivary secretion.
- (2) Explain the effects of drugs on intracellular signal transduction in the salivary glands.
- (3) Acquire basic research skills, including cell culture, biochemical analysis, and molecular biology techniques.
- (4) Learn advanced analytical techniques, including live cell imaging and confocal microscopy.
- (5) Learn techniques for animal handling and for monitoring saliva secretion, blood flow, and responses of intracellular calcium.

[Course content]

| Class | Theme                                                                                                                                                                                                                                 | Content                                                                                                                                                                                 | Academics                        |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 1     | Classroom lectures                                                                                                                                                                                                                    | functions of receptors and intracellular signaling, mechanism of salivary secretion                                                                                                     | Akihiko Tanimura<br>Akihiro Nezu |
| 2     | Laboratory course focused on understanding cellular functions                                                                                                                                                                         | 1) Basic research techniques (cell culture, Western blotting).<br>2) Molecular biology techniques (reverse transcription-polymerase chain reaction, vector construction, gene transfer) | Akihiko Tanimura<br>Akihiro Nezu |
| 3     | Laboratory course focused on animal experiments, including anesthetics, control of respiration, real-time monitoring of salivary secretion using a pressure sensor, imaging analyses of blood flow using a laser speckle fluorimeter. |                                                                                                                                                                                         | Akihiko Tanimura<br>Akihiro Nezu |
| 4     | Laboratory courses focused on understanding of cellular functions and learning techniques for live cell imaging.                                                                                                                      | 1) Techniques for confocal microscopy.<br>2) Techniques for live cell imaging using cultured cells.<br>3) Techniques for in vivo gene delivery and imaging analyses using live animals. | Akihiko Tanimura<br>Akihiro Nezu |

[Grading policies]

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

[Remarks]

Textbook: Students will be informed of which textbook to use.

Reference book: Students will be informed of which reference book to use.

[Preparation for course]

Students must understand the course objectives and prepare appropriately for classes.