

Experiments in Animal Physiology

Syllabus Number

5E236

Basic Major Subjects

Elective Requisites 2
credit

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1. Course Description

Students have to attend an ethical lecture on the first day. Students will perform the experiments of the following four subjects.

Subject 1: Extraction of mouse genome and genotyping of gene-modified mice using PCR method.

Subject 2: Anatomy of mouse and the preparation of brain tissue. Observation of mouse brain with immunohistochemical method.

Subject 3: Embryology of sea urchin

Subject 4: Behavioral analysis of neonatal mice.

In this lecture, students will acquire knowledge and train comprehensive thinking skill on DP1 and DP2.

Furthermore, students will also utilize various knowledge and experimental techniques, and extract problems and solve them on DP3 and DP4.

2. Course Objectives

The goal of this experimental lecture is to understand the molecular and cellular mechanisms of life phenomena. Furthermore, this experimental lecture aims at improving logical thinking ability through planning and carrying out experiments, preparing reports, and conducting presentations. Students logically interpret the experimental results and create their own reports. In addition, through the experiments, students present the results in a collaborative manner while discussing between the group members, and answer questions about experimental results.

3. Grading Policy

There is no examination. Attend at least 2/3, and score 60% or more on each issue report and presentation. The report will be returned after scoring and the points will be explained. Presentations will be followed by questions and responses between teachers and students.

4. Textbook and Reference

Textbook

There is no textbook.

5. Requirements (Assignments)

Students who wish to have an Animal Research Laboratory in graduation research are strongly recommended to take classes.

Prepare your own lab coat, name tag, and experiment note.

If you are concerned about dissection or animal allergy, please notify the teacher (Dr. Uchino or Dr. Hirasawa) in advance.

6. Note

Students use the distributed prints.

7. Schedule

Animal Experiment Ethics Guidance:

Genotyping of genetically modified mice 1: Extract genomic DNA from the tail of the mice.

Genotyping of genetically modified mice 2: Determine genotypes of genetically modified mice using PCR method and create a report.

Mouse dissection: Observe and sketch the nervous system, circulatory system, digestive system and urinary system in mammals. In addition, the brain is prepared for tissue analysis.

Immunostaining and observation of brain: Brain sections with antibody staining are observed using a fluorescence microscope. Furthermore, learn how to acquire and analyze images and create a report.

Development of sea urchins 1: Eggs and sperm are collected from sea urchins and fertilized. In addition, we carry out fertilization about Takonomakura (*Clypeaster japonicus*) and observe cell division, growth process after fertilization in real time.

Development of sea urchins 2: Observe the fertilized eggs of the day before, to the prism larvae. Learn the physiological significance of calcium, which is essential for fertilization. In addition, observe the developmental process of embryo of *Drosophila*. Summarize your observations in a report.

Behavioral analysis of mice 1: Behavioral analysis designed by each group will be performed using newborn mice. The planning of the experiment will be conducted under the supervision of the instructor from the research ethics side.

Behavioral analysis of mice 2: After conducting discussion in each group, students will give presentation of results and ask questions.

