

# Cell Biology

Syllabus Number

5C224

Basic Major Subjects

Elective Requisites 2  
credit

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## 1. Course Description

Students will study the structure and the physiological properties of cells, including the function of organelles, the mechanisms of cell cycle, division and death. Since the lecture includes the practice session, students will confirm their own degrees of understanding. In this lecture, students will acquire knowledge and train comprehensive thinking skill on DP1 and DP2.

## 2. Course Objectives

Cell biology is the study of biological processes within living organisms. The research area of cell biology is closely related to genetics, biochemistry, molecular biology, immunology, and neuroscience. The goal of this lecture is to understand the structure and function of cells that constitute living organisms. Students can describe the technical terms learned in each lecture. In addition, they can combine their knowledge and solve the exercises given in each lecture.

## 3. Grading Policy

Evaluation is conducted on regular examination results. A score of 60% or more is passed. Regular examination can be taken regardless of attendance rate, but students with attendance rates of less than 60% (less than 9 courses) will not qualify for re-examination. After the examination, I will explain some of its contents.

## 4. Textbook and Reference

### Textbook

和田勝著 基礎から学ぶ生物学・細胞生物学(第3版)  
羊土社(ISBN 978-4-7581-2065-4)

### Reference

東京大学生命科学教科書編集委員会編 理系総合のための生命科学(第5版) 羊土社(ISBN 978-4-7581-2102-6)

## 5. Requirements(Assignments)

I strongly recommend to take this course for students who wish to take "Experiments in Animal Physiology"

## 6. Note

Distribute the print if necessary. After each lecture, the contents of the lecture will be posted on the LMS.

## 7. Schedule

- [1] Introduction to Cell Biology: Review of Biology  
Textbook: Introduction (P18-22), Chapter 1. Basics of Biology (P31-32)
- [2] Cell Structure 1: Cell membranes and Cellular organelles  
Textbook: Chapter 2. Profile of cells (P48-53, P63-71)
- [3] Cell Structure 2: Cytoskeleton and Cell movement  
Textbook: Chapter 5. Proteins are responsible for various cellular activities (P131-139)
- [4] Expression of gene 1: Structure and Replication of gene  
Textbook: Chapter 7. The road to multicellular organisms 2 (P 169-175)
- [5] Expression of gene 2: Transcription and Translation  
Textbook: Chapter 3. What determines cell shape and function (P 76-93)
- [6] Exercise and Summary:  
Review the contents of the first to fifth lectures while solving the exercises.
- [7] Cell Function 1: Cell cycle and Cell division  
Textbook: Chapter 7. The road to multicellular organisms 2 (P175-177)  
Chapter 8. The road to multicellular organism 3 (P 185-189)
- [8] Cell Function 2: Cell death and Regeneration  
Textbook: Chapter 10. Living and dying (P246-254)
- [9] Cell Function 3: Energy production and Metabolism  
Textbook: Chapter 4. For living and active cells (P102-113)
- [10] Exercise and Summary:  
Review the contents of the first to ninth lectures while solving the exercises.

- [11] Principles and Diversity of Signal transduction  
Textbook: Chapter 6. The road to multicellular organisms 1 (P 147-154)  
Chapter 11. Organized as an individual (P 284-288)
- [12] Immunology  
Textbook: Chapter 9. The immune system to protect individuals (P213-234)
- [13] Neurology  
Textbook: Chapter 11. Organized as an individual (P271-276)
- [14] Cell Biology and Life sciences:  
Introduces the latest topics in cell biology. Example: Disease model mouse produced by using gene modification technology and regenerative medicine.
- [15] Examination and Commentary:  
I will give examination and explain some of its contents.