

# Biochemistry

Syllabus Number

5D245

Special Subjects

Elective 2 credit

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## 1. Course Description

Students will study the mechanisms of gene expression, protein synthesis, and signal transduction including enzymology within living organisms. 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

Biochemistry is the study of chemical and biological processes within living organisms. The goal of this lecture is to understand the structure and function of the organic chemicals 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

山口雄輝編著、成田央著 基礎からしっかり学ぶ生化学

羊土社 (ISBN 978-4-7581-2050-0)

### Reference

東京大学生命科学教科書編集委員会篇 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)

## 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 Biochemistry: Energy metabolism and Cell biology  
Textbook: Chapter 5. Glucose metabolism 1 (P90-98), Chapter 6. Glucose metabolism 2 (P109-123)
- [2] Expression of gene 1: Structure and Synthesis of nucleic acid  
Textbook: Chapter 2. Structure and Function of nucleic acid (P 43-57)
- [3] Expression of gene 2: Replication of gene  
Textbook: Chapter 10. DNA Replication, Repair, Recombination (P171-186)
- [4] Expression of gene 3: Transcription of gene  
Textbook: Chapter 11. Transcription and RNA processing (P187-202)
- [5] Protein: Synthesis and Higher structure of protein  
Textbook: Chapter 1. Structure and Function of protein (P23-35)  
Chapter 12. Translation and Post-translational Modification (P206-214)
- [6] Exercise and Summary:  
Review the contents of the first to fifth lectures while solving the exercises.
- [7] Signal Transduction 1: Receptor  
Textbook: Chapter 3. Monosaccharides and polysaccharides, lipids and cell membranes (P70-75), Chapter 12. Translation and Post-translational Modification (P217-223)
- [8] Signal Transduction 2: Classification and Function of enzyme  
Textbook: Chapter 4. Kinetics of Enzyme Reaction (P 76-83)
- [9] Signal Transduction 3: Mechanism of enzyme reaction and Regulation of enzyme activity  
Textbook: Chapter 4. Kinetics of Enzyme Reaction (P 83-88)

- [10] Exercise and Summary:  
Review the contents of the first to ninth lectures while solving the exercises.
- [11] Biochemistry of metabolism 1: Signal transduction and Cellular responses  
Textbook: Chapter 13. Signal Transduction (P224-235)
- [12] Biochemistry of metabolism 2: Hormones and Bioregulation  
I will give lectures focusing on printing. Regulation mechanism of blood glucose concentration, etc.
- [13] Biochemistry of metabolism 3: Metabolic abnormalities, diseases  
I will give lectures focusing on printing. Such as autophagy, epigenetics and developmental disorders.
- [14] Biochemistry and Life sciences: Technology of Genetic engineering, Cell engineering, Chromosome engineering  
Introduce the important topics of PCR and electrophoresis, gene recombination, and application examples of gene modification technology.
- [15] Examination and Commentary:  
I will give examination and explain some of its contents.