

Microbial Chemistry

Syllabus Number

5L363

Special Subjects

Elective 2 credit

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1. Course Description

After reviewing the basic knowledge of microbiology, this course covers the basic and topics of pathogenic microorganisms, prevention of infection by them, and chemical therapy using the supplementary materials provided.

The following subjects will be studied during the course.

- (1) taxonomy and identification of microorganisms
- (2) infection and defense
- (3) pathogenic microorganisms
- (4) antimicrobial chemotherapy

2. Course Objectives

Microorganisms are utilizable in our personal lives and are used in industry. A large number of valuable antibiotics have been isolated from natural resources so far and used as drugs. This course will provide background knowledge of how antibiotics have been discovered from natural resources and an explanation of why antibiotics exist in nature.

3. Grading Policy

Reports and occasional test (20%) results are considered with final examination results (80%).

4. Textbook and Reference

Textbook

Teaching material (prints) will be distributed.

Reference

Yoshio Ueno and Satoshi Omura (in Japanese) "Kagakuryouhougaku" Nankoudo
ISBN978-4-524-40248-9

5. Requirements(Assignments)

(Preparation of lecture) The students are required to read the corresponding part of the text in advance, make it clear what they don't understand, and be ready to ask during the lecture (2 hr.).

(Review of lecture) The students should check any contents, which could not be understood, after the lecture (1 hr.).

6. Note

It is strongly suggested for students to study "Fundamental Microbiology", "Fundamentals of Organic Chemistry" and "Organic Chemistry 1 and 2" beforehand in classes. Studying beforehand is strongly suggested because you will learn many chemical reactions in this class.

7. Schedule

- [1] Bacterial classification
- [2] Bacterial morphology and cell structure
- [3] Infection and defense (1) (Infection route and infection source)
- [4] Infection and defense (2) (Opportunistic infection and microbial substitution)
- [5] Pathogenic microorganisms (1) The gram-positive cocci
- [6] Pathogenic microorganisms (2) The gram-positive bacilli
- [7] Pathogenic microorganisms (3) The gram-negative cocci
- [8] Pathogenic microorganisms (4) The gram-negative bacilli
- [9] Pathogenic microorganisms (5) Spirochete, rickettsial and chlamydial pathogens
- [10] Antimicrobial agents (1) Development history of antimicrobial agents and definition of antibiotics
- [11] Antimicrobial agents (2) Application of microorganisms (Cultivation, taxonomy and identification)
- [12] Cell wall synthesis inhibitor (1) Penicillins
- [13] Cell wall synthesis inhibitor (2) Cepheems
- [14] Cell wall synthesis inhibitor (3) Carbapenems, oxapenems and monobactams
- [15] Cell wall synthesis inhibitor (4) β -Lactamase inhibitors