

Syllabus

1. Course title, style, and credit

Epithelial cell biology

Lecture

1 credit

2. Appropriate grade level and eligible departments

All departments

For Department of Physiological Sciences, D1, 2 (obligatory), D3-5 (optional)

3. Lecturers

Mikio Furuse

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NIPS (Yamate)

4. Time

[Oral]

April 15, 22

May 13, 20, 27

June 1, 10, 24

10:00-12:00 on Friday (except June 1, Wednesday)

5. Place

2F Seminar Room in the west side of Yamate No. 2 Building.

6. Prerequisites and styles

This course has no prerequisites. The oral lectures are given in English.

7. Contents

Epithelium is a tissue of a continuous sheet composed of cells that cover body surfaces, cavities and tubes. Epithelium is contained in most of the organs and is involved in a wide variety of physiological functions. Epithelium consists of epithelial cells, which have common characteristics of cell polarity and cell-to-cell adhesion. On the other hand, epithelial cells have diversity in the structure and biochemical property to perform organ-specific functions. In this course, we will introduce the molecular mechanisms of the structure, function and behavior of epithelial cells, based on the updated knowledge in cell biology and physiology. We will also discuss how the basic properties of epithelial cells and their variations are utilized for the functions of organs.

8. Course objectives

1. To understand the molecular mechanism underlying the morphogenesis of polarized

epithelial cells.

2. To understand the molecular mechanism underlying the epithelial transport, which contributes to homeostasis.
3. To understand various functions of epithelia.

9. Schedule

1. April 15
Introduction to epithelium
Mikio Furuse (NIPS)
2. April 22
Establishment of epithelial cell polarity
Yasushi Izumi (NIPS)
3. May 13
Intracellular transport in epithelial cells
Tetsuhisa Otani (NIPS)
4. May 20
Epithelial morphogenesis
Tetsuhisa Otani (NIPS)
5. May 27
Regulation of paracellular transport and epithelial barrier function
Mikio Furuse (NIPS)
6. June 1 (Wed)
Regulation of intestinal epithelial transport: Intestinal fluid and electrolyte movement
Atsukazu Kuwahara (University of Shizuoka)
7. June 10
Epithelial cells in the brain
Kazunobu Sawamoto (Nagoya City University)
8. June 24
Barrier function of stratified epithelia
Takeshi Matsui (RIKEN)

10. Lecture materials and readings

- Ross, Pawlina "Histology: a textbook and atlas" 6th ed.
Alberts, Johnson, Lewis et al. "Molecular Biology of the Cell" 6th ed.

11. Grades

The lecturer will present a theme based on the course objective at the end of the course. Students are requested to submit an essay report on the theme by the dead line. The grade will be determined by the quality of the report, and will be either "passed" or "failed".

12. Notes

Nothing particular