2025 Akita University Faculty of Medicine Syllabus

Category ： 基礎医学 IV
Course Title ： (Immunity and host defense)
Eligible Students ： grade 2 Related Course
Code ： 71563017
Schedule ： week 17 〜 week 26
Credits ： 1

1. **Lead Instructor**

   Satoshi Ishii (Professor, Department of Immunology, 6089)

2. **Instructors**

   Satoshi Ishii (Professor, Department of Immunology, 6089)
   Shigeharu Ueki (Professor, Department of General Medical Practice and Laboratory Diagnostic Medicine, 6209)
   Daisuke Yasuda (Lecturer, Department of Immunology, 6090)

3. **Course Description Outline(Course Objectives)**

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   臨床現場で必要となる各疾患の病態を修得して診療を実践してくために、免疫学の基礎概念を理解する。
   また、関連するプロフェッショナリズム（信頼、誠実、思いやり、省察、倫理)、医療行動科学、医療安全、医療法（制度）EBM を活用した総合的な判断、ICT の適切な活用について学ぶ。(1-1〜1-2, 2-1〜2-6, 2-8, 3-1〜3-7, 4-1〜4-7, 5-1〜5-4, 6-1〜6-2)
   概要
   1. 免疫系の機構を分子レベルで理解し、病原体に対する免疫反応、アレルギー、自己免疫疾患、先天性免疫不全症と癌細胞と移植片に対する免疫系の反応について説明できる。
   2. 寄生虫の基本的性状、病原性とそれによって生じる病態について説明できる。
   3. 関連するプロフェッショナリズム（信頼、誠実、思いやり、省察、倫理)、医療行動科学、医療安全、医療法（制度）EBM を活用した総合的な判断、ICT の適切な活用について説明できる。

   Aims:
   Students will understand the basic concepts of immunology in order to master the pathogenesis of each disease and practice medical treatment as required in clinical practice.
   In addition, this student practice offers opportunities to learn about related topics such as professionalism, medical ethics, medical safety, evidence-based medicine (EBM), and medical laws.
   (1-1〜1-2, 2-1〜2-6, 2-8, 3-1〜3-7, 4-1〜4-7, 5-1〜5-4, 6-1〜6-2)

   Goals of the course:
   1. Understand the mechanisms of the immune system at the molecular and cellular levels and explain immune responses to pathogens, cancer cells, and grafts, as well as the pathogenesis of allergies, autoimmune diseases, and congenital immunodeficiency diseases.
   2. Describe the basic properties and pathogenicity of parasites and the pathologies caused by them.
   3. Explain about professionalism, medical ethics, patient safety, evidence-based medicine (EBM), and medical law, which are related to the field.

4. **Textbook/Reference Books**

   「エッセンシャル免疫学 第 4 版、平野俊夫・村上正晃監訳、メディカル・サイエンス・インターナショナル: ”The Immune System 5th Edition (by Peter Parham) ”の日本語訳」に沿って行う。講義の内容を良く理解するために各自必ず準備すること。

また,「Janeway ’s 免疫生物学 原書第 10 版、笹月健彦監訳、南江堂: ”Janeway ’s Immunobiology 9th Edition ” の日本語訳」を副教材とすることがある。

The Immune System 4th Edition (by Peter Parham) will be used as a text.
Janeway ’s Immunobiology 10th Edition (by Kenneth Murphy et al.) may be used as a supplementary material.

5. **Assessment**

Evaluation will depend on the following assessment: Comprehensive examination and Attendance.

6. **Out of Class Study/Message**

The lecture will be given according to the designated textbook.
Purchase the designated textbook by the first day of the lecture and prepare for the lecture.
Review the textbook after the lecture.

Topics and Contents of class, Course Objectives						
	Class Date	**Period**	**Class Format**	**Topics and Contents of class, Course Objectives**	**Instructors**	**Class Room**
1	8 / 26 (Tue)	1-2	Lecture	Theme: Elements of the Immune System and their Roles in Defense Explain the characteristics of the immune system (specificity, diversity, tolerance, memory) in the defense mechanism. Explain the tissues and cells involved in the immune response. Explain the establishment and breakdown of the immunological self. Explain the difference between innate and acquired immunity.	Satoshi Ishii	基礎棟第 2 講義室
2	8 / 26 (Tue)	3-10	Lecture	Theme: Innate Immunity Explain the defense mechanisms by innate immunity.	Satoshi Ishii	基礎棟第 2 講義室
3	9 / 2 (Tue)	1-4	Lecture	Theme: Antibody Structure and the Generation of B-Cell Diversity Explain the structures and reaction modes of immunoglobulins. Explain the mechanism of diversity acquisition based on the structure and genetic rearrangement of immunoglobulin genes.	Satoshi Ishii	基礎棟第 2 講義室
4	9 / 2 (Tue)	5-8	Lecture	Theme: Antigen Recognition by T Lymphocytes Explain the basic structure of major histocompatibility complex (MHC) class I and class II and the difference in antigen presentation pathways. Explain the structure of T-cell receptors and their reaction modes. Explain the mechanism of diversity acquisition based on the structure and genetic rearrangement of T-cell receptor genes. Explain the characteristics of immune responses to viruses, bacteria, fungi, and parasites.	Satoshi Ishii	基礎棟第 2 講義室
5	9 / 2 (Tue)	9-10	Lecture	Theme: The Development of B Lymphocytes Explain the mechanism of diversity acquisition based on the structure and genetic rearrangement of immunoglobulin genes. Outline the establishment mechanisms for discrimination between self and non-self and immunological tolerance.	Satoshi Ishii	基礎棟第 2 講義室
6	9 / 9 (Tue)	1-4	Lecture	Theme: The Development of B Lymphocytes Explain the mechanism of diversity acquisition based on the structure and genetic rearrangement of immunoglobulin genes. Outline the establishment mechanisms for discrimination between self and non-self and immunological tolerance.	Satoshi Ishii	基礎棟第 2 講義室
7	9 / 9 (Tue)	5-10	Lecture	Theme: The Development of T Lymphocytes Explain the mechanism of diversity acquisition based on the structure and genetic rearrangement of T-cell receptor genes. Outline the establishment mechanisms for discrimination between self and non-self and immunological tolerance.	Satoshi Ishii	基礎棟第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	**Period**	**Class Format**	**Topics and Contents of class, Course Objectives**	**Instructors**	**Class Room**
8	9 / 16 (Tue)	1-2	Lecture	Theme: T Cell-Mediated Immunity Outline the regulatory mechanisms that enhance or diminish the signals from antigen receptors. Describe the characteristics of representative cytokines and chemokines. Explain the defense responses of helper T cells (Th1 and Th2 cells), cytotoxic T lymphocyte (CTL), and regulatory T cells (Treg). Explain the characteristics of immune responses to viruses, bacteria, fungi, and parasites.	Daisuke Yasuda	基礎棟第 2 講義室
9	9 / 16 (Tue)	3-6	Lecture	Theme: Immunity Mediated by B Cells and Antibodies Outline the regulatory mechanisms that enhance or diminish the signals from antigen receptors. Describe the characteristics of representative cytokines and chemokines. Describe the characteristics of immune responses to viruses, bacteria, fungi, and parasites.	Daisuke Yasuda	基礎棟第 2 講義室
10	9 / 16 (Tue)	7-10	Lecture	Theme: Immunological Memory and Vaccination Explain immunological memory in defense mechanisms. Explain the principles of vaccines.	Daisuke Yasuda	基礎棟第 2 講義室
11	10 / 20 (Mon)	1-2	Lecture	Theme: IgE-Mediated Immunity and Allergy Outline the mechanisms of allergy development (Coombs classification).	Shigeharu Ueki	基礎棟第 2 講義室
12	10 / 20 (Mon)	3-4	Lecture	Theme: Formative assessment	Satoshi Ishii Daisuke Yasuda	基礎棟第 2 講義室
13	10 / 20 (Mon)	5-8	Lecture	Theme: Fails of the Body's Defenses Outline the mechanisms of acquired immune deficiency diseases.	Satoshi Ishii	基礎棟第 2 講義室
14	10 / 20 (Mon)	9-10	Lecture	Theme: Transplantation of Tissues and Organs Explain the pathophysiology of transplant rejection and graft-versus-host disease. Explain the types of immunosuppressive drugs and their mechanisms of action.	Satoshi Ishii	基礎棟第 2 講義室
15	10 / 27 (Mon)	1-2	Lecture	Theme: Transplantation of Tissues and Organs Explain the pathophysiology of transplant rejection and graft-versus-host disease. Explain the types of immunosuppressive drugs and their mechanisms of action.	Satoshi Ishii	基礎棟第 2 講義室
16	10 / 27 (Mon)	3-4	Lecture	Theme: Disruption of Healthy Tissue by the Adaptive Immune Response Outline the mechanisms that maintain immune tolerance and the development of autoimmune diseases due to its disruption.	Satoshi Ishii	基礎棟第 2 講義室

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	Class Date	**Period**	**Class Format**	**Topics and Contents of class, Course Objectives**	**Instructors**	**Class Room**
17	10 / 27 (Mon)	5-10	Lecture	Theme: Parasitology Explain the classification and morphological characteristics of protozoa and helminths. Explain the life cycles of parasites and their infection pathways. Explain the characteristics of host defense against infected parasites. Describe the major parasitic diseases of various organs. Outline the diagnosis, treatment and prevention of parasitic diseases.	Satoshi Ishii	基礎棟第 2 講義室