

Principles of Immunology

Syllabus for Bio4013

(Tentative)

Course Goals & Objectives:

Immunology is a fundamental discipline concerning the one and only defense system that higher creatures possess. The goal of this course is to provide a comprehensive understanding of the contemporary immunology from innate to adaptive immunity to pathogen-host interactions during immunoresponses.

Objectives - To provide knowledge and methods for students to understand and analyze immune system, innate immunity, adaptive immunity, immune system development, defenses against tumors and infectious agents, and transplantation and the immune system.

- > Describe structural basis of the innate immune system.
- > Describe the functional interplay between innate and adaptive immunity.
- > Describe antigen presentation to lymphocytes.
- > Describe cellular immune responses.
- > Describe humoral immunity.
- > Describe immunological tolerance and autoimmunity.
- > Describe tumors and transplantation in the context of immunity.
- > Describe immune system diseases.

Section I The Immune System (Ch. 1)

- i. Terminology
- ii. Basic properties
- iii. Different components

Section II Innate Immunity (Ch. 2)

- i. Immediate defense against infection
- ii. Evolution

Section III Antigen Presentation to Lymphocytes (Ch. 3)

- i. Antigen processing
- ii. MHC/peptide interaction

- iii. Intracellular trafficking
- iv. Antigen presentation to T cells
- v. Antigen presenting cell types

Section IV Adaptive Immune System (Ch. 4)

- i. Structure of antigen receptors
- ii. Immunological repertoires

Section V Cellular Immune Responses (Ch. 5 & 6)

- i. Activation of T cells
- ii. Antigens by cell-associated microbes
- iii. Eradication of intracellular microbes

Section VI Humoral Immunity (Ch. 7 & 8)

- i. B cell activation
- ii. Responses of B cells
- iii. B cells and antibodies
- iv. Elimination of extracellular microbes and toxins

Section VII Immunological Tolerance and Autoimmunity (Ch. 9)

- i. Self-nonsel self discrimination
- ii. Consequences of failure

Section VIII Immune Responses against Tumors and Transplants (Ch. 11)

- i. Immunity to transformed cells
- ii. Rejection of transplants

Section IX Immune System Diseases (Ch. 10 & 12)

- i. Disorders of immune responses - hypersensitivity
- ii. Diseases due to defective immunity - e.g. Covid19

The textbook for this course:

Basic Immunology, Abbas, A. and Lichtman, A.H., 4th Edition (2012 or newer) Saunders

Recommended Reference:

Janeway's Immunobiology, Kenneth Murphy, 8th Edition (2011) Garland Science