Department of Biology

College of Education

Salahaddin University

Subject: Immunology

Course Book – (Year: 4)

Lecturer's name: Dr. Suhayla Hamad Shareef

Academic Year: 2022/2023

Course Book

1. Course name	Immunology
2. Lecturer in charge	Dr. Suhayla Hamad Shareef
3. Department/ College	Biology Dept./ College of Education
4. Contact	e-mail: suhayla.shareef@su.edu.krd
5. Time (in hours) per week	Theory: 4
6. Office hours	6 hours
7. Course code	
8. Teacher's academic profile	BSc. in Biology - Education college - Salahaddin University MSc. in Clinical Immunology – Medicine College– Hawler Medical University Now, Ph.D. In Medical Immunology-Medicine College-Sulaimani university.
9. Keywords	Antigen, Antibody, Complement, Infection, disease Phagocytosis…

10. Course overview:

Immunology: is one of the most important branches of medical science, it is the study of immune cells and how they defend the body. The objective of this course is to in still a broad-based knowledge of the science of immunology. Immunology is a science that studies immunity. Historically, immunity has been understood as a defense against, or resistance to, contagious (infectious) diseases. It has become apparent, however, that the mechanisms that confer protection against the above diseases also operate when a body mounts a reaction against some innocuous substances. Such a reaction is triggered when certain substances that are not made in the body (‘‘foreign’’ substances) invade the body from outside. The mechanisms of immunity can protect against diseases that might be caused by foreign agents but, on the other hand, these same mechanisms can injure the body and cause disease. Therefore, immunity was redefined as a reaction against foreign substances, including – but not limited to – infectious microorganisms. This reaction may or may not be protective. This reaction is quite complex and involves many different cells, molecules, and genes (collectively termed the immune system), the response of the immune system to the introduction of foreign substances is called the immune response.
Immunity is a part of a complex system of defense reactions of the body. These defence reactions can be innate or acquired. Innate (or natural)

immunity refers to the work of mechanisms that pre-exist the invasion of foreign substances, while acquired immunity refers to a reaction that is caused by the invasion of a certain foreign substance. The ability of the immune system to ‘‘remember’’ an encounter with an antigen and to develop a qualitatively better response to it is called the immune memory. This feature is a paramount property of specific immunity.

11. Course objective:

The main objectives of this course are, students should know something about immunity and the arms of immunity, component of the immune system such as: cells, cytokines how our immune system work in disease and in health, antigen and their types, immunoglobulin and their classes, the different pathway of complement activation, cytokine and the mode of their action …. and other different subjects. We will dissect the particular mechanisms of immunity and characterize the elements of the immune system and the properties of immune responses. The immune system—it is the only thing standing between us and a sea of microbial predators that could send us to an early and ugly death microbe.

12. Student's obligation:

Students are responsible for all course material/Assignments on the day they are presented or due. Carefully read through the following course guidelines:

I. Assignments are due at the beginning of the class period on the date/time designated by the instructor. Late coursework is not accepted (e.g. projects, reports, papers…), unless otherwise indicated by the instructor. Work will only be accepted in an emergency situation.

II. Missed class notes are not provided by the instructor and must be obtained from other students. See missed lab session below for more information.

III. Missed exams and quizzes. Lab exams are only offered at specified times and must be taken at that time. Exceptions to this will only be made for an extreme emergency (to be determined by the instructor). Missed pre-lab quizzes may not be made up and will result in a grade of zero for the missed quiz.

IV. Missed lab session (excludes lab exam day). If space is available you will be expected to attend another lab session to complete assigned

work (you must contact your instructor to arrange this within 24 hours of the missed session). If this is not possible, and you are given an excused absence

V. Punctuality is expected for each lab session. Labs begin promptly at the start of the session. Any missed quizzes or work (bonus or otherwise) will be forfeited and a grade of zero will be assigned due to tardiness.

VI. Course Work - Incorrect content, formatting, general appearance, spelling, and grammar will result in point deductions from a student's work.

VII. Cell phones and other electronic devices must be turned off while you are in class. During assessments, electronic devices that are on may result in a forfeiture of the assessment.

13. Forms of teaching

Different forms of teaching will be used to reach the objectives of the course: 'PowerPoint presentations for the head titles and definitions and summary of conclusions, classification of materials and any other illustrations, furthermore students will be asked to prepare research papers on selective topics. There will be classroom discussions and the lecture will give enough background to evaluate problem sets and different issues discussed throughout the course. To get the best out of the course, it is suggested that you attend classes as much as possible, and read the required lectures, and teacher's notes regularly as all of them are foundations for the course.

14. Assessment scheme

Methods of instruction include lecture format, class discussion, assignments, experiments, quizzes, and external links for self-study review (internet).
Assessment formats for your laboratory course grade include:
2 Laboratory Exams (35 pts. each) 5 points Laboratory Reports
10 Technique Quizzes*/Pre-labs / & Assignments 20 points.

15. Student learning outcome:

After going through this unit, students will be able to:

- Define antigens and describe how antigens affect adaptive defences.
- Discuss the properties of antigens.
- Understand the importance of haptens and adjuvants.
- Explain the structure, properties, and functions of antibodies.
- Compare and contrast primary and secondary immune responses.
- Describe the mechanisms of hypersensitivity reactions

- Give a detailed description of various types of tests
- Discuss the role of MHC in the immune system.
- Understand about how APC and other cell are involved in antigen processing, Role of TLRs in immunity.
- Explain about AIDS, Cancer and autoimmune diseases.

16. Course Reading List and References:
Some textbooks that should be depended:

1. Clark, W.R. (2007). In Defense of self. How the immune system really works in managing health and disease. 1st Edition. Oxford University Press, New York.

2. Shetty, N. (2005). Immunology. Introductory textbook. 2nd Edition. New Age International (P) Limited Publisher. New Delhi.

3. Ezekowitz, R.A.B. and Hoffmann, J.A. (2003). Innate immunity. 2nd Edition. Humana Press, Totowa.

4. Janeway's Immunobiology textbook Searchable free online version at the National Center for Biotechnology Information

5. Charles A Janeway, Jr; Travers, Paul; Walport, Mark; Shlomchik, Mark J. (2001). "The Humoral Immune Response".

6. Goldsby RA; Kindt TK; Osborne BA & Kuby J (2003). Immunology (5th ed.). San Francisco: W.H. Freeman. ISBN 0-7167-4947-5.

7. Jaspan HB; Lawn SD; Safrit JT; Bekker LG (February 2006). "The maturing immune system: implications for development and testing HIV-1 vaccines for children and adolescents". AIDS. 20 (4): 483–94. doi:10.1097/01.aids.0000210602.40267.60.PMID 16470112.

8. Glezen WP (December 2001). "Maternal vaccines". Prim. Care. 28 (4): 791–806, vi–vii.doi:10.1016/S0095-4543(05)70041-5. PMID 11739030.

9. Sudha Gangal 2013 Textbook of Basic and Clinical Immunology Orient Blackswan Private Limited - New Delhi

10. Murphy K, 2011 Janeway's Immunobiology. 8th Ed. Garland Science Publishers, New York.

17. The Topics:	Lecturer's name
1. Introduction to immunology 2. Milestones of immunology	Introduction & history 2 hrs
1. Immune system-an overview 2. Immune system structure and function 3. Basic classification of immune system	Immune system 2 hrs

4. Immune system response	
1. Innate immune response 2. External defenses: skin, mucous membrane, secretion 3. Mechanical /chemical/biological barriers	Innate immunity 2 hrs
1. Innate immune response 2. Internal defenses: phagocytosis 3. Cells of the innate immunity: Types and function 4. Monocyte, macrophage, dendritic cell	phagocytosis 2 hrs
1. Functions and Manifestation of Immunity 2. Immune defense 3. Immune homeostasis 4. Immune surveillance	Immune function and manifestation 2 hrs
1. The Inflammatory Response 2. Vital role of inflammation 3. Cells participate 4. Acute phase protein	Inflammation and fever 2 hrs
1. Adaptive Immunity cells 2. Humoral and cellular immune response	Adaptive Immunity 2 hrs
1. Structure of antigen 2. Types of antigens	Antigen 2 hrs
1. Antibody structure 2. Isotypes of antibody 3. Function of each isotype	Antibody 2 hrs
1. Complement structure 2. Three pathways of complement	Complement 2 hrs
1. Cytokine types 2. Cytokine Function	Cytokines 2 hrs
1. Cells produced interferon 2. Antiviral function of interferon	interferon 2 hrs
1. Hypersensivity 2. Types 3. Clinical manifestation of hypersensivity types	Hypersensivity 2 hrs

1. Introduction to Autoimmune disease 2. Causes 3. Example such as Rheumatoid arthritis 4. systematic Lupus erythromatous	Autoimmune disease 2 hrs
1. Introduction of Immunodeficiency 2. Disease 3. Types 4. Examples	Immunodeficiency 2 hrs

19. Examinations:

1. Compositional

1. What do you understand by Blood Types and Immunology? What is the structure of Immunoglobulin?
2. What are the classes of Immunoglobulin?
3. What Is an Epitope?
4. Immunocompetent T lymphocytes are selected in the thymus. What is the fate of the T cells that have a high affinity for self-MHC?
5. Describe the steps in activation and control of the alternate complement pathway. You may use a diagram to illustrate your answer if you wish.

3. Multiple choices:

1. The ability of an organism to resist infections by the pathogens is called_____
   a) Infection
   b) Hypersensitivity
   c) Immunity
   d) Allergy
2. Innate immunity present since birth and it has no memory.
   a) True
   b) False
3. 3. Which of the following compounds is NOT found in tears?
   a) Lysozyme
   b) Lactoferin
   c) IgA
   d) IgE
4. 4. Name the cytokines which released in response to virus infection?
   a) Interferons
   b) Monokines
   c) Lymphokines

d) Interleukins

2. True or false type of exams:

1-Kerationcytes main immune system cell that picks up foreign invaders and travels out of the skin to lymph nodes to alert the body that something is wrong with skin.

2- Endothelial cells of the dermis are the main immune cells that fight foreign invaders.

3-Active immunization is protection transferred from another person or animal. Its temporary protection wanes with time.

4-Most microorganisms will not be phagocytosed without opsonins

5- Lactic acid in spermine remove microbes from the genital tract by maintaining the acidic environment for micro-organisms.

20. Extra notes:

This Research Skills Module is designed to develop student experimental design, report writing and practical skills. Student will be introduced to microbiology research techniques in a laboratory-based project. Student will use techniques such as aseptic technique, preparation of growth media and identification of bacterial strains.

21. Peer review