**Immunology**

**Academic Year 1430 – 1431 H.**

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**I- General Objectives:**

The Objectives of the course are the followings :-

1. To introduce the basic principles of the immune system.
2. Enumerate the components of the immune system which include, organs, tissues , cells and molecules.
3. To explain how the immune system functions in health and disease.
4. To bridge the immunological concept with other clinical disciplines.
5. To explain the role of immunology in diagnosis and management of pathological problems.
6. To update students on recent developments in the subject (cutting edge information).

**Required Textbook:**

Immunology

FITTH EDITION

Richard A. Goldsby , Thomas J. Kindt

Barbara A. Osborns , Janis Kuby

ISBN 0-7167-4947-5

**Other resources: (attached at the end of this document)**

**1) Immunobiology animation CD/ 2) Textbook CD**

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**II- Specific Objectives:**

**Topic 1:-**

**Introduction to Immunology and classification of Immunity**

At the end of this lecture, the student should be able:

1. To know full description of the course; general objective, specific objective, and grading policy.
2. To define the discipline of immunology
3. To give a historical background about the development of the

discipline of immunology.

1. To introduce some immunological terms.
2. To recognize the classification of immune system

Chapter – 1 and Glossary

**Topic 2:-**

**Natural (innate) Immunity**

**Elements of Innate Immunity**

At the end of this lecture, the student should be able:

1. To identify components of the natural immune defense system.
2. To describe how natural immunity functions.
3. To differentiate between the main features of natural and adaptive

immunity

Chapter 1

**Topic 3:-**

**The Lymphoid System and Immune Cells**

At the end of this lecture, the student should be able:

1. To describe the organs, tissue, cells of the immune system which include; thymus gland, bone marrow, primary and secondary lymphoid organs.
2. To describe how B and T lymphocytes are developed.
3. To identify and understand the functions of different receptors on B and T lymphocytes.
4. To identify different subpopulation and subsets of T lymphocytes.
5. To recognizes the location of B and T cells in the secondary lymphoid organs and their interactions.

Chapter - 2

**Topic 4:-**

1. **Immune response**

At the end of this lecture, the student should be able:

1. To describe the main differences between adaptive and natural immunity which include the concepts of: recognition, specificity, diversity and memory.
2. To illustrate how the immune response is induced.
3. To describe the factors that influences immune response.
4. To explain the differences between primary and secondary immune response.

Chapter – 1

**(II) MHC System**

At the end of this lecture, the student should be able:

1. To introduce major histocompatibility complex and its components.
2. To explain the relationship between MHC and HLA.
3. To understand the influence of MHC molecules on immune response.
4. To describe MHC class I and MHC class II and their distribution and respected function in the immune cells.

Chapter – 7

**Topic 5:- (I) Humoral Immunity**

At the end of this lecture, the student should be able:

1. To identify and appreciate the classification of a adaptive immunity into Antibody Mediate Immunity (AMI) and Cell Mediated Immunity (CMI).
2. To describe how the antibody mediated immunity (AMI) is initiated involving predominantly B lymphocytes.
3. To explain the concept of T-dependent and T- independent in the activation of B lymphocytes.
4. To describe the transformation of activated B cells into plasma cells.
5. To recognize that plasma cells are the cells synthesize Immunoglobulins (antibodies).
6. To describe the control mechanism of antibody mediated response.

Chapter – 11

**(II) Immunoglobulins (antibodies): Structure and function**

At the end of this lecture, the student should be able:

1. To describe the prototype of Immunoglobulin (Ig) structure.
2. To discuss the different components of Ig molecule in relation to its function.
3. To introduce different classes and subclasses of Immunoglobulins.
4. To identify different features of Immunoglobulins in relation to their distribution in different body fluids and compartments.
5. To understand how Immunoglobulins perform their protective function including; interaction with antigens, interaction with receptors on inflammatory cells and other molecules.
6. To explain the role of Immunoglobulins in disease process.
7. To know techniques of Immunoglobulins measurement.

Chapter – 4

**Topic 6:-**

**Cell Mediated Immunity (CMI)**

At the end of this lecture, the student should be able:

1. To identify and appreciate the classification of adaptive immunity into AMI and CMI.
2. To describe how cell mediated immunity is initiated involving predominantly T lymphocyte.
3. To understand the activation of different T lymphocyte subpopulations and subsets.
4. To compare T Cell Receptor (TCR) and B Cell Receptor (BCR) to show similarity and dissimilarity in relation to function.
5. To understand how CMI perform its protective role.
6. To appreciate the involvement of other cells in CMI response (e.g. Macrophage, NKcells).
7. To describe the mechanism of cytotoxicity by cytotoxic T lymphocyte (CTL) and other cell.
8. To understand the control mechanism of CMI response.

Chapter - 14

**Topic 7:-**

**Complement system**

**Pathophysiology of complement**

At the end of this lecture, the student should be able:

1. To introduce the complement system and its discovery.
2. To describe the complement nomenclature and terminology.
3. To understand different complement activation pathways: classical, alternative and lectin pathway.
4. To recognize the biological activity generated during the course of complement activation.
5. To understand control mechanisms of complement activation.
6. To become acquainted with the role of complement in health and disease.
7. To know techniques of complement measurements.

Chapter - 13

**Topic 8:-**

**Introduction to Cytokines**

**Cytokines in health and disease**

At the end of this lecture, the student should be able:

1. To clarify the different terms for cytokines nomenclature.
2. To describe the classification, structure and function of different Cytokines.
3. To explain the mode of action and effects on immune functions.
4. To describe receptors and the different activation pathways of cytokines.
5. To explain the structure and function of chmokinyes.
6. To understand the role of cytokines in health and disease.

Chapter – 12

**Topic 9:-**

**Immunodeficiency**

**Primary and secondary ID**

At the end of this lecture, the student should be able:

1. To identify that Immunodeficiency is due to a defect in the immune function.
2. To describe the classification of Immunodeficiency.
3. To explain the presentations of different types of Immunodeficiency (e.g. recurrent infections).
4. To understand the varieties of immune system deficiencies (T cell defects, B cell defects, phagocytes function defects, complement defects).
5. To understand the laboratory investigation for Immunodeficiency disorders.

Chapter – 19

**Topic 10:-**

**Hypersensitivity**

At the end of this lecture, the student should be able:

1. To identify that hypersensitivity is an over-reaction of the immune system leading to tissue damage.
2. To introduce the term "hypersensitivity" and its classification.
3. To describe with details; type I, type II, type III and type V hypersensitivity reactions.
4. To appreciate the overlap between the different types of hypersensitivity reactions.
5. To know how to diagnose different types of hypersensitivities.

Chapter – 16

**Topic 11:-**

**Autoimmunity**

At the end of this lecture, the student should be able:

1. To explain tolerance and the concept of self/non-self recognition.
2. To define autoimmunity and the different proposed underlying mechanisms.
3. To understand the classification of different types of autoimmune diseases; organ specific and systemic autoimmune diseases.
4. To understand the different mechanisms leading to tissue damage in autoimmunity; auto-antibodies, cell mediated immunity TDTH or immune complexes.
5. To appreciate the link between hypersenstivity and autoimmunity in relation to immunopathology.

Chapter - 20

**Topic 12:**

**Immunity to infection**

At the end of this lecture, the student should be able:

1. To understand the immune response to different microbial infections including; bacteria, viruses, fungi and parasites
2. To recognize complications that may occur during the process of immune response
3. To know the different immune mechanisms that combat extracellular or intracellular infections
4. To appreciate the interaction of both the innate and acquired immunity in controlling infection.

Chapter- 17

**Topic 13:-**

**Transplantation Immunology**

At the end of this lecture, the student should be able:

1. To recognize different types of tissue grafts.
2. To introduce immunological basis of graft rejection.
3. To recognize that the graft rejection occurs as first or second set rejection and underlying mechanisms involving T cells and memory.
4. To appreciate the donor and recipient matching procedures; ABO and MHC (HLA) typing.
5. To recognize clinical manifestation of graft rejection ; hyperacute , acute and chronic rejection reactions.
6. To understand the importance of general immunosuppressive therapy.

Chapter – 21

**Topic 14 & 15**

**Practical demonstration spots & Revision**

+ To demonstrate to the students practical laboratory tests and their interpretation