

IMMUNOGENETICS (HCB-814)

Credit Hrs 3(3-

0)

Educational Objectives:

1. This course will focus on the concepts, principles, and scope of genetics with respect to immunology. It will also cover the issues of immune genetics on a global basis. The fundamental principles of immunology; tissues and cells of the immune system; humoral and cell-mediated immune responses; immunogenetics; immunoglobulin structure, function and biosynthesis; immunopathology; infection and immunity; transplantation, autoimmunity and tumour immunology. Intended for students specializing in immunology and related programs, and requiring a more intensive background in biochemistry and molecular biology. The aim of the course is to provide an extensive view on the advances in the field of immunogenetics and genetics of diseases resistance through experimental approaches presented by scientists, experts in different animal species and immune response/disease models.

Course Outcomes:

2. At the end of the classes, the student shall have knowledge of the basic physiological mechanisms that regulate the functioning of the immune system as well as the capability to understand the different types of immune responses and their biological significance based on the genetics. In particular, the student will know about genetic strategies that allow the diversification of the immune responses to antigens and will be able to understand the principle of the vaccine strategy.

3. Course Contents:

- a. Background and history
- b. Innate immunity and Acquired immunity
- c. Antigens and MHC
- d. Antigen antibody interaction
- e. Immunoglobulins: Structure & Function
- f. Organization and Expression of Immunoglobulin genes
- g. Complement and cytokines

- h. B cell Maturation, Activation & Differentiation
- i. T cell Maturation, Activation & Differentiation
- j. Hypersensitivity Reactions
- k. Leukocyte Migration and Inflammation
- l. T-cell Receptor
- m. Immunodeficiency diseases
- n. Transplantation Immunology
- o. Cancer and immune system
- p. The Immune System in AIDS

Recommended Books:

1. **Molecular autoimmunity** by Moncefzouali.
2. **Kuby Immunology** by W.H. Freeman Year 2011.
3. **Immunogenetics** by Hugh O. McDevitt Year 1992.