

COURSE OUTCOME:

1. It is an important paper as students are trained to understand the basics of immunology
2. Evolution of immune cells and organs in vertebrates and invertebrates is discussed.
3. To know about antigen, immunogen, epitopes and their properties.
4. Development of immune responses, organs and molecules involved in it are also dealt in detail.
5. How our immune system fights different pathogens and evasive mechanisms developed by the microbes.
6. The discussion also includes autoimmunity and applied aspects like immunological basis of organ transplantation, development and applications of vaccines.

UNIT I

Overview of the immune system: Historical perspectives and important concepts.

Cells, organs and micro environments of immune system: Cells of immune system, Primary lymphoid organs, Secondary lymphoid organs, Tertiary lymphoid organs

Innate immunity: Components of innate immunity, Interactions between innate and adaptive immunity systems. The complement system: Major pathways of complement activation, diverse functions, Regulation of complement activation, Complement deficiencies and microbial evasion strategies.

UNIT II

Antigens and Immunogens: Immunogens and immunogenicity, Properties of immunogens, Epitopes and their characteristic properties, Adjuvants, Haptens.

Major histocompatibility complex: Structure and function of MHC molecules, General organization and Inheritance of the MHC, Role of MHC and Expression patterns, MHC and immune responsiveness, MHC alleles and susceptibility to diseases.

Processing and presentation of antigens: Endogenous and Exogenous pathway of antigen processing and presentation of antigens, Cross presentation of exogenous antigens, presentation of nonpeptide antigens.

UNIT III

Structure and function of antibodies: Structure of Antibodies, Antibody binding site, Antibody mediated effector functions, Antibody classes and biological activities, Antigenic determinants on antibodies, B-Cell receptor, Immunoglobulin super family and monoclonal antibodies, abzymes.

B – Cell development: Development in bone marrow, Development of B-1 and marginal-zone B cells, B cell activation, Differentiation and Memory generation.

Receptor and signalling: Receptor ligand interactions, Common strategies used in many signalling pathways, Signal transduction in B cells.

UNIT IV

T – Cell development: Early thymocyte development, T-cell activation differentiation and memory .T- cell receptor and co-receptor complex, accessory molecules and signalling. Cell mediated effector responses, Experimental assessment of cell –mediated cytotoxicity. T-cell responses to tumors, regulatory T-cell responses and memory.

UNIT V

Tolerance: Establishment and maintenance of tolerance; Immunosuppression and induction of immunosuppression.

Autoimmunity: autoimmune diseases, factors responsible for induction, mechanisms of induction and treatment.

Infectious diseases; Bacterial, Viral, Protozoan and Fungal infections and evasive mechanisms developed by microbes.

Vaccines: Active and passive immunization, Vaccine strategies, Types of vaccines advantages and challenges

Transplantation immunology: Types of transplants, Graft rejection, Tissue typing Immune tolerance to allografts, clinical transplantations.

REFERENCES

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