MMB - C301
IMMUNOLOGY

L T Credit
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Learning objectives:

- Student will learn about the components of the immune system as well as their functions and response..
- To develop understanding of innate and adaptive immunity
- To understand different serological reaction for the diagnosis of disease.
- To integrate immunology with medical sciences and enrich the knowledge for tumor immunology, rejection of organ transplant, autoimmune disorders, hypersensitivity reaction..

Learning outcomes:

At the end of course student will be able to

- Explain the different components of immune system and how they provide defense against infection.
- Describe how our immune system protects against foreign pathogens.
- Diagnose the viral and bacterial infection through different serological test .
- Gain knowledge of different diseased conditions generated due abnormalities in immune system.
- Explain antigen antibody reactions and principles of hypersensitivity and also explain how to produce monoclonal antibody.

UNIT – I

Immune system and Immunity: History of immunology, structure, composition and function of cells and organs involved in immune system; inflammation, Host-parasite relationships; microbial infection; virulence and host resistance; immune response – naturally acquired immunity; artificially acquired immunity; immunohaematology- blood groups, blood transfusion and Rh incompatibility.

(11 Lectures)

UNIT – II

Antigens and Antibodies- Antigens- structure and properties (types, iso and allo- haptens, adjuvants); antigen specificity; Immunoglobulins (antibodies)- structure, heterogeneity – types and subtypes, properties (physico-chemical and biological); theories of antibody production; complement pathways and biological consequences of complement activation; hybridoma technology- monoclonal antibodies, methods of production; applications of monoclonal antibodies; Immunotoxins; vaccines and toxoids.

(13 Lectures)

UNIT - III

Antigen-Antibody reactions –*In vitro* methods- agglutination, Widal test, haemagglutination, precipitation, complement fixation, immunofluorescence; enzyme linked immunosorbent assay (ELISA), radioimmunoassay; *in vivo* methods – skin test and immune complex tissue demonstrations; application of these methods in diagnosis of microbial diseases.

(12 lectures)

UNIT – IV

Major hisocompatibility complex (MHC) and tumour immunology- Structure and functions of MHC and HLA system; gene regulation and Ir-genes; HLA and tissue transplantation; tissue typing methods for organ and tissue transplantation in humans; graft versus host reaction and rejection; autoimmunity- theories, mechanisms and diseases with its diagnosis; tumour immunology- tumour specific antigens, immune response to tumour, immunodiagnosis of tumour- detection of tumour markers- alpha foetal proteins, carcinoembryonic antigens, etc.

(13 Lectures)

UNIT – V

Hypersensitivity reactions- Antibody-mediated Type I; anaphylaxis: Type II; antibody dependent cell toxicity, Type III; immune complex mediated reactions; Type IV; cell mediated hypersensitivity reactions and the respective disease, immunological methods of their diagnosis; lymphokines and cytokines- its assay methods.

(11 Lectures)

Suggested Reading

1. Janis Kubey, Immunology, W.H.Freeman
2. Peter J Delves, S.J. Martins, D.R. Burtons, Roitts Essential Immunology, Wiley Blackwell
3. C.V.Rao , An Introduction to Immunology, Alpha Science International Ltd , **ISBN** 978-1842650356

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