

## LSC 501—IMMUNOLOGY

1. Organs, cells and molecules of Immune System.
2. Mechanisms to check the entry of microbes into human body, innate and adaptive immune responses, cellular and humoral immune response.
3. Differentiation of haemopoetic stem cells, role of cytokines, inflammatory reaction, chemokines, migration of neutrophils to the site of infection, phagocytosis and microbicidal mechanisms, eosinophils, asthma, basophils, IgE receptor and function.
4. TLR receptors and sensing of pathogen-associated molecular patterns, signal transduction, opsonization, Fc Receptors, prostaglandins and leukotrienes.
5. Antibody structure and function, classification of immunoglobulins, domains, variability, crosses reactivity; Isotypes, allotypes and Idiotypic markers.
6. Idiotypic network Immunoglobulin genes, VJ/VDJ rearrangements and genetic mechanisms for antibody diversity, affinity maturation, allelic exclusion.
7. Hybridoma and monoclonal antibodies, class switching, receptor and soluble forms of immunoglobulin.
8. Antibody engineering. B cell differentiation, BCR and pre-BCR, receptor editing, structure and function of complements, classical and alternative pathways.
9. Histocompatibility, genetic organization of MHC (H2) and HLA complexes. Class I and class II MHC molecules, structure and function.
10. T cell receptors, activation and interaction with APC, Th1 and Th2 cells, intercellular antigen presentation pathways, antigen presentation and MHC restriction.
11. T cell differentiation in thymus,  $\alpha\beta$  and  $\gamma\delta$  T cells, thymic selection and tolerance to self, cytotoxic T cells, super antigens.
12. NK cells, hybrid resistance, NK cell receptors and gene complex, correlation with target MHC expression, missing self-hypothesis, cytotoxicity reaction, apoptosis.
13. Immunological techniques, tumor and transplantation, diseases of relevance to the immune system.
14. Vaccines, peptide and DNA vaccines.

### Suggested Readings

1. Kuby Immunology - by T.J. Kindt, B.A. Osborne & R.A. Golds
2. Janeway's Immunobiology – by Ken Murphy, Paul Travers & Mark Walport