BACHELORS WITH ZOOLOGY AS MAJOR
4th Semester
ZOL422J2: ZOOLOGY: FUNDAMENTALS OF IMMUNOLOGY

Credits: Theory=4, Practical=2

Learning objective: To acquire knowledge about immunity, innate & acquired, complement system; understand the concept of immune deficiencies, hypersensitivity, autoimmunity and transplantation immunology

Learning Outcome: understand the defense mechanism against pathogens and utilize the knowledge for human welfare; gain knowledge on undesirable immunological reactions and their complications in health management

Theory (4 Credits)

Unit I: Overview of Immune System

1.1. Historical background & scope of immunology

1.2. Cells, tissues and organs of the immune system

1.3. Innate immunity and acquired immunity

1.4. Vaccines and their types

Unit II: Molecules of Immune system

2.1. Antigens: nature & types, antigen processing & presentation; MHC: functions & types

2.2. Antibodies: structure, types & functions; theories of antibody formation; monoclonal antibodies

2.3. Cytokines: types, properties and functions.

2.4. Complement system: components & pathways of its activation

Unit III: Immunodeficiency and Tumor Immunology

3.1. Immune deficiencies: primary &secondary; stem cell, T & B-cell & compliment deficiencies

3.2. Acquired immunodeficiency syndrome

3.3. Tumor immunology: immune surveillance, tumor associated antigens & tumor escape mechanisms

3.4. Tumor immunotherapy: antigen non-specific & antigen specific

Unit IV: Damaging and Defective Immune Response

4.1. Concept & classification of hypersensitivity reactions with brief descriptions

4.2. Mechanism of type I and type II hypersensitivity reactions

4.3. Introduction to autoimmune (AI) diseases with emphasis on AI anaemia's & rheumatoid arthritis

4.4. Transplantation immunology: types of grafts; mechanism of homograft rejection

Practical's (2 Credits)

List of Practical's:

1. Demonstration of lymphoid organs
2. Identification of various immune cells by morphology – Leishman staining, Giemsa staining
3. Total leukocyte counts (TLC)
4. Differential leukocyte counts (DLC)
5. Demonstration of phagocytosis in vivo
6. Agglutination reactions- latex agglutination reactions
7. Heam-agglutination reactions- blood grouping, Rh Typing
8. Serum electrophoresis
9. Visit to SKIMS, SKUAST-K and Kashmir University laboratories for demonstration of immunological techniques

Suggested Books / Reading Material

1. Basic Immunology by Sharon, J. William and Wilkins
2. Immunology by F. M. Burnet
3. Immunology by Kuby, Goldsby, R., Kindt, T.J. and Osbourne, B.A., W.H. Freeman
4. Immunology by P. M. Lydyard, A. Whelan And M. W. Fanger
5. Immunology by Roitt, I.M., Brostoff, J. and Male, D. Mosby
6. Immunology: An Introduction by Ian R Tizard
7. Medical Immunology for Students by Playfair, J.H.L. and Lydyard, P.M. Churchill