SEMESTER-IV

COURSE 11: IMMUNOLOGY

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES

- To promote critical thinking among students.
- To provide students with a foundation in immunological processes
- To provide students with knowledge on how the immune system works building on their previous knowledge
- To clearly state the role of the immune system.
- To compare and contrast the innate versus adaptive immune systems.
- To provide an overview of the interaction between the immune system and pathogens.

LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of concepts of immunology. This course will provide students with a deep knowledge in immunology by the completion of the course the graduate shall able to –

- Articulate the roles of innate recognition receptors in immune responses
- Compare and contrast humoral versus cell-mediated immune responses
- Distinguish various cell types involved in immune responses and associated functions;
- Distinguish and characterize antibody isotypes, development, and functions
- Understand the role of cytokines in immunity and immune cell activation;
- Understand the significance the Major Histocompatibility Complex in terms of immune response and transplantation

SYLLABUS:

UNIT – I: Overview of Immune system

1.1 Introduction to basic concepts in Immunology
1.2 Innate and adaptive immunity
1.3 Cells of immune system
1.4 Organs of immune system

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Model chart preparation of cells/organs of immune system
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – II : **Antigens**

2.1 Basic properties of antigens
2.2 B and T cell epitopes, paratopes
2.3 Haptens and adjuvants
2.4 Factors influencing immunogenicity
Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/ Model chart preparation of organogenesis
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – III: Antibodies
3.1 Structure of antibody
3.2 Classes of antibodies
3.3 Functions of antibodies
3.4 Monoclonal antibodies

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/ Model chart preparation of antibodies
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV: Working of Immune system
4.1 Structure and functions of major histocompatibility complexes
4.2 Exogenous pathway of antigen presentation and processing
4.3 Endogenous pathway of antigen presentation and processing
4.4. Basic properties and functions of cytokines

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/ Model chart preparation of MHC
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V: Immune system in health and disease
5.1 Gell and Coombs' classification and brief description of various types of hypersensitivities
5.2 Introduction to concepts of autoimmunity and immunodeficiency
5.3 General introduction to vaccines Types of vaccines, Immunization programme
5.4 Organ transplantation- Graft rejection, immune suppressors

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/ Model chart preparation of classification of Hypersensitivity
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (suggested)

- Organizing awareness on immunization importance in local village in association with NCC and NSS teams
- Charts on types of cells and organs of immune system
- Student study projects on aspects such as – identification of allergies among students (hypersensitivity), blood groups in the class (antigens and antibodies duly reported) etc., as per the creativity and vision of the lecturer and students

REFERENCES BOOKS:

- Judy Owen, Jenni Punt, Sharon Stranford 2013 Kuby Immunology: International Edition W. H. Freeman
- Abbas AK, 2011, Cellular and Molecular Immunology 7th Ed. Elsevier Health Sciences – India.
- Delves P, Martin S, Burton D, Roitt IM 2011 Roitt's Essential Immunology. 12th Ed. Wiley-Blackwell Scientific Publication, Oxford.
- Murphy K, 2011 Janeway's Immunobiology. 8th Ed. Garland Science Publishers, New York.

- Peakman M, and Vergani D. (2009). Basic and Clinical Immunology. 2nd edition Churchill Livingstone Publishers, Edinberg.
- Richard Coico, Geoffrey Sunshine 2008 Immunology: A Short Course, 6th Edition Wiley-Blackwell
- Sudha Gangal 2013 Textbook of Basic and Clinical Immunology Orient Blackswan Private Limited - New Delhi

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SEMESTER-IV

COURSE 11: IMMUNOLOGY

Practical Credits: 1 2 hrs/week

LEARNING OBJECTIVES

- To acquire knowledge on the distribution of lymphoid organs
- To study the histology of lymphoid organs
- To acquaint with the process of blood grouping with kit
- To acquaint with the ELISA test
- To acquaint with the Widal test

SYLLABUS:

1. Demonstration of lymphoid organs (as per UGC guidelines)
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Blood group determination
4. Demonstration of ELISA
5. Demonstration of Immunoelectrophoresis
6. Testing for Typhoid antigens by Widal test.
7. Differential Leukocyte Count
8. Isolation of monocytes from blood.
9. Rapid Plasma Reagin (RPR) Test

RFERENCE WEB LINKS:

- https://vlab.amrita.edu/?sub=3&brch=69
- https://ivl1-au.vlabs.ac.in/List%20of%20experiments.html
- https://ivl2-au.vlabs.ac.in/List%20of%20experiments.html
- https://www.medicine.mcgill.ca/physio/vlab/immun/vlabmenuimmun.htm
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf
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- https://webstor.srmist.edu.in/web_assets/downloads/2021/18BTC106J-lab-manual.pdf

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