MIC 404: Microbial Physiology and Immunology

COURSE CODE: MIC 404
NO. OF CREDITS: 04

COURSE OUTCOMES (COs)

- **CO1** Interactions of microbes with humans with knowledge in the field of immunologyis provided that enables students to understand the impact of pathogenic microbes on human health.
- **CO2** Imparting the in-depth knowledge in microbial growth and physiology.
- **CO3** Understanding the interplay of various components of the immune system during infection.
- **CO4** Learning the deficiencies and disorders of the immune system.

Unit 1: Principles of Physiology

- Nutrient transport in prokaryotic cell
- Signal transduction in bacteria
- Mechanism of drug resistance
- Quorum sensing
- Bacterial Bioluminescence
- Bacterial differentiation

Unit 2: Microbial growth

- Batch growth and its kinetics: definition, trophophase, idiophase, diauxic growth,maximum growth rate, specific growth rate, yield co-efficient
- Continuous growth and its kinetics: continuous culture, dilution rate, residual substrateconcentration
- Factors affecting growth: temperature, pH, oxygen, salt concentration, pressure, wateractivity, radiation
- Growth measurement: direct methods and indirect methods
- Control of microbial growth: physical agents and chemical agents

Unit 3: Functioning of Immune System

- Antigen processing and presentation
- MHC: structure and function
- Cytokines and cytokine bias in diseases
- Compliment components and activation
- T cell receptors and activation of T cells
- B cell receptors and activation of B cells

Unit 4: Immune disorders and immunological techniques

- Hypersensitivity (Hypersensitive reactions)
- Autoimmunity and autoimmune diseases
- Transplantation immunology
- AIDS and other immunodeficiency
- Cancer and the immune system

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REFERENCE

No.	Name	Author
1.	Advances in microbial physiology	Robert K. Poole
2.	Biochemistry Stryer 5th edition	W.H. Freeman
3.	Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology	Wilson, Walker
4.	Biophysical chemistry	A Upadhyay, K Upadhyay
5.	Growth of bacterial cell	Ingraham et. al
6.	Harper's biochemistry	Murray et. al
7.	Microbial cell-cell interaction	Martin
8.	Microbial ecology	Bartha and Atlas, Pearson Edu
9.	Microbial physiology	Dawes & Southerland
10.	Principle of biochemistry 3rd edition	Lehninger Nelson & Cox
11.	Principles of microbiology	RM. Atlas
12.	The microbial cell cycle	C. Edwards
13.	Textbook on principles of bacteriology, virology, and Immunology, IX Edition (5 Volumes), Edward, London, 1995	Topley and Wilson's
14.	Immunology	Janis Kuby
15.	Immunology and immunotechnology	A. K. Chakravarty
16.	Immunology	I. R. Tizard

WEBLINKS

e-PGPathshala:

1. Principles of physiology

https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=SbxpZDmQJ9L1h7rf83v6ow==

- Paper-12 Module-19 Active transport
- Paper-12 Module-15, 16 & 17 Diffusion
- Paper-11 Module-26 Signal transduction

2. Microbial Growth:

https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=SbxpZDmQJ9L1h7rf83v6ow==

- Paper-11 Module-03 & 04 Cell growth and division

3. Immunology:

https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=MNhNzp1RQlU+6LM40KjY1Q==

- Paper-16 Module-22 Antigen processing
- Paper-16 Module-20 MHC
- Paper-16 Module-19 & 21 T-Cells
- Paper-16 Module-17 & 23 B-Cells
- Paper-16 Module-27 to 30 Hypersensitivity
- Paper-16 Module-31 Autoimmune diseases
- Paper-16 Module-34 Cancer and AIDS

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