MMB - E303
ELECTIVE - III CELLULAR MICROBIOLOGY

L T Credit
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Learning objectives:

- Student will learn about Host parasite interaction
- To understand the mechanism of cell signaling in prokaryotic and eukaryotic cells.
- To know about quorum sensing.
- To understand different virulence factor responsible for the initiation of disease

Learning outcomes:

At the end of course student will be able to

- Explain the mechanism of pathogenicity
- Describe how our immune system protects against foreign pathogens.
- Explain how different kind cellular component involved in pathogenesis.
- Develop some therapeutic product from microbial metabolite.

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UNIT – I

Introduction – Bacterial diseases - mutualism, commensalism, and parasitism, bacteria and idiopathic diseases; emergence of cellular microbiology, cellular biology underlying prokaryotic and eukaryotic interactions- ultrasturucture, cytoskeleton, vesicular transport pathways, exocytosis, endocytosis, genomic expression, pathogenecity island, cell cycle and apoptosis.**(12 Lectures)**

UNIT – II

Prokaryotic and eukaryotic signalling mechanism – Eukaryotic cell to cell signalling, endocrine signalling, cytokines signalling, prokaryotic cell to cell signalling; quorum sensing and bacterial pheromones; intracellular signalling-prokaryotic signalling mechanisms and eukaryotic signalling pathways, outcomes of activation of signalling pathways. **(12 Lectures)**

UNIT – III

Infection and cell-cell interaction – Bacterial adherence, basic principles, molecular mechanisms of adhesion, bacterial strustures involved, bacterial adhesins, effect of adhesion on bacteria, effect of adhesion on host cells, bacterial invasion of host cells – mechanism, consequences of invasion, survival and growth after invasion. **(13 Lectures)**

UNIT – IV

Bacterial protein toxins: classification of toxins on the basis of activity, biological effects of toxin action- cell death, nerve transmission, signal transduction, interaction with cytokines; origin and evolution of toxin genes, therapeutic uses of toxins. **(11 Lectures)**

UNIT – V

Cellular microbiology future directions –prokaryotic and eukaryotic interactions in bacterial growth, effect of bacteria on eukaryotic growth and survival, bacterial control of eukaryotic cell cycle and apoptosis, commensal microflora in cellular conversation, application of cellular microbiology to the generation of novel therapeutics, cellular microbiology and idiopathic diseases. **(13 Lectures)**

Suggested Reading

1. CKJ Paniker. Test Book of Microbiology, Orient Longman
2. Henderson. Cellular Microbiolgy, Wiley
3. Warran Levinson .Medical Microbiology and Immunology, Appleton &Lange;**ISBN**978-0071382175.
4. Cossart P, Boquet P, Normark S, Rappuoli R. Cellular Microbiology eds. 2nd edition. American Society for Microbiology Press. 2005.

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