MANGALORE UNIVERSITY

DEPARTMENT OF MICROBIOLOGY

MSc Microbiology

MBS- 507: MedicalMicrobiology 40h

OBJECTIVES

1. To understand types of human pathogens, occurrence, transmittance
2. To analyze distinctive characteristic of bacterial and fungal pathogens
3. Mode of entry, pathogenecity studies and mechanism to control
4. Antibiotic resistances, mechanism developed by microbes
5. To prospect novel antibiotics, understanding on new vaccine development

COURSE OUTCOME

CO1: Overview of microbial viz., Fungal, bacterial infections
CO2: Human pathogens, mode of infections, mechanism of emergence
CO3: Cell-Cell interactions, bacterial toxins, membrane and intracellular targets
CO4: Molecular techniques to diagnose infections
CO5: Understanding antibiotic resistance, prospect for novel antibiotics
CO6: Development of newer vaccines

Unit-I:

An overview, obligate intracellular bacteria, Non sporulating extracellular bacteria, sporulating extracellular bacteria, parasites, yeasts and molds, Infection: Definition, Types, stages of infection, portal of entry, process of infection.

Unit II:

Important human pathogens: *Mycobacterium tuberculosis, Klebsiella pneumonia, Proteus vulgaris, Shigella dysenteriae, Vibrio cholera.* Emerging and re-emerging pathogens, mechanism of their emergence. Rapid diagnostic principles, Nucleic acid probes, Real Time PCR, diagnostic sequencing and mutation detection, molecular typing, array technology.

Unit III:

Microbes-Host cell interaction, cell organization, signal transduction and cell adhesion, cell surfaces and bacterial interactions: lectins, proteoglycans, mucins, glycolipids,
Routes of Invasion, selection of intracellular niche, tissue damage, cell-cell spread (metastasis) of intracellular pathogens, role of enzymes, proteins and toxins during invasions Bacterial toxins: Types, superantigens, pore-forming toxins, membrane perturbance and permeabilization, soluble toxins, toxins acting on signal transduction,

Unit IV:

Antibiotics, Mechanisms of antibiotic resistance, extended spectrum β- lactamases. Inhibitors of enzymes, novel antibiotics from natural resource, strategic mechanism and interference between host cell and pathogen interaction and control of pathogenesis. Mechanisms of antimicrobial therapeutic molecules AMPS, Newer vaccines: Recombinant vaccines, subunit vaccines, DNA vaccines, BCG & HIV- vector basedvaccines.

Note: Each unit is for 10h