

I. Foundations of Microbiology – Session 1

A. Introduction to Microbiology)

1. History of Microbiology
 - a. The microscope: vanLeeuwenhoek, Hooke
 - b. Spontaneous generation: Redi, Spallanzini, Pasteur
 - c. Cell theory: Schleiden & Schwann, Virchow (Biogenesis)
 - d. Microorganisms and food: Pasteur, Apert, Noah
 - e. Germ theory of disease: Lister, Koch, Pasteur
 - f. Prevention and treatment of infectious disease:
 - 1) Vaccination: Jenner (Smallpox), Pasteur (Rabies),
 - 2) Chemotherapy: Ehrlich (Salvarsan), Fleming (Penicillin)
2. Contemporary Microbiology
 - a. General: Anatomy, Physiology, Genetics
 - b. Applied: Soil, Aquatic, Food, Industrial
 - c. Medical: Immunology, Virology, Bacteriology, Mycology
3. Prokaryotic and Eucaryotic Organisms
 - a. Introduction to microbial diversity
 - b. Nomenclature & taxonomy: e.g.
 - Staphylococcus aureus*
 - Legionella pneumophila*
 - Escherichia coli*
 - Streptococcus pneumoniae*
 - c. Prokaryotic cells vs. eucaryotic cells
 - 1) Cellular and biochemical nature
 - 2) Differential anatomy
4. Kingdoms/Domains of living organisms
 - a. Eubacteria - Bacteria
 - b. Archea - Archaeobacteria
 - c. Eucarya -
 - Algae and protozoa,
 - Yeasts and molds,
 - Plants and animals
5. The Nature of Viruses:
 - a. Obligate intracellular parasites
 - b. Acellular, Non-metabolic
 - c. Nucleic acid, Reproduction

B. Microscopy and Microbial Diversity

1. Microscopes
 - a. Composition of microscopes:
 - Source of illumination
 - Specimen holder
 - System for magnification
 - b. Quality of viewing:
 - Illumination: Source, Condenser, Diaphragm
 - Specimen: Integrity and Contrast
 - Magnification: Quantity and Quality
 - Resolution
 - c. Types of microscopes:
 - 1) Brightfield
 - 2) Darkfield
 - 3) Phase contrast
 - 4) Fluorescence
 - 5) Transmission electron microscope
 - 6) Scanning electron microscope
2. Staining
 - a. Simple stain - For contrast
 - b. Differential stains -

Gram stain, Acid-Fast stain
c. Structural stains -
Spore stain, Flagella stain, etc.