BIOLOGY SS 1: WEEK TWO

Micro-Organism Around Us

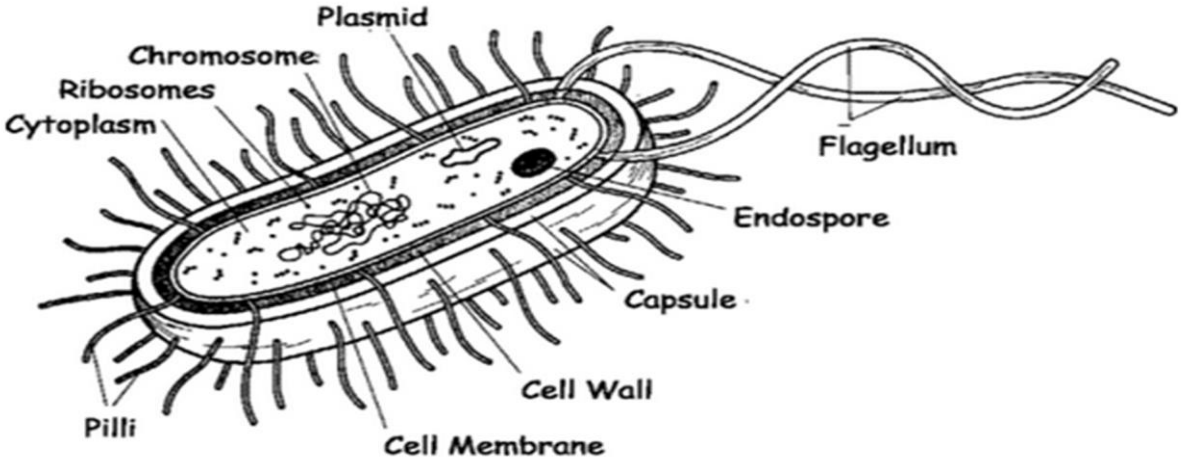
Micro-organisms are tiny organisms that cannot be seen with the naked eyes except with the aid of a microscope. Anthony Van Leeuwenhoek (1632– 1733) was the first scientist to discover micro-organism with his newly invented microscope.
Micro-organisms are dreaded as disease-causing agents (germs). However, many of them are beneficial to man e.g. saprophytic microbes that bring about the decay of organic matter. Those micro-organisms that have negative effects on man are called pathogens.
Micro-organisms are found everywhere – in the air, water, soil, in our food, on our food, on surfaces of objects, and on and inside living organisms, on our bodies, inside of our bodies and on our clothes, everywhere.

Micro-organisms can be grouped into the following:
Bacteria
Viruses
Some algae
Protozoa
Some fungi

Most microbes are unicellular but some like fungi and algae are multi-cellular. Micro-organisms form spores during the adverse season when the favourable season comes the spores are released, carried in the air and on landing on suitable substrate grow and produce more spores.

Bacteria:

Bacteria can be seen with the use of a light microscope and has a simple structure. It is unicellular. It is a prokaryotic cell i.e. it does not have a true nucleus. Heredity materials are contained in a strand of DNA (Deoxyribose nucleic acid) inside the cell.



Bacteria cells typically are surrounded by a rigid, protective cell wall. The cell membrane also called the plasma membrane regulates the passage of materials into and out of the cytoplasm. The DNA, located in the nucleoid region, contains the genetic information for the cell. Ribosomes carry out protein synthesis. The flagellum, found in numerous species, is used for locomotion. Some bacteria contain one plasmid, a small chromosome with extra genes. Others have a capsule, a sticky substance external to the cell wall that protects bacteria from attack by white blood cells micro-organism.

Types of bacteria
Bacteria can be grouped based on the following:

Oxygen requirement
Shapes
Gram's staining technique

Based on the oxygen requirement
Aerobic Bacteria: This group of Bacteria uses oxygen in respiration e.g. Vibrio cholera.
Obligate anaerobes: This group of bacteria do not utilize oxygen in respiration e.g. putrifying bacteria.
Facultative anaerobes: These are bacteria that can exist in two states e. they can use oxygen and they can also do without oxygen.

Based on shape
Cocci:- This group are round in shape.
Bacilli:- They have a rod-like shape.
Spirillae:- These are spiral.
Vibrios:- They are comma-shaped.
Flagellated Spirochaetes:- Some bacteria have a whip-like structure called flagella that affect their movement.

Based on Gram's staining technique
Gram-positive bacteria: retains the purple/violet stain in its cell. (Needed during culture of bacteria)
Gram-negative bacteria: lose or do not retain the purple stain in the cells

Viruses:
They are unicellular and they have no nucleus, cytoplasm or cell membrane. They are smaller than bacteria and can only be seen under an electron microscope. Viruses lack life. Thus they cannot respire nor carry out metabolism. They can only survive inside living cells.

Fungi:
These are non-green simple plants. They feed Saprophytically or parasitically. Saprophytic fungi such as mucor, yeast, penicillium are useful to man. Parasitic fungi cause diseases which are unpleasant to man. Example of animal diseases caused by fungi is Ringworm, Athlete's foot, mouth thrush, candidiasis etc. Plant diseases caused by parasitic fungi are mildewed, spots, wild, blights and Rots.

Protozoa:
These are unicellular microscopic animals. They are found in damp soil and water. Some of them are parasitic while others live freely in their habitat. Examples of parasitic protozoa are Trypanosome, plasmodium etc. examples of free-living Protozoa are: Amoeba,
Parameciumetc. parasitic protozoans are pathogens that cause disease like Malaria, sleeping sickness, Bilharziasis etc.

Algae:
Algae are mostly free-living microscopic plants. They survive in a wide range of habits such as wet soil, freshwater, sea etc. they have chlorophyll to several other pigments giving rise to green algae, brown algae, blue/green algae etc. examples of algae are Spirogyra, volvox, Chlamydomonas, nostoc, Diatoms etc.

ASSIGNMENT

1. What are Micro-organisms?
2. Classify bacteria based on oxygen requirement, shapes and Gram's staining technique
3. Briefly discuss the following micro-organisms: Algae, Viruses, Protozoa