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Paper : Basic Microbiology

Q No: 2

What is the role of microscope?  
Types of microscope.

Ans:

Microscope are used in viewing the specimens that are relatively very small in size, they are used to view the cellular structure of organs, germs, and bacteria, they play a very importance role in the laboratory for the tissue and organism which are too small to be seen clearly with the naked eye. All branches of biology use microscopes especially in molecular biology and histology (the study of cell), microscope are the backbone of studying biology.

# \* Types of Microscope

## 1) Simple Microscope:

The simple microscope is generally considered to be the first microscope. It was created in the 17th century by Antoni van Leeuwenhoek, who combined a convex lens with a holder for specimens. Magnifying between 200 and 300 times. This microscope was simple.

## 2) Compound Microscope:

With two lenses, the compound microscope offers better magnification than a simple microscope. The second lens magnifies the image of the first. Compound microscopes are bright field microscopes. These devices provide a magnification of 1000 times.

## 3) Stereo Microscope:

The stereo microscope also called a dissecting microscope, provides magnification of up to 300 times. These binocular microscopes are used to look at opaque objects or objects that are too large to be viewed with a compound microscope.

∴ Confocal Microscope:

" unlike stereo and compound microscope, which use regular light for image formation. the confocal microscope are uses a laser light to scan samples that have been dyed. these samples are prepared on slide and inserted. operator can create 3-D images.

∴ Scanning Electron Microscope (SEM).

(SEM) are uses electrons rather than light for image formation. samples are scanned in vacuum or near-vacuum condition, so they must be specially prepared by first undergoing dehydration and then being coated with a thin layer of a conductive material, such as gold.

Q NO 1

Ans: Prokaryotic and Eukaryotic cell: ?

∴ prokaryotic:

Prokaryotic are organism made up of cell that lack a cell nucleus or any membrane-encased organelles. these means the genetic material DNA in prokaryotic is not bound within a nucleus. in addition the DNA is less structured in prokaryotic than in eukaryotic.

in prokaryotic, DNA is a single loop while in Eukaryotic organism into chromosomes.

prokaryotic are made up of just a single cell (unicellular) but there are a few that are made of collection of cell (Multicellular).

ii) Eukaryotic ::

Eukaryotes are organism made up of cells that possess a membrane-bound nucleus (that holds DNA in the form of chromosomes) as well as membrane-bound organelles. Eukaryotic organism may be multicellular or single-celled organism. All animal are Eukaryotic other eukaryotic include plants, fungi and protists.

+ Similar features of prokaryotic and Eukaryotic cells.

i) Cell membrane :: Both eukaryotic and prokaryotic cells bear a lipid bilayer, which is an arrangement of phospholipids and protein that acts as a selective barrier between the internal and external environment of cell.

i) Genetic Material:

Eukaryotic and prokaryotic cells both use deoxyribonucleic acid (DNA) as the basis for their genetic information. This genetic material is needed to regulate and inform cell function through the creation of RNA by transcription, followed by the generation of protein through translation.

ii) Ribosomes:

Ribosomes facilitate RNA translation and the creation of protein, which is essential to the functioning of both eukaryotic and prokaryotic cells.

Q No: 3

\* Difference of prokaryotic and eukaryotic cells.

Ans: i) Cell size:

Eukaryotic cells are ordinarily larger (10 - 100  $\mu\text{m}$ ) than prokaryotic cells (1 - 10  $\mu\text{m}$ ).

ii) Cell arrangement:

Eukaryotic are often multicellular whereas prokaryotic are unicellular. There are however some exceptions - unicellular

eukaryotic include amoebas, paramecium, yeast.

i) True membrane-bound nucleus:-

Eukaryotic cells have a true nucleus bound by a double membrane. It contains the DNA-related function of the large cell in a smaller enclosure to ensure close proximity of material and increased efficiency for cellular communication and function. In contrast, the smaller prokaryotic cells have no nucleus. The materials are already fairly close to each other and there is only a "nucleoid" which is the central open region of the cell where the DNA is located.

ii) DNA Structure:-

Eukaryotic DNA is linear and complexed with packaging protein called "histones" before organization into a number of chromosomes.

Prokaryotic DNA is circular and is neither associated with histones nor organized into chromosomes.

iii) Ribosome Size:- Both eukaryotic and prokaryotic cells contain many ribosomes. However, the ribosomes of the eukaryotic cell are larger than prokaryotic ribosomes. i.e. 80S compared to 70S.