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SECTION:- A

PAPER:- Microbiology

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Answer No 1) Fill in the blanks

1) **MICROORGANISM**
2) **PHYCOLOGY**
3) **PATHOGENS**
4) **RIBOSOME**
5) **MITOCHONDRIA**
6) **BINARY FISSION**
7) **LOGARITHMIC INCREASE**
8) **LOG PHASE**
9) **PLASMOLYSIS**
10) **PROTEIN.**

ANSWER NO 2

1)MITOCHONDRIA:-

DEFINITION:- Mitochondria is also known as the power house of the cell. It is a double membrane bound organelle which is semiautonomous, which means that it acts independently to some degree.

DISCOVERY:- It is discovered by a cytologist named Richard Altman, identify it by a staining technique and named it as bioblast. Later Carl Benda give the name Mitochondria.

FUNCTION:- The primary function of mitochondria is to generate energy in the form of ATP. Its other functions is to store calcium for cell signaling, generation of heat and cell growth and death.

Some other details:- As we know that mitochondria has double membrane. Its outer membrane is freely permeable to some small molecules and some channels which are capable of transporting large molecules. While the inner

membrane is very less permeable as compared to outer membrane.

- The matrix of mitochondria contain DNA and some enzymes which act in *TCA* cycle also called *citric acid cycle* or *krebs cycle.*
- The cristae, which bent folded, contain protein components of the ETC.
- The size of mitochondria ranges from 0.5 to 10 micrometer which is similar to the size of bacterium.

2)NUCLEUS:-

DEFINITION:- nucleus also called the *brain of cell*. Nucleus is separated from the other organelle through its membrane which is a double layer. It control all activities of the cell.

DISCOVERY:- In biological science, nucleus is discovered by *Robert Brown* in 1831. He discovered while studying orchids. During the study he observe an opaque area which he called the *areola* or *nucleus.*

Some other details:-

- The nucleus contain nucleoli which are small bodies.
- The matrix of nucleus called *nucleoplasm.*
- Normally the cell is mononucleated but there is also multinucleated cell is present.
- Nucleolus is present which produces ribosomal RNA which in turn makes the ribosome.
- Nucleolus is most prominent structure of the nucleus.
- Chromosomes are present which is thread like structures formed from strands of DNA and the histone protein.

3)BUDDING:-

- It may be define as a type of asexual reproduction in which a new individual form from an outgrowth of mature organism of a particular site.
- This division occur mitotically.
- The separation of new individual which form from an outgrowth, occurs when it becomes the size of a parent organism.

- The example of this is *hydra* which use regenerative cells for reproduction.

4)CULTURE MEDIA:- It maybe define as a gelatinous substance which contains nutrients for the growth of some individual. The individual may be microorganism or some tissue.

SOME TERMS ARE FOLLOWING:-

- **INOCULUM:-** The introduction of microorganism into the culture medium. So the substance which is used for inoculation(introduction) such as microbes, are called inoculum.
- **STERILE:-** The culture media having no living organism.
- **AGAR:-** A thick jelly like substance which is obtained from red algea. It is used to thickened the food such as jelly.
- **SLANTS:-** When a culture is made on a slant surface of a solidified medium in a test tube to provide greater area.
- **DEEP:-** also called *Deep culture* which is obtained by a deep inoculation into an agar. It is used for anaerobic bacterial growth.
- **Petri plates:-** The petri dish which are filled to used in a culture media is called petri plates.

5) GROWTH FACTORS:- A substance which is capable of stimulating the growth of an individual.

- As organisms cannot form its essential component which help them to grow. So it must be taken from the environment.
- As some individual like bacteria need certain vitamins and that vitamins is produced by certain enzymes which bacteria cannot make, so they have to obtain it from the environment.
- Example of this is amino acid, purine, pyrimidine, cytokines etc.

ANSWER NO 3):-

BACTERIAL GROWTH:-

DEFINITION:- The increase in the number of bacteria rather than its population is called bacterial growth.

lets say a bacteria can reproduce through binary fission. So the parent cell firstly divided in to two cell, then the two cell become four and so on. So its just limited to the number of bacteria rather than its size.

Phases of bacteria:-

There are four phases of bacteria which are following:-

1)LAG PHASE:- When bacteria is introduced to a new medium. The size of bacteria increases while its population remain the same. Its because they are synthesizing the enzymes and other factors which is necessary for cell division. the time frame of this period is from 1 to several days.

2)LOG PHASE:- This phase is also called logarithmic increase. Now the division occur in this phase. The metabolic activity is also high in this phase. The metabolic activity is high because the essential substance are generated such as RNA, DNA, Cell wall components.

This phase is very sensitive to harsh condition. It is in this growth phase that antibiotics and disinfectants are most effective as these substances target bacteria cell walls or the protein synthesis processes of DNA transcription and RNA translation.

3)STATIONARY PHASE:- The growth of bacteria become slow as the nutrients available for bacterial growth start to decline as well as the accumulation of waste product occur. In this stage the bacterial growth reach to its maximum level as the number of dividing cell becomes equal to the number of dying cell.

So no increase in number occur, thus competing with one another for the nutrients which lead the cell to become less metabolically active. The bacteria mutate itself to survive in this harsh condition thus cause diseases to the individual.

4)DEATH PHASE:- This phase also called logarithmic decline phase. In this phase the nutrient become so less that the number of dying cell increases. The growth curve experience a sharp decline.

The interesting point in this phase is that those bacteria which lysis. Due to this membrane breakdown the contents which was in the bacteria, become available for the other bacteria. Thus helping them to live long enough.