

Mid-Term Assignment (Spring-2020) (BS-MLT 2ndSec-A)

ID 15875

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Course Title: Basic Microbiology Instructor: Mr. Fazli Zahir Mian

Time: 48 Hours

Q1: Fill in the Blanks.

- 1) **Microorganisms** are living things which individually are too small to be seen with naked eye.
- 2) The scientific study of algae is called **Phycology**.
- 3) Diseases causing living organisms are known as **Pathogenesis**.
- 4) **Ribosomes** cell organelle is present both in prokaryotic and eukaryotic cell.
- 5) The power house of cell is known as **Mitochondria**.
- 6) **Binary fission** is the most common method of asexual reproduction in microbes.
- 7) Log period of bacterial growth is also known as **Logarithmic**
- 8) **Log** phase of microbial growth is metabolically active and is for industrial purposes.
- 9) Shrinkage of cell's plasma membrane caused by osmotic loss of water is called **Plasmolysis**
- 10) For synthesis of cellular material nitrogen and sulfur is needed for **Protein** synthesis.

Q2: Write short notes on the following

1) **Mitochondria**

Mitochondria are organelles within eukaryotic cells that produce ATP the main energy molecule used by the cell. For this reason the mitochondrion is sometimes referred to as the power of the cell. It is thought that mitochondria arose from once free living bacteria that incorporated into cells.

2) **Nucleus**

The cell's nucleus contains all of the cell's genome, except for a small fraction of mitochondrial DNA, organized as multiple long linear DNA molecules in a complex with a large variety of proteins. A double membrane that encloses the entire organelle and isolates its contents from the cellular cytoplasm, and the nuclear matrix which includes the nuclear lamina, a network within the nucleus that adds mechanical support much like the cytoskeleton, which supports the cell as a whole.

3) **Budding**

Budding is a type of asexual reproduction in which a new organism develops from an outgrowth or bud due to cell division at one particular site. The small bulb-like projection coming out from the yeast cell is called a bud. Since the reproduction is asexual, the newly created organism is a clone and, excepting mutations, is genetically identical to the parent organism. Organisms such as hydra use regenerative cells for the reproduction in the process of budding.

In hydra ,a bud develops as an outgrowth due to repeated cell division at one specific time these buds develop into yiny individuals and, when fully mature detach from the parent body and become new independent individuals..

4) **Culture media**

A culture media is a specific medium used in microbiological laboratories to grow different kinds of microorganisms . A growth or a aculture medium is composed of different nutrients that are essential for microbial growth.

A culture may be solid or liquid .The solid culture media is composed of a brown jelly like substances known as agar .Different nutrients and chemicals are added to it to allow the growth of different microorganisms.

5) **Growth factors**

A growth factor is anaturally occurring substances capable of stimulating cellular growyh, proliferation, healing, and cellular differentiation. Usually it is a protein or a steroid harmone. Growth factors are important for regulating a variety of cellular processes.

Growth factors typically act asa signaling molecules between cells. Example are cytokines and harmones that bind of specific receptors on the surface of their target cells.

Q3:What is bacterial growth? Discus different phases of bacterial growth?

BACTERIAL GROWTH:-

Bacterial growth is proliferation of bacterium into two daughter cells ,in a process called binary fission. Providind no event occurs, the resulting daughter cells are genetically identical to the original cell. Hence, bacterial growth occurs,.

There are four types of phasdes of bacterial growth:-

1 LAG PHASE

2 LOG PHASE

3 STATIONARY PHASE

4 DEATH PHASE

LAG PHASE:-

During lag phase , bacteria adapt themselves to growth conditions. It is the period where the individual bacteria are maturing and not yet able to divide. During the lag phase of the bacterial growth cycle , synthesis of RNA, enzymes and other molecules occurs. During the lag phase cell change very little because the cells did not immediately reproduce in a new medium. This period of little to no cell division is called the lag phase and can last for 1 hour to several days.

LOG PHASE:-

The log phase (sometimes called the logarithmic phase) is a period characterized by cell doubling. The number of a new bacteria appearing per unit time is proportional to the present population. If growth is not limited doubling will continue at a constant rate of population increase doubles with each consecutive time period. For this type of exponential growth, plotting the natural logarithm of cell number against time produces a straight line. The slope of this line is the specific growth rate of the organism , which is the measure of the number of divisions per cell per unit time.

STATIONARY PHASE:-

The stationary phase is often due to a growth limiting factor such as the depletion of an essential nutrient, and the formation of an inhibitory product such as organic acid. Stationary phase results from from a situation in which growth rate and death rate are equal. The number of new cells created is limited by the growth factor and as the result the rate of cell growth matches the rate of cell death. The result is smooth horizontal linear part of curve during the stationary phase. Mutation can occurring during stationary phase.

DEATH PHASE:-

A death phase (decline phase) bacteria die. This could be caused by lack of nutrients, environmental temperature above or below the tolerance band for the species, or their injurious conditions.

This basic _batch culture growth model draws out and emphasizes aspects of bacterial growth which may differ from the growth of macrofauna. It emphasizes clonality, asexually binary fission division, the short development time relative to replication itself, the seemingly low death rate, the need to move from a dormant state to a reproductive state or to condition the media, and tendency of lab adapted strains to exhausts their nutrients

The cell do not reproduce in synchrony \without explicit and continual prompting (as in experiments with stalked bacteria) and their exponential phase growth is often not ever a constant rate, but instead a instead a slowly decaying rate.

Good luck.