Final Term Summer Assignment

Technology

Medical Lab Technology(MLT)

Subject

Basic Microbiology

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Submitted To

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Date

25-Sep-2020

Q1 : Write a detail note on pathogenic action of bacteria ?

Answer :

Pathogenic action of bacteria :

- **Tissue destruction:** flesh-eating bacteria: Clostridium perfrigens.
- **Obstruction:** Cytic fibrosis.
- **Toxins**: bacterial components that directly harm tissue or trigger disease symptoms
  - **Endotoxin**: lipopolysaccharides.
  - **Exotoxin**: A-B toxins.
- **Immunopathogenesis** :
  - Excess immune responses
  - Autoimmunity.

Q2 : Explain in detail host parasite relationships ?

Answer :

Host parasite relationship :

Parasites are defined as organisms which live on or within some other living organisms deriving sustenance from it, the organism in which he lives is an host. A parasitic relationship is one in which one organism, the parasite, lives off of another organism, the host, harming it and possibly causing death. The parasite lives on or in the body of the host. A few examples of parasites are tapeworms, fleas, and barnacles. A parasite and its host evolve together. The parasite adapts to its environment by living in and using the host in ways that harm it. Hosts also develop ways of getting rid of or protecting themselves from parasites.

- **Symbiosis :**

Symbiosis is defined as the permanent association between two specifically distinct organisms dependent on each other.

- **Commensalism :**

Commensalism is an association between host and parasite in which one parasite is benefitted and other is neither benefitted nor harmed .If the parasite is pathogenic and harms its host the condition is known as parasitosis.

- **Mutualism :**

Mutualism describes a type of mutually beneficial relationship between organisms of different species. It is a symbiotic relationship in which two different species interact with and in some cases, totally rely on one another for survival.

- **Parasitism :**

Parasitism is a type of symbiotic relationship, or long-term relationship between two species, where one member, the parasite, gains benefits that come at the expense of the host member.

Q3 : What is the barrier system required for pathogenic action of bacteria ?

Answer :

Barrier systems required for pathogenic action of bacteria are as follows :

Host cell membrane	Taken up by phagocyte and resist killing	Inhibitory molecules	**Mycobacterium**
Production of antibody	Degrade antibody	IgA protease	**Streptococcus**
Antimicrobial cell mediated	Activate T cells non-specifically	super antigens	**staphylococcus**
Antimicrobial immune response	Vary presenting microbial antigen	switch on production of different antigens	**Borrelia**
		Genetic recombination	**streptococcus**

Q4 : Describe Asexual reproduction method of reproduction of Bacteria ?

Answer :

A sexual reproduction of bacteria :

Asexual Reproduction :

Asexual reproduction in bacteria occurs by the following methods:

1. **Binary fission:**

This is the most common type of asexual reproduction in actively growing bacteria and occurs during favorable conditions. On this basis, bacteria were once called 'Fission fungi' (Shizomycetes). In this process, the cytoplasm and the nucleoid divide equally into two without mitosis, and the two daughter cells formed are identical to each other; hence the namebinary fission. The whole process of binary fission involves two steps—Genome replication and Septum formation. Both the events occur simultaneously and are triggered by a mesosome (if present).

a. Genome/DNA replication:

Binary fission begins with DNA replication. DNA replication starts from an origin of replication, which opens up into a bubble. The replication bubble separates the two DNA strands, each strand acts as a template for synthesis of a daughter strand. The DNA replication is bidirectional, starting from the point of origin and resulting in the formation of two circular daughter DNA molecules. In each daughter DNA molecule, one strand is derived from the parental DNA molecule while another strand is a new one. This is semi-conservative mode of DNA replication.

b. Septum formation/cell division:

A peripheral ring of plasma membrane invaginates and grows centripetally to form a double-membranous septum. Wall material is deposited between the two membranes of the septum. This separates the parent cell into two nearly equal daughter cells, each having its own nucleoid.

Under optimal conditions of nutrition, water and temperature, the process of binary fission is very quick and the division may be completed in about 20-30 minutes. Thus, in 24 hrs, a very large number of bacteria may be produced.

2. Zoogloea stage:

Under unfavorable conditions, the bacterial cells come to lie in chains and get surrounded by a lot of mucilage. This is called zoogloea stage. It is a temporary phase for avoiding dessication.

2. **Conidia formation:**

This condition occurs in mycelial bacteria. The terminal portions of bacterial filaments cut off rounded structures in chains, called conidia. These conidia on detachment form new individuals.

3. **Gonidia formation:**

In this case, the bacterial cell produces a number of flagellated daughter cells within. These daughter cells are also called as swarmers. The cell wall of parent cell ruptures, releasing gonidia. This is reported in Rhizobium species.

4. **Cyst formation:**

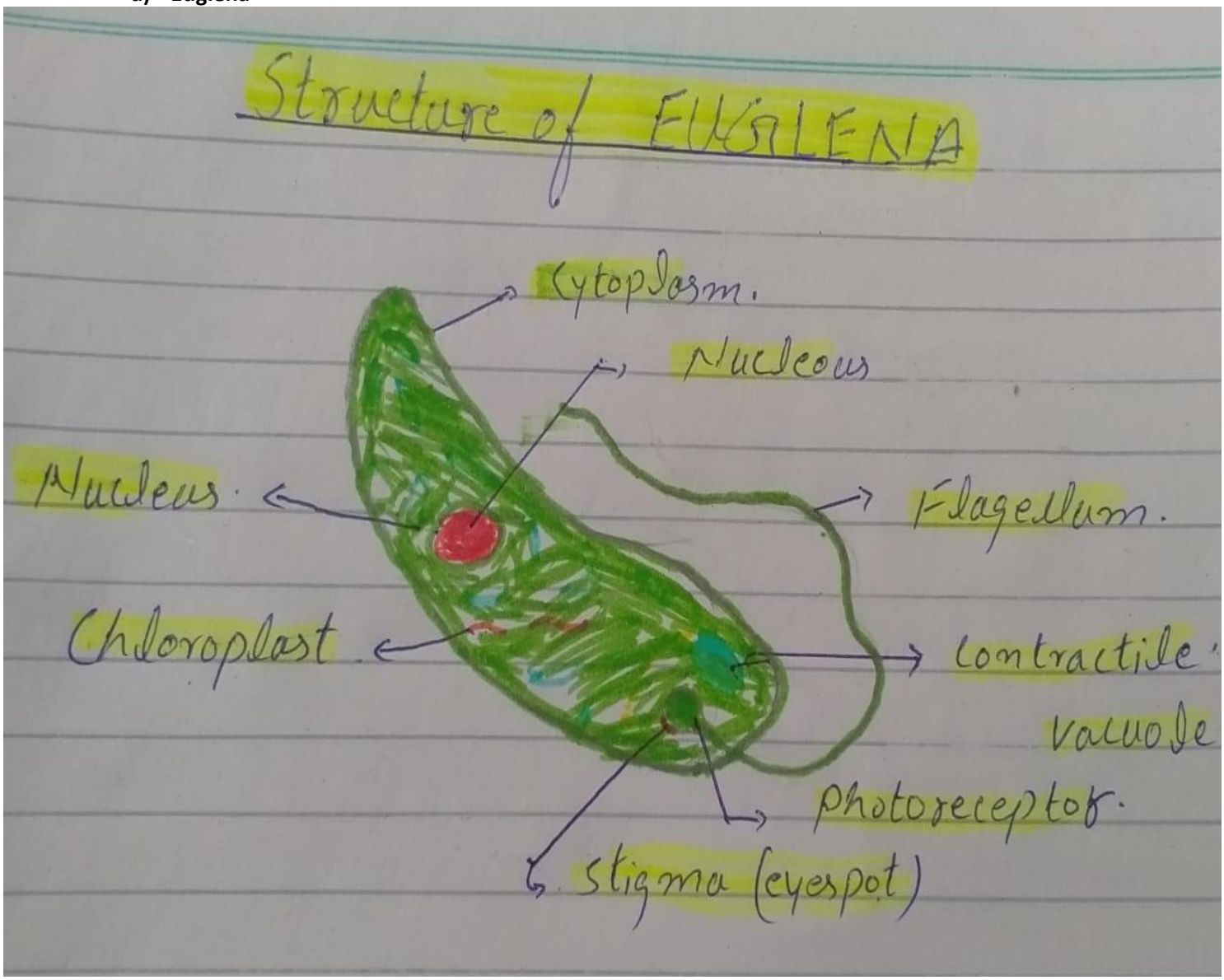
This is reported in Azatobacter. The parent cell secretes a highly protective covering called cyst wall, which can resist unfavorable conditions. On return of favorable conditions, the cyst wall dissolves and the bacterium gets released. Thus, cyst formation helps in perennation.

5. **Budding:**

Some bacteria continuously produce protrusions, called buds, which on detachment form new individuals. Hyphomicrobium vulgare and Rhodomicrobium vannielia are common examples of budding bacteria.

Q5 : Draw a labeled structure of the following :

a) **Euglena**



b) Paramecium