Benha University **1st year of Vet.Med**

Faculty of Science **Jan- 2017**

Time : 2 Hours **Biology 100 A Exam** **Vet.drug sec.**

1- Complete the missing words:

a) The virus which infect bacteria called **Bacteriophage** while infect plants called Phytophage

b) Bacteria living in the presence of oxygen are **aerobes** while living in the absence of oxygen are **anaerobes**

c) *Chlamydomounas* motile by two equal **Flagella**

d) *Spirogyra* sexually reproduced by **Sclariform** or **Lateral** conjugation

e) Fungi asexually reproduced by **Sporangiospores** or **Conidiospores**

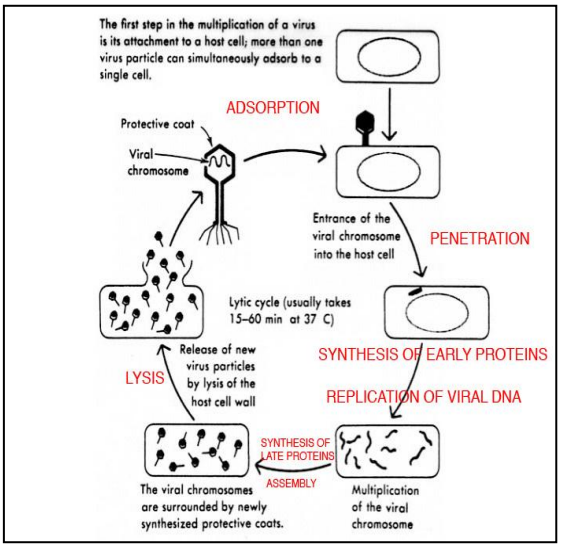
f) Procaryotic organisms contain **Primitive** Nucleus

g) The mass of hyphae called **Mycelium**

2- Write short notes on 3 only of the following:

a) Lytic cycle

The bacteriophage is a virus composed of a strand of DNA and a protein coat , the virus attaches to the bacterium and invasion takes place during viral replication , a molecule of viral DNA is synthesized then enzymatically cut into multiple sections. The sections are packaged with viral protein .then the bacterium lyses and releases the viruses.



b) Heterotrophic bacteria:

These bacteria depend on availability of food from outside sources. They are classified into saprophytic bacteria and parasitic bacteria.

Saprophytic bacteria:

They grow on dead and decaying organic matter. They produce enzymes to digest the organic material and absorb them. The break down of carbohydrates is called fermentation and the break down of protein is called putrefaction.

Parasitic bacteria:

They live on or within living plants and animals and obtain organic food from the host.

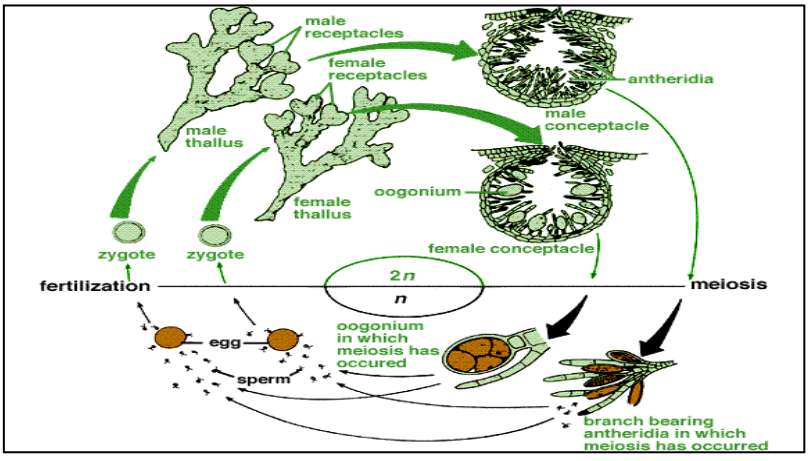
Symbiotic bacteria:

These bacteria form mutually beneficial association with other organisms. Different species of the bacterium *Rhizobium* induce nodule formation in roots of suitable legume plants. The bacteria get shelter and food from the legume. In turn it fixes the atmospheric nitrogen into nitrogenous compounds for the legume plant.

c) Diatoms

- Most members are unicellular, having a yellow or golden brown color.
- The cell wall composed of two overlapping halves.
- In the side view we can detect either one of the valves, the outer (epitheca) and the inner (hypotheca).
- They are penniless or central type
- There are a rapha in the valve view.
- Presence of silica in the cell wall

d) Life cycle of *Fucus*



3- Write on two only of the following :

a) General characteristics of viruses

Viruses are infectious agents with both living and nonliving characteristics. They can infect animals, plants, and even other microorganisms. Viruses that infect only bacteria are called bacteriophages and those that infect only fungi are termed mycophages.

- Living characteristics of viruses

  a. They reproduce at a fantastic rate, but only in living host cells.

  b. They can mutate.

- Nonliving characteristics of viruses

  a. They are acellular, that is, they contain no cytoplasm or cellular organelles.

  b. They carry out no metabolism on their own and must replicate using the host cell's metabolic machinery. In other words, viruses don't grow and divide. Instead, new viral components are synthesized and assembled within the infected host cell.

  c. The vast majority of viruses possess either DNA or RNA but not both**.**

- Criteria used to define a virus

  a. The vast majority of viruses contain only one type of nucleic acid: DNA or RNA, but not both.

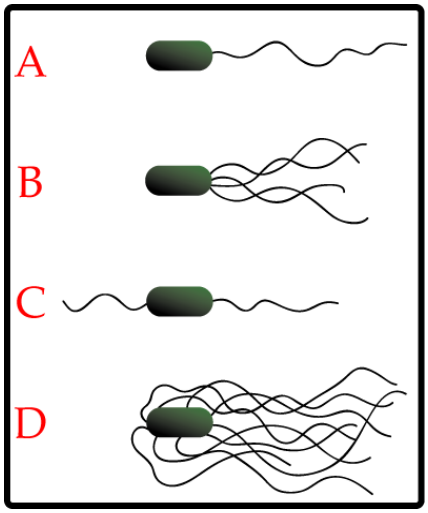
  b. They are totally dependent on a host cell for replication. (They are strict intracellular parasites.)

  c. Viral components must assemble into complete viruses (virions) to go from one host cell to another.

- Laboratory cultivation of viruses

Since viruses lack metabolic machinery of their own and are totally dependent on their host cell for replication, they cannot be grown in synthetic culture media. Animal viruses are normally grown in animals, embryonated eggs, or in cell cultures where in animal host cells are grown in a synthetic medium and the viruses are then grown in these cells.

b) Motility of bacteria



Many bacteria can move using a variety of mechanisms: flagella are used for swimming through water; bacterial gliding and twitching motility move bacteria across surfaces; and changes of buoyancy allow vertical motion. Flagella are semi-rigid cylindrical structures that are rotated and function much like the propeller on a ship. Bacterial species differ in the number and arrangement of flagella on their surface; some have a single flagellum (monotrichous), a flagellum at each end (amphitrichous), clusters of flagella at the poles of the cell (lophotrichous), while others have flagella distributed over the entire surface of the cell (peritrichous). The bacterial flagella is the best-understood motility structure in any organism and is made of about 20 proteins, with approximately another 30 proteins required for its regulation and assembly. The flagellum is a rotating structure driven by a reversible motor at the base that uses the electrochemical gradient across the membrane for power. This motor drives the motion of the filament, which acts as a propeller.

Many bacteria (such as *E. coli*) have two distinct modes of movement: forward movement (swimming) and tumbling. The tumbling allows them to reorient and makes their movement a three-dimensional random walk. (See external links below for link to videos.) The flagella of a unique group of bacteria, the spirochaetes, are found between two membranes in the periplasmic space. They have a distinctive helical body that twists about as it moves.

c) Cyanophyta

It is a blue green algae which differ from other algae in the following:

- Lacking membrane bounded nuclei
- Lacking mitochondria, Golgi apparatus and endoplasmic reticulum

It is more connected with bacteria in the following:

- With regard with reproduction
- Prokaryotic organism
- The wall of some species have constituent like bacteria

They are unicellular, colonial form or filamentous.

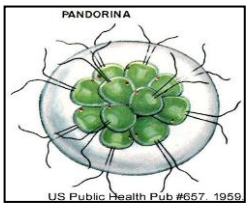
The most typical example is *Nostoc*.

4- Compare between two pairs only of the following:

a) Cell wall & Capsule

Cell wall	Capsule
-It is rigid and elastic porous structure allowing the passage of solutes. -It's composition varies from one bacterial species to others ,but there is a basal structure in all species. -It protect the delicate cytoplasmic membrane and maintains the characteristic shape of the cell. -It play an important role in the cell division.	-It is a slime layer of low optical density. -It is not an integral part of the cell, but a result of its metabolic activity. -It is greatly influenced by the environment . -It is the outer part of the bacterial cell. -It affords the cell some protection against drying . -Not all bacteria are produce capsule.

b) *Pandorina* & *Volvox*

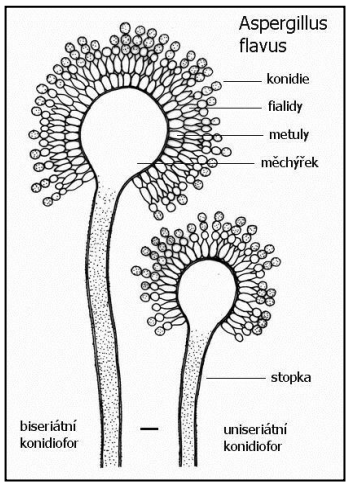
Pandorina	*Volvox*
-It is a spherical solid colony of 16 *chlamydomonas* cells closely packed together and surrounded by a mucous layer.  - They are motile colonies -There are no division of labour -Asexual reproduction takes place by formation of daughter colonies. -Sexual R-takes place by formation of isogametes or uni isogametes.	-It is a hollow sphere colony with a large number of cells.  The cells distinguished to Vegetative cells connected together by cytoplasm strands, the responsible for motility and nutrition. Gonidia, they are large in size than vegetative cells and smaller in number. They produce daughter colonies (Asexual reproduction) Sexual cell: they are antheridia and oogonia, the former are the male cells which produce antherozoids. The oogonia are the female cells which produce female gametes or eggs. -They are motile colonies -There are divisions of labour.

c) Aspergillus & Penicillium

Aspergillus:

Is a fungus whose spores are present in the air we breathe, but does not normally cause illness. However an individual with a weakened immune status may be susceptible to aspergillus infection

Some *Aspergillus* species cause serious disease in humans and animals. The most common causing pathogenic species are *Aspergillus fumigatus* and *Aspergillus flavus*. *Aspergillus flavus* produces aflatoxin which is both a toxin and a carcinogen, and which can potentially contaminate foods such as nuts. The most common causing allergic disease are *Aspergillus fumigatus* and *Aspergillus clavatus*. Other species are important as agricultural pathogens. *Aspergillus* spp. cause disease on many grain crops, especially maize, and synthesize mycotoxins including aflatoxin.



***Penicillium*:**

Is a genus of Ascomycetous fungi of major importance in the natural environment as well as food and drug production. It produces penicillin, a molecule that is used as an antibiotic, which kills or stops the growth of certain kinds of bacteria inside the body. The thallus (mycelium) typically consists of a highly branched network of multinucleate, septate, usually colorless hyphae. Many-branched conidiophores sprout on the mycelia, bearing individually constricted conidiospores. The conidiospores, are the main dispersal route of the fungi, and often green.