**Microbiology 2th semester.**

**Microbial Taxonomy**

**Mid-term assignment paper.**

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*Instruction; Write briefly and up to the point. All questions carry equal marks.*

Q No 1 : What do you know about algae ? also classify Algae into different groups?

**ANSWER:**

**ALGAE:**

**Definition:** Algae is the member of plant kingdom but they lack true stem, roots and leaves commonly found on terrestrial plants. It is a photosynthetic plants and also a source of food for various organisms in aquatic environments.

* The study of algae is known as “phycology”. Phycology is a greek word “Phykos” which means seaweed.
* Cryptogamic plants consequently, flowering plants originated from prokaryotic algae.

**Classification of Algae:**

Algae are classified in different categories.

1. Prokaryotic algae
2. Eukaryotic algae (divide into three groups that include)
* Chloroplasts surrounded by double membranes (belonging to the chloroplast)
* Chloroplasts surrounded by a single membrane (of chloroplast E.R)
* Chloroplasts surrounded by a double membrane of chloroplast E.R.

Q No 2 : What are viruses ? how will you classify viruses into different groups ?

**ANSWER:**

**VIRUS:**

**Definition:** Virus is infectious agent of small size and simple composition that can multiply only in living cells of animals, plants, or bacteria.

**Different Classification of Virus**:

This classification system groups viruses based on mRNA production:

**· Group I** - Includes viruses (E.g. the herpesvirus) with double-stranded DNA that produces mRNA through transcription. Here, the virus uses enzymes belonging to the host.

**· Group II** - Include those with single-stranded DNA (E.g. Parvovirus). This is first converted into the double-stranded intermediate before the mRNA is produced.

**· Group III** - These viruses (E.g. Rotavirus) have a double-stranded RNA. One of the strands acts as the template for mRNA generation. Here, the enzyme encoded by the virus is involved in mRNA generation.

**· Group IV** - This group includes viruses with a single-stranded RNA (E.g. Picornavirus). Although this RNA can serve as the mRNA, double-stranded RNA (replicate intermediates) are first produced to produce mRNA.

**· Group V** - Group V viruses (E.g. Rhabdovirus) contain single-stranded RNA. Unlike Group IV viruses, however, their RNA cannot directly act as mRNA and are therefore complementary. However, double-stranded RNA is first produced before the production of mRNA.

**· Group VI** - Viruses in this group (E.g. HIV virus) contain a diploid single-stranded RNA that is first converted to a double-stranded DNA before the production of mRNA.

**· Group VII** - Viruses of Group VII (E.g. Hepadnavirus) have a partially double-stranded DNA. These genomes first name single-stranded RNA intermediates that also act s mRNA.

Q No 3 : Classify Fungi into different groups ? also write some names of fungi present in every group ?

**ANSWER:**

**Classification of Fungi:**

Fungi were initially classified with plants and were a subject of interest for botanists; hence the influence of botany can be seen on their classification.

Traditionally the classification proceeds in this fashion: Kingdom - Subkingdom - Phyla/phylum - Subphyla - Class - Order - Family - Genus- Species. This classification is too complicated to be dealt here. There are alternate and more practical approaches, one based on sexual reproduction and the other based on morphology of the thallus (vegetative structure).

Based on Sexual reproduction:

**1. Zygomycetes:** which produce through production of zygospores.

**2. Ascomycetes:** which produce endogenous spores called ascospores in cells called asci.

**3. Basidiomycetes:** which produce exogenous spores called basidiospores in cells called basidia.

**4. Deuteromycetes (Fungi imperfecti):** fungi that are not known to produce any sexual spores (ascospores or basidiospores). This is a heterogeneous group of fungi where no sexual reproduction has yet been demonstrated.

**Names of Fungi:**

**1. Moulds (Molds):** Filamentous fungi Eg: Aspergillus sps, Trichophyton rubrum

**2. Yeasts:** Single celled cells that buds Eg: Cryptococcus neoformans, Saccharomyces cerviciae

**3. Yeast like:** Similar to yeasts but produce pseudohyphae Eg: Candida albicans

**4. Dimorphic:** Fungi existing in two different morphological forms at two different environmental conditions. They exist as yeasts in tissue and in vitro at 37o C and as moulds in their natural habitat and in vitro at room temperature. Eg: Histoplasma capsulatum, Blastomyces dermatidis, Paracoccidiodes brasiliensis, Coccidioides immitis Some 200 "human pathogens" have been recognized from among an estimated 1.5 million species of fungi

Q No 4 : Explain the structure and function of a prokaryotic cell in detail ?

**ANSWER:**

**Prokaryotic Cell:**

**Definition:** “Prokaryotic cells are the cells that do not have a true nucleus or membrane-bound organelles.”

**Structure and Function of Prokaryotic cell:** Prokaryotic cells are not as complex as eukaryotic cells. They have no true nucleus as the DNA is not contained within a membrane or separated from the rest of the cell, but is coiled up in a region of the cytoplasm called the nucleoid.

Prokaryotic organisms have varying cell shapes. The most common bacteria shapes are spherical, rod-shaped, and spiral.

Using bacteria as our sample prokaryote, the following structures and organelles can be found in bacterial cells:

**Capsule:** Found in some bacterial cells, this additional outer covering protects the cell when it is engulfed by other organisms, assists in retaining moisture, and helps the cell adhere to surfaces and nutrients.

**Cell Wall:** The cell wall is an outer covering that protects the bacterial cell and gives it shape.

**Cytoplasm:** Cytoplasm is a gel-like substance composed mainly of water that also contains enzymes, salts, cell components, and various organic molecules.

**Cell Membrane or Plasma Membrane:** The cell membrane surrounds the cell's cytoplasm and regulates the flow of substances in and out of the cell.

**Pili (Pilus singular):** Hair-like structures on the surface of the cell that attach to other bacterial cells. Shorter pili called fimbriae help bacteria attach to surfaces.

**Flagella:** Flagella are long, whip-like protrusions that aid in cellular locomotion.

**Ribosomes:** Ribosomes are cell structures responsible for protein production.

**Plasmids:** Plasmids are gene-carrying, circular DNA structures that are not involved in reproduction.

**Nucleoid Region:** Area of the cytoplasm that contains the single bacterial DNA molecule.

**Diagram:** ****

Q No 5 : Explain classification of eukaryotes into different phylum ?

**ANSWER:**

**Classification of Eukaryotes into different phylum:**

**Porifera:**

 The more common name for the Porifera is the Sponge. Porifera are marine animals, although with an exception of a freshwater one. They are found in every known part of the ocean, and directly interact with many other animals in the ocean. One of these interactions is where a sponge grows on the shell of a snail that is being used by a hermit crab, and then will move around as the hermit crab does. In general, sponges eat by filtering out bacteria out of the water around it, and are even capable of regulating the flow of water around it. There is an exception, however, where some sponges can capture crustaceans as they brush around it. The cells gradually draw the crustaceans in, and the cells digest it from the outside. Porifera are both female and male.

**Cnidaria:**

Cnidarians are all very different, but a few key traits lead us to believe that they all have a common ancestor, and therefore belong in a group together. Cnidarians all have some physical form that is similar. They are tall and round, with medusae- like tendrils floating around them. They are especially notable that they are the most feathery of aquatic animals, although these feathery parts are nothing like those in birds. The trait that most people are familiar with and that makes scientists believe that they are all related is the fact that they all have stinging cells, which is their primary defense mechanism.

Coral, Anemones, box jellies, and jellyfish are all apart of this group.

**Platyhelminthes:**

 Platyhelminthes are better known as Flatworms. Flatworms are symmetrical and are made up of three layers of cells.Other than a gut, these organisms have no cavities. Because of this features, these organisms must depend on diffusion, a process of the gradual spreading out of matter, which makes it so they must retain their flat shape. Flatworms are internal parasites, or organisms that survive by feeding on matter inside another organism's organs. It is believed that most flatworms descend from the same ancestors as many mollusks and earthworms, while the rest seemed to evolve from the more basic roots of animals.Flukes, planarians, and marine flatworms are all Platyhelminthes.

**Annelida:**

 Annelida are segmented worms, including earthworms, leeches, and marine worms. We know of about 9000 different Annelida. Annelida do not include the smooth worms that come to mind when we think of them, but also bristled ones, too. Some Annelida include bristleworms, earthworms, and leeches.

**Mollusca:**

Mollusca has at least 50,000 species, although it is estimated that there are more than 200,000, such as clams, oysters, snails, and octopuses.

Mollusca are one of the organisms that have an exoskeleton, which is made of chitin, such as the shells of snails. Although they are very diverse in shape, and have, for example, from one foot on a snail to 8 feet on an octopus, they all seem to retain some patters, such as all seem to have an area for their head distinctly separated from the area with their feet Mollusca are also major parts of almost every ecosystem, for example in some cases up to 3,000 species have been found in one coral reef. One of the reasons for this is that they have highly variable diets.

**Arthropoda:**

Arthropoda take up 3/4 of all living and fossilized organisms.

 Arthropods are all covered in an exoskeleton made of chitin. Chitin is what makes organisms in this phylum so crunchy- such as ants, crabs, crayfish, and lobster. The phylum gets its name because of the way the chitin joints the appendages together.