Biology 11 – The Protists Study Guide

1. The Kingdom Protista consists of organisms that are eukaryotic, which are organisms whose cells have nuclei and membrane-enclosed organelles. Members of the Kingdom Protista are known as protists. Protists are defined as unicellular, or single-celled, eukaryotic organisms. However, some protists are multicellular. Many protists live individually, but some are colonial, which means they live in groups of the same species and are attached to each other. They are heterotrophic or autotrophic organisms. The oldest fossils of protists are only about 1.5 billion years old. Protists are organized into two groups, one is animallike protists and one is plantlike protist.

2. Prokaryotes are single-celled organisms whose cells do not have a nucleus. Eukaryotes are organisms made up of cells that have a nucleus and its organelles are membrane-bounded.

3. The Endosymbiotic Hypothesis was proposed by Lynn Margulis. It is a hypothesis that suggests that eukaryotic cells were created from symbiotic relationships between different monerans around 1.5 billion years ago. Prokaryotes lived inside another moneran as endosymbionts, which are symbiotic organisms that live within another organism (the host organism). They benefited each other and eventually the endosymbionts lost its independence and must live with the host cell and inside it. It gave rise to the organelles that we see today in eukaryotic cells.

3 structural features of the mitochondrion:
- has its own DNA with a slightly different genetic code and its own ribosomes
- is enclosed in a double membrane
- replicated through binary fission, like bacteria

4. The nucleus became surrounded by a double membrane because when it became reliant to the host cell, in order to stop macromolecules from diffusing freely between the nucleoplasm and the cytoplasm, a double membrane must be formed to act as a barrier.
5. Phylum Ciliophora:
   - all have cilia to move
   - has two types of nucleus (macronucleus and micronucleus)
   - has trichocysts for defense
   - reproduce by binary fission
   - involved in a modified type of sexual reproduction: conjugation
   - eg. paramecium

   Phylum Zoomastigina:
   - uses flagella to move
   - no shells or cases surrounding membrane
   - heterotrophic, absorb nutrients through cell membrane
   - reproduce through binary fission
   - reproduce sexually by forming gametes
   - eg. Trypanosomiases

   Phylum Sporozoa:
   - nonmotile parasites
   - reproduce by means o spores
   - eg. Plasmodium

   Phylum Sarcodina:
   - use pseudopods for feeing and movement
   - reproduce through binary fission
   - some produce elaborate shells that contain silica or calcium carbonate
   - eg. Amoeba

6. Paramecium:

7. A paramecium may defend itself from an attack by another cell by using its trichocysts, which are spiny bristle-like projections embedded in the pellicle. When they are agitated, the trichocysts shoot out their spines, which rupture adjacent cells.

8. Conjugation is similar to sexual reproduction because genetic information is exchanged between the two paramecia. It produces combinations of genes, which leads to genetic diversity. It is different to sexual reproduction because it does not produce offspring. The genes are just exchanged between the two paramecia.

9. African sleeping sickness is a disease caused by trypanosomes. This disease is passed from one person to another by an insect known as the tsetse fly. Once inside a human it destroys red blood cells and infects tissues, causing chills, fever, rash, and weakness. Patients pass out and go in coma, often resulting in death. Another disease is the Chagas disease, caused by T. cruzi. It infects and weakens muscle, especially the heart muscle.

10. Trichonympha is a zoomastiginan that lives inside the digestive systems of the termite and wood roach. Termites eat wood, made up of carbohydrate cellulose, but they do not have the enzyme to break down the chemical bonds of cellulose. Trichonympha lives inside it and manufacture cellulose, the enzyme to break the chemical bonds, helping wood roaches and termites digest.

11. Giardia is a zoomastiginan that is a parasite. It attaches to the small intestine of humans. It has been found in the drinking water of Vancouver.

12. Gametes fuse in the gut of a female Anopheles mosquito, and the zygote undergoes many divisions to produce sporozoites. These sporozoites migrate to her salivary glands. Then, the mosquito bites a human, and the sporozoites are based into the bloodstream and then the liver of the host. Asexual spores are produced in the liver and they enter the bloodstream and then red blood cells. The red blood cells bursts and spores invade and reproduce asexually inside new red blood cells. Spores and toxins get into the bloodstream. Some spores become male and female gametocytes and enters the bloodstream. They become gametes when they are taken up by a mosquito. This disease is transmitted back to the mosquitos if it bites a human who is infected with malaria. The mosquito will then bite another human, causing the spread of this disease.

13. Malaria can be controlled by destroying breeding areas for Anopheles mosquitoes so the life cycle of plasmodium is interrupted and prevents the spread of malaria.

14. Ameba:

Ameba moves by extending out a pseudopod, after which the cytoplasm streams into the extended pseudopod, pulling the rest of the cells with it. This is known as ameboid movement. It eats by engulfing other organisms with their pseudopods and forming a vacuole around them. Vesicles with enzymes then fuse with the vesicle to digest the contents.

15. The symptoms of amebic dysentery includes bleeding and severe diarrhea. Entamoebam, a species of ameba, causes this disease. It lives in the intestine as a parasite, eating food and also the wall of the intestine. Amebas can pass out in the feces of an infected person, which can get into drinking water in areas with inadequate sanitation, and the cycle continues.

16. Ameba appears to be a blob of pseudopod, but foraminifers have a thread-like pseudopod. Also, foraminifers have shells of $CaCO_3$ and ameba does not.

17. Radiolarians have shells of silicon dioxide, while foraminifers have shells of calcium carbonate.

18. The white cliffs of Dover were created by the build up of dead foraminifer skeletons that filled ocean basins. Foraminifers present in sedimentary rock can be used to determine the age of the rock and whether there is oil in it.

19. Zooplanktons are heterotrophic plankton. They drift in the water column of oceans, seas, and bodies of fresh water. They are important because they are food for many organisms. Without them, food chains will be broken.

20. Euglena:

Euglena move by the means of two flagella, and also via euglenoid movement. It is a phototrophic autotroph, and its eyespot helps them find sunlight. It allows it to carry out the light and dark reactions of photosynthesis. When sunlight is not available, it can live as a heterotroph and absorb nutrients in the water. It reproduces asexually by binary fission.

21. Euglena can move via “euglenoid movement” when forced against a hard surface. It will change shape and crawl along the surface. This is an animal-like behaviour. They are structurally a lot like the zoomastiginans, except for the chloroplasts.

22. Pyrrophyta are also known as the dinoflagellates. They are luminescent; if they are agitated, they will give off light. Also, their chromosomes lack histone proteins, a protein that all other eukaryotic cells have. It moves by using its two flagella. They are photosynthetic. It reproduces asexually by binary fission.

23. Dinoflagellate bloom is an enormous mass of dinoflagellates. These blooms cause red tide. It releases a toxin which can cause shellfish to be affected. It can cause paralysis and even death if ingested in large amounts. This toxin can also kill fish and dolphins.

24. The three types that can be found are yellow-green algae, golden-brown algae, and diatoms. They all have gold-coloured chloroplasts. Most are solitary, but some live in thread-like colonies. The cell walls contain he carbohydrate pectin, instead of cellulose. Diatoms' cell walls have lots of silicon compounds, giving their cell walls a glassy appearance.

25. They are often used in the production of toothpaste and reflective paint because they are luminescent. It allows people who use toothpaste to have teeth that is shiny and it gives the reflective layer for the paint.

26. Phytoplankton is any small photosynthetic organism found in great numbers near the surface of the ocean. It provides our planet with lots of oxygen and food through photosynthesis and is a direct source of nourishment for organisms such as shrimps and whales. Land animals such as humans also get nutrients indirectly from them.

27. Slime molds are found near rich sources of food such as rotting wood, piles of compost, and even thick wet lawns. They are not photosynthetic and have several fungus-like characteristics. Acrasiomycota starts off as separate individual cells that look like amebas. They reproduce and feed voraciously as long as there is food. When food runs out, they join with others to form a mass of cells that acts like a multicellular organism. It will form reproductive structures called fruiting bodies that produce spores by mitosis. The spores that are released grow into ameba-like cells, and the life cycle repeats.

28. Myxomycota starts off as separate individual cells that look like amebas. Each of these cells can go through repeated mitosis to form a structure called a plasmodium, which may have thousands of nuclei enclosed within a single cell membrane. They can grow to be several centimetres in diameter. Eventually, fruiting bodies grow from the plasmodia which produce haploid spores by meiosis. The spores are released and germinate into ameboid and also flagellated haploid cells. They then fuse to form diploid ameboid cells and the cycle goes again.