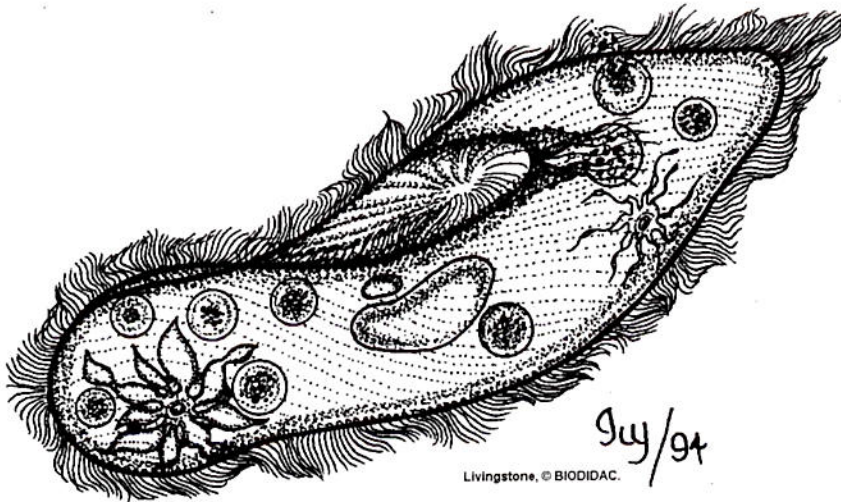


1. Be sure to study all of the pictures of the different protists for identification purposes. The following protists are fair game for the test: zooflagellates, ciliates, *Stentor*, paramecium, amoeba, radiolarians, trypanosomes, *Euglena*, dinoflagellates, diatoms, slime mold sporangia (fruiting bodies), slime mold plasmodia.
2. List the characteristics that unify the kingdom Protista. ***Protists are unicellular, eukaryotic cells.***
3. Describe the endosymbiotic theory. ***Eukaryotic cells probably evolved from symbiotic relationships between prokaryotic cells. Perhaps some smaller autotrophic prokaryotes were taken in to a larger, heterotrophic cell by endocytosis. The smaller cell was not digested, and instead, began to live and grow inside the larger cell. A symbiotic relationship developed. Eventually, the two cells lost the ability to live without each other. The autotrophic cell became a chloroplast. The same may have happened to create mitochondria. Both chloroplasts and mitochondria have double membranes and their own DNA. They replicate on their own, independent of the rest of the cell.***
4. What characteristic do ciliophora have in common? (name 2) ***Cilates are covered in cilia.***
5. List the name of 2 ciliophora examples. ***Paramecium and Stentor***
6. Label the following diagram of a paramecium



- | | |
|---|--|
| <p>a. Cilia</p> <p>b. anal pore</p> <p>c. food vacuoles/ waste vacuole</p> <p>d. macronucleus</p> | <p>e. micronucleus</p> <p>f. lysosome</p> <p>g. contractile vacuole</p> <p>h. pellicle</p> <p>i. oral groove</p> |
|---|--|
7. Describe the function of the following structures: Macronucleus, micronucleus, trichocyst, contractile vacuoles, lysosomes.

Macronucleus: controls the cell processes/ stores the DNA

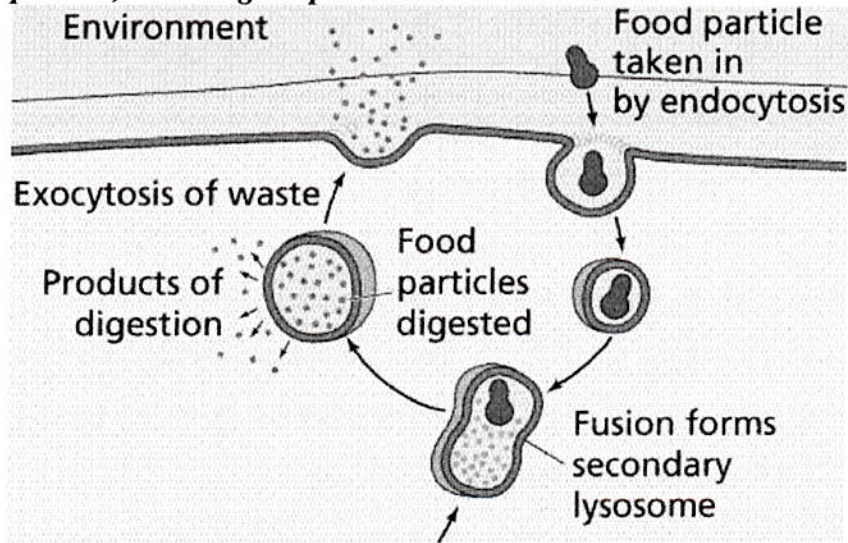
Micronucleus: used to mix up the genes during conjugation

Trichocysts: spiny structures that can be projected at a predator

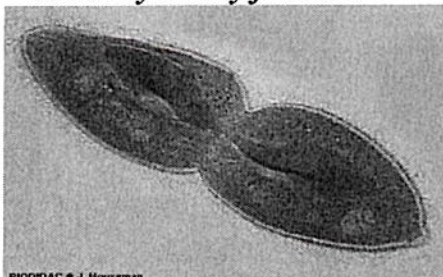
Contractile Vacuoles: Collects extra water and squirts it out of the cell

Lysosomes: Vacuoles filled with digestive enzymes. Used to fuse with food vacuoles and digest the contents to release the nutrients.

8. Describe and name the processes that paramecium use to have food enter the cell, and wastes exit the cell. Use a diagram to aid your descriptions. **Food enters the paramecium at the end of the oral groove via endocytosis. The cell membrane indents at the end of the groove and eventually pinches off around the food particle, enclosing the particle in cell membrane.**

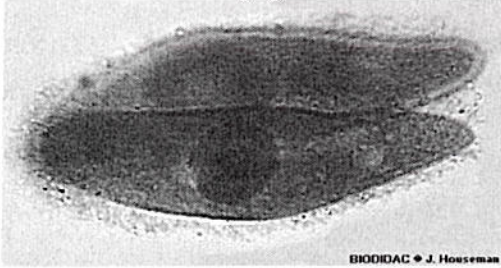


9. Why is it necessary for a paramecium to have contractile vacuoles? What would happen if they did not have these organelles? **Paramecium live in freshwater. That means that they are swimming around in a solution that is hypotonic compared to their insides. Water will move into the cell constantly – so much so that the cell would lyse if the contractile vacuoles did not pump the extra water back out of the cell.**
10. How does a paramecium reproduce? What does this look like? **Paramecium divide by binary fission.**



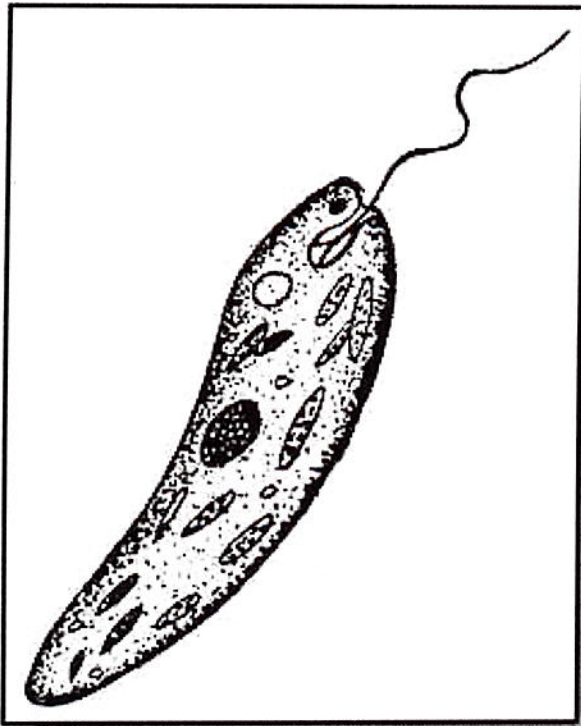
11. What is conjugation? (in general – you do not need to describe all the details). **Conjugation is a mixing of genes. The parameciums get together and mix the genes of their micronuclei. Each paramecium comes away with a complete set of genes, but they will be a different mix than what they started with.**

12. What does conjugation look like?



13. Why is conjugation not really a form of reproduction? Why do the paramecium engage in such behaviour? ***Conjugation is not really a form of reproduction because no new cells are produced – 2 cells go in and 2 cells go out. Paramecium engage in conjugation in times of stress. The theory suggests that the mixing of genes might produce a new combination that will make the paramecium stronger, or more able to survive the stressful situation it is under.***
14. What characteristic unifies the Zooflagellates? ***Zooflagellates are heterotrophic protists with flagella.***
15. Compare zooflagellates, paramecium, amoeba, plasmodium, and euglena in terms of how they get nutrients into their bodies. ***Paramecium and amoeba use endocytosis to get nutrients into their bodies. Zooflagellates and Plasmodium simply absorb nutrients through their cell membranes. Euglena use both methods.***
16. What is “beaver fever” and what causes it? ***“Beaver fever” is the name given to the illness that associated with an infection of Giardia in the gut. Giardia is prevalent in streams and rivers if there are animals defecating in the area. (it comes from the colons of animals. This why it is recommended that you treat the water that you are drinking from rivers or streams when you are hiking.***
17. What characteristics unify Sporozoans? (list three) ***Sporozoans are heterotrophic, non-motile, parasitic protists that reproduce by creating spores.***
18. Describe the life cycle of *Plasmodium*. ***Plasmodium spores are passed to humans through the saliva of mosquitoes when they bite. The plasmodium spores travel to the liver and then the blood. The Plasmodium cells reproduce so rapidly, they cause the infected cells to burst within intervals of 48-72 hours. This releases toxins and plasmodium cells that will move to infect further host cells. The toxins cause the host to have a high fever and feel chills. Eventually, the disease is passed back to a mosquito host when it bites the human host and takes some blood. The plasmodium cells grow within the mosquito and create spores that end up in the salivary glands of the mosquito – ready to move on to the next human host.***
19. How could you protect yourself from getting malaria? ***There is some medication (chloroquine) that will destroy some of the spores of plasmodium, the best way to prevent malaria is to avoid getting bit by the mosquitoes that carry it! Do that any way you can – stay away from the areas that has malaria, use insecticides, eliminate the mosquitoes in the area, etc.***
20. How do amoeba move? ***Amoeba use their pseudopods and directed cytoplasmic streaming to move in the direction they want to go. This is called amoeboid movement.***

21. What characteristics of radiolarians and foraminifers make them easy to study in geology? *They have shells, and there were millions of the creatures over the years. Radiolarians create shells of Silica (SiO₂) and foraminifers have shells of calcium carbonate (CaCO₃). Shells have a much better chance of being fossilized than soft bodies. Couple that with an incredible number of the creatures in the water over a great period of time, and the likelihood of a geologist finding a fossil greatly increases.*
22. What is African sleeping sickness, what are its symptoms and what causes it? *African sleeping sickness is a deadly disease that affects humans caused by an infection of Trypanosomes. Symptoms include extreme fever, chills, skin rash and loss of consciousness. The trypanosomes infect the nervous system, making humans weak and prone to losing consciousness.*
23. What does *Entamoeba* cause? *Entamoeba infections cause amoebic dysentery. (VERY bad diarrhea). The entamoeba attack the intestinal lining.*
24. How do termites digest cellulose? *Termites have endosymbiotic relationships with protists. The protists manufacture the enzyme cellulase necessary for cellulose digestion.*
25. Label the following diagram of euglena.



- | | |
|-----------------------------|-----------------|
| a. Nucleus | d. flagella |
| b. contractile vacuoles | e. pellicle |
| c. eye spot (photoreceptor) | f. chloroplasts |

26. What is the eyespot used for in euglena? *The eyespot can detect the presence of light. The euglena use it to move into the light for the purpose of photosynthesis.*

27. How does a euglena move around? (2 ways) *Euglena swim using their flagella or they crawl using cytoplasmic streaming if they are in a tight spot and can't swim.*
28. What does a euglena do that makes it difficult to classify it as a true phytoflagellate? *Euglena can be heterotrophs if there is no sun around, and if there are digested nutrients in the area, they can even be saprotrophs. They are not the true definition of an autotrophic protist.*
29. List the types of nutrition acquisition that are available to euglena. *Heterotroph, Autotroph, or Saprotroph.*
30. How are *Astasia* and *Euglena* related? *Astasia seem to be Euglena without the chloroplasts. In fact Euglena are able to change into Astasia over a few generations if they are grown at temperatures above 25°C. The chloroplasts are no longer able to reproduce at that temperature, but the Euglena are still able to live as a saprotroph or a heterotroph.*
31. What characteristic of pyrophytes give them their name? *Pyrophytes are luminescent.*
32. What do dinoflagellates look like? *They have two flagella – one is wrapped around its body and the other is long and used for swimming. They have thick plates that surround their cell membranes that resemble armour.*
33. How can you recognize diatoms? *Diatoms have intricate, glassy shells that are either like a pill box, or etched with geometric shapes.*
34. Describe the differences between the life cycle of a cellular slime mold and that of an acellular slime mold. *Both types of slime molds start life as an amoeboid-like cell. They reproduce rapidly and deplete the area of food. At this point cellular slime molds join together and move as a multicellular organism to a new location. Then the multicellular slime mold creates a fruiting body that contains spores, and the spores are dispersed. They grow into new amoeboid cells. However, the ACELLULAR slime mold amoeboid cells get together and FUSE to make one giant, multinucleated cell called a plasmodium. The plasmodium creates a fruiting body, and fills it with HAPLOID cells. The haploid cells are dispersed. They swim with FLAGELLA to find each other, fuse, and create diploid amoeboid cells to start the cycle again.*
35. Where do you find slime molds? *Slime molds are decomposers – they are found around rotting vegetation in damp places.*
36. What happens in lakes or ponds when there is too much waste material in the water? Why is this damaging to the pond? *When there is too much waste, there is too much food for the euglenophyta. The balance is destroyed; the euglenophyta population soars (called BLOOMS), until they deplete much of the oxygen in the water and die of the stress of overpopulation. Then their bodies become part of the waste problem themselves.*
37. What is red tide? *Red tides is a bloom of dinoflagellates that create a red tint to the water when they are overpopulated.*
38. Why can't you eat bivalves if there is a red tide in the area? *The dinoflagellates that create red tide also produce a toxin. The toxin is not strong enough to harm you if you are swimming in the water, but you can't eat anything that is a filter feeder (bivalves are all filter-feeders) since the filter vast amounts of water*

- and concentrate the toxins to amounts that will be harmful. The toxins attack the nervous system and can cause paralysis.*
39. What ecological roles do plant-like protists have? *Autotrophic protists are part of the larger group of "phytoplankton" (microscopic autotrophs in the oceans) that are responsible for 70% of photosynthesis on the earth. That provides a huge source of oxygen. They are also a major part of MANY aquatic food chains, being the main source of energy for many other organisms.*
40. What is methylcellulose used for? *Methylcellulose is used to slow down microscopic organisms so that you are able to see them under the microscope at higher powers. Unfortunately, it will eventually kill the creatures you are trying to see. Eventually, the contractile vacuoles will stop functioning properly, so the organism will start to bloat, and will eventually lyse.*