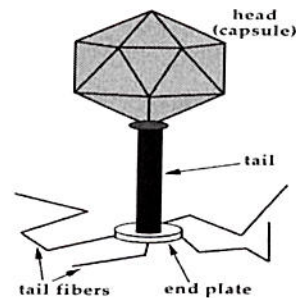
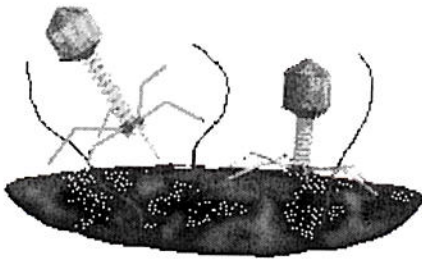
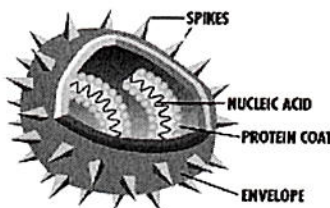


Biol 11 Ch 17 REVIEW: Viruses and Monerans - Answers

1. How does the classification system designed by Carolus Linnaeus work? What are the names of the different *taxon* in order? ***Organisms are organized into groups (taxa) according to body structures. The taxa are organized in a hierarchical series from most general to most specific. The taxa, in order are: Kingdom, phylum, class, order, family, genus, species. All organisms are given two names; the genus and the species. Eg. Homo sapiens.***
2. What is a virus? Why are they not classified as “alive”? ***A virus is an acellular particle that can cause disease. It consists of a protein shell (capsid) and some genetic material. It is not considered “alive” because it is acellular; it does not have a nucleus, organelles or cytoplasm. Also, it does not perform any of the basic characteristics of life on its own – it cannot reproduce, grow, move, eat, get rid of wastes, etc. It just makes us really sick!***
3. What are bacteriophages? Draw and label the structure of a bacteriophage. ***Bacteriophages are viruses that infect bacteria only. They consist of a capsid filled with DNA (the head) and a tail that is used to attach themselves to the bacteria and insert its’ DNA into the host.***

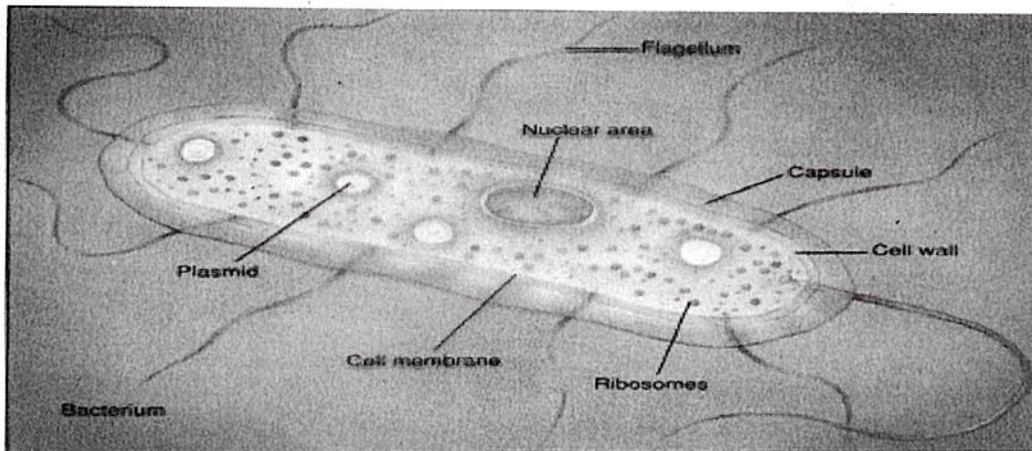


4. How does a virus “infect” a host cell? ***The virus must attach to the cell membrane or wall of the host cell, and then it inserts its’ DNA or RNA into the cytoplasm. Each type of virus will have the ability to attach to a specific type of cell – they are “host specific” in that regard.***
5. Label the following diagram of a virus.



6. What two life cycles are exhibited by viruses? Draw and label the two cycles to describe their main differences.
7. How might a lysogenic virus actually benefit an organism? *If the lysogenic virus was carrying a gene that was beneficial to the organism, than the host would be able to capitalize on that gene while it was inserted as part of the prophage. For example, a virus might (by chance) carry the gene that offered a bacterium resistance to an antibiotic. While the prophage was inserted in the bacterium's genome, the bacterium would be resistant to the antibiotic.*
8. Using a similar concept, how might a prophage be detrimental to its host, even if it is not actively causing the cell to manufacture viruses? *A prophage inserts itself into the host genome wherever it can fit itself in. This might mean that it inserts itself into the middle of an important gene, destroying the sequence of amino acids in the code. If this gene was essential, the organism would be in trouble.*
9. What is a retrovirus? What type of genetic material does it have? What enzyme does it employ? What infamous diseases are caused by some retroviruses? *A retrovirus has RNA as its genetic material. They use the enzyme "reverse transcriptase" to change their RNA back to DNA in order to insert itself into the host DNA. (RNA would not be compatible with the host DNA). Some cancers are caused by a retrovirus, and HIV is also a retrovirus.*
10. Are viruses able to infect any type of cell, from any type of organism? Explain. *Viruses are not able to infect just any type of cell. They are "host specific"; there are specific viruses that can only infect its specific host. However, there are specific viruses that infect specific hosts from ALL of the kingdoms of life. Sometimes, the viruses will "jump" from its specific host to a host that is closely related. For example, it is thought that HIV was once a virus that only infected other primates. Now it is able to infect homo sapiens as well.*

11. Why is it so difficult for our bodies to kill the HIV virus? *The HIV virus infects the cells that are designed to kill intruders – cells of our immune system. Our body has a hard time killing HIV because HIV attacks the immune system itself.*
12. What term is used to describe something (like viruses) that are not made of cells? *Acellular (without cells)*
13. What is a vaccine and how does it work to provide future immunity? *A vaccine is a non-virulent (not able to make you sick) part of the virus. It is injected into the bloodstream and your body will identify it as a foreign. Your body then figures out a way to kill the foreign particle (not realizing that it is already “dead”). Once our bodies have “learned” how to eliminate something, it REMEMBERS, so that the next time you encounter that particular foreigner, you will be able to kill it right away. Occasionally, you might need to get a “booster” – a second vaccine just to remind your body to keep that information on hand.*
14. What is a prokaryotic cell? How is it different from a eukaryotic cell? *A prokaryotic cell is the type of cell that all bacteria have. They are simple cells – much less complex than eukaryotic cells. Like eukaryotic cells, they have cytoplasm, cell membranes and /or walls, and some ribosomes. They have genetic material, but it is circular, not linear like the eukaryotic cells. They do not have many organelles, nor do they have a nucleus as eukaryotic cells do.*
15. Sketch and label a typical prokaryotic cell.



16. Describe the three different forms of obtaining nutrients and energy. *A. autotrophic – traps the energy from the sun. b. heterotrophic – break down organic molecules to use their stored energy. C. saprotrophic- decompose dead materials for their stored energy and nutrients.*
17. What is the difference between aerobic and anaerobic respiration? *Aerobic respiration is the process of breaking down molecules to release their stored energy using OXYGEN. Anaerobic respiration breaks down molecules to release their energy without using oxygen.*
18. Describe the three terms; facultative anaerobe, obligate anaerobe and obligate aerobe. *Facultative anaerobe – can live with or without oxygen. Obligate*

anaerobe – will die in the presence of oxygen. Obligate aerobes – will die without the presence of oxygen.

19. In terms used in question #11 and #13, what is the most common type of bacteria that exist today? *The most common type of bacteria are heterotrophic, obligate aerobes.*

20. In terms of phyla, what is the largest group of bacteria? *Eubacteria*

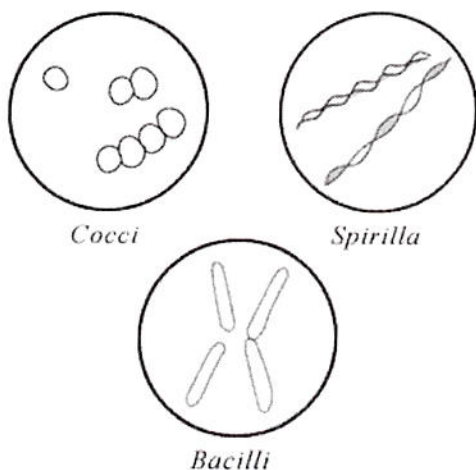
21. What unique characteristics do each of the phyla cyanobacteria, archaebacteria and prochlorobacteria exhibit that qualifies them to be in separate phyla?

Cyanobacteria: they perform a primitive type of photosynthesis. They are thought to be similar to the organisms that first released Oxygen into the atmosphere some 2.2 billion years ago.

Archaebacteria: Are very closely related to eukaryotic cells. They live in the harshest of environments, and are thought to be similar to some of the first bacteria that inhabited the world.

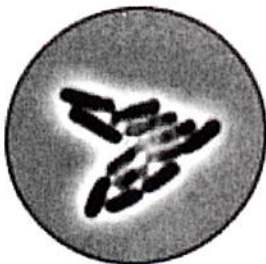
Prochlorobacteria: Have a type of photosynthesis that is very similar to higher plants. Are thought to be the ancestors of higher plants for that reason.

22. Sketch and label the three different shapes of bacteria.



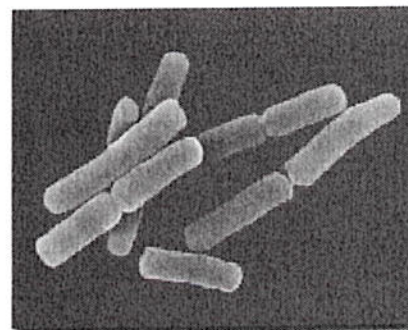
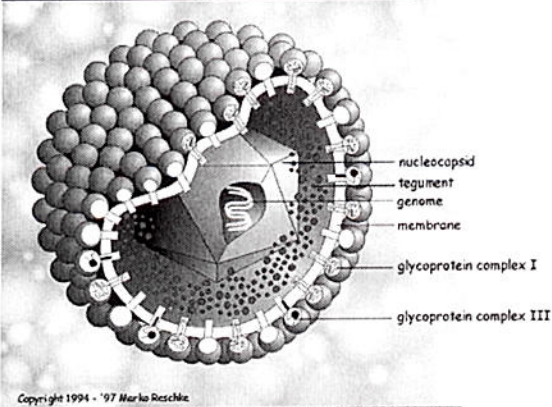
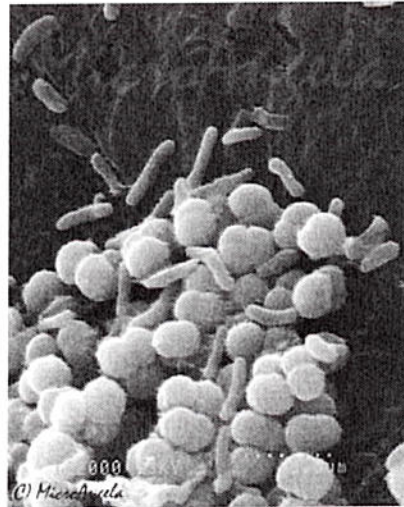
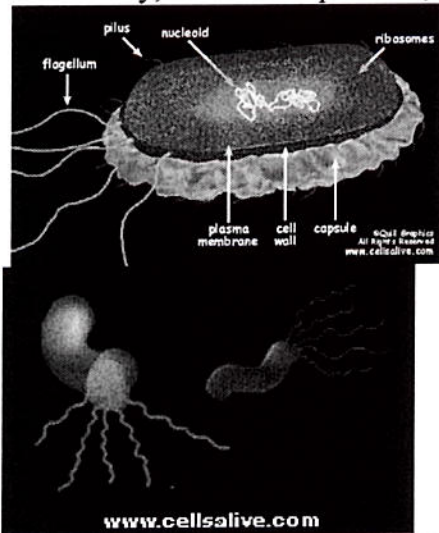
23. What is Gram staining? Describe the procedure that you would have to follow in order to fix and Gram stain a sample of bacteria. *1. Wash a glass slide with soap and water and pat dry. 2. Using an inoculating loop, dab a sample of the bacteria onto the slide. 3. "Fix" the bacteria to the slide by passing the slide over the hottest part of a Bunsen burner at least three times, being sure that the glass slide is not allowed to get too hot –check this by placing the slide on the back of your hand after swiping. 4. Place your slide on a beaker filled with water. Cover the bacteria with several drops of crystal violet stain. Allow to sit for at least 60 seconds. 5. Tip the slide to allow all of the stain to drain off the slide. Submerge the slide in the beaker of water – allow water to run off. 6. Cover the bacteria in Gram's Iodine (IKI) and allow to sit for 60 seconds. 7. Wash off the iodine by submerging the slide into clean water. Pat dry. 8. Wash off the dye by drenching the slide in ethanol repeatedly (until no more color comes off) Rinse the slide in water. 9. Pat dry. 10. Cover the bacteria with*

- safranin and allow to sit for 30 seconds. 11.. Rinse off the safranin with clean water. 12. Allow to air dry. 13. Observe under oil immersion.*
24. How do bacteria get around (move)? *Bacteria move by lashing their flagella, coordinated movement of their cilia, gliding along a slime-layer, and spiralling forward.*
25. What is the difference between chemosynthetic and photosynthetic autotrophs? *Photosynthetic autotrophs obtain their energy by trapping sunlight and storing it in organic molecules. Chemosynthetic autotrophs obtain their energy from inorganic molecules instead of the sun.*
26. How are bacteria able to cause us harm? *Bacteria can either damage our cells or secrete poisonous toxins.*
27. What defence mechanisms do we have against bacterial infection? *Our skin is our first defence, but the bacteria make it past that, we have an incredible immune system to fight off the intruders. We can also fall back on medicine; there are antibiotics and some vaccinations.*
28. How do bacteria reproduce? *They reproduce asexually by binary fission (splitting into two), and sexually by conjugation. They also are able to form endospores when the conditions are unfavourable for life. The endospores will create a new bacterium when the conditions become favourable again.*
29. How can asexual reproduction be an advantage over sexual reproduction? *Asexual reproduction only requires one parent (no need to search for an appropriate mate!). It is often faster than sexual reproduction, and does not require the formation of specialized gametes.*
30. Label the following diagram of a typical prokaryotic (bacterial) cell.
31. Use the field diameters the class calculated to approximate how long each of the following creatures are:



32. How much have the creatures actually been magnified in the drawings?

33. Identify, as much as possible, the following creatures:



Bacillus Bacteria