Cell Membranes

I. Read the following article about [Cell Membranes](http://www.nature.com/scitable/topicpage/cell-membranes-14052567).

**Cell Membranes - Introduction**
1. What is the function of cell membranes?

2. How are eukaryotic cells different than prokaryotic cells? How are they similar?

**What Are Cellular Membranes Made Of?**
3. What are glycerophospholipids? What are they made up of? Label each part of figure c. to the left
   1. _____________ 2. ______________ 3. _______________
   4. ______________

4. Glycerophospholipids are by far the most ______________ lipids in cell membranes.
5. Like all lipids, they are __________ in water, but their unique geometry causes them to aggregate into __________ without any energy input.
6. What is meant when the author says that glycerophospholipids are "two-faced" molecules?

7. How do these molecules align themselves in water?

8. The _____________ heads of the glycerophospholipids in a cell's plasma membrane face both the water-based _____________ and the ________________ of the cell.

9. How much of the cell membrane's mass is accounted for by lipid? ________%

10. How much of the cell membrane's mass is accounted for by cholesterol? ________%

11. Cholesterol is not present in what types of cells and organelles?

12. What role does cholesterol play in the cell membrane?

13. How much of the cell membrane's mass is accounted for by protein?

14. How are transmembrane proteins oriented (positioned) in the membrane?
15. At physiological (normal body) temperatures, cell membranes are ___________; at cooler temperatures, they become gel-like.

16. Scientists who model membrane structure and dynamics describe the membrane as a fluid mosaic in which transmembrane proteins can move ___________ in the lipid bilayer.

17. Therefore, the collection of lipids and proteins that make up a cellular membrane relies on natural ___________ properties to form and function.

18. In living cells, however, many ___________ are not free to move.

19. They are often ___________ in place within the membrane by tethers to proteins outside the cell, cytoskeletal elements inside the cell, or both.

What Do Membranes Do?

20. Cell membranes serve as ___________ and ___________.

21. What does it mean when the author says that a cell membrane is semi-permeable?

22. List four things that can diffuse across the cell membranes.
   a. 
   b. 
   c. 
   d. 

23. List three things that are restricted by the cell membrane.
   a. 
   b. 
   c. 

24. How do important molecules such as sugars and amino acids find passage through the membrane?

25. Membrane transport proteins are ___________ and ___________ for the molecules they move, and they often use energy to catalyze passage.

26. Define "concentration gradient". (Google for definition) What does, "these proteins transport some nutrients against a concentration gradient" mean?

27. The ability to maintain concentration gradients and sometimes move materials against them is vital to cell ___________ and ___________.

28. Thanks to membrane ___________ and transport ___________, the cell can accumulate nutrients in higher concentrations than exist in the environment and, conversely, ___________ of waste products.

29. Other transmembrane proteins have ___________-related jobs.

30. These proteins bind signals, such as ___________ or immune mediators, to their ___________ portions.
31. Label the transmembrane proteins to the right and describe what each protein does for the cell
a.
b.
c.
d.
32. Binding causes a ___________ change in the protein that transmits a signal to ______________ messenger molecules.

33. Like transport proteins, receptor proteins are ___________ and ___________ for the molecules they bind.

34. How are peripheral membrane proteins different than transmembrane proteins?

35. Some peripheral proteins form a ___________ network just under the membrane that provides attachment sites for ______________ proteins.

36. Other peripheral proteins are secreted by the cell and form an extracellular ___________ that functions in cell ___________

**How Diverse Are Cell Membranes?**

37. How are prokaryotic cells different than eukaryotic cells when considering the plasma membrane?

38. Which organelles are part of the endomembrane system?

39. Membrane components are ___________ throughout the endomembrane system in an ___________ fashion.

40. For instance, the membranes of the ___ and the_________ _________ have different compositions, and the proteins that are found in these membranes contain _______ signals, which are like molecular _______ _______ that specify their final destination.

41. How are the membrane structures for mitochondria and chloroplasts unusual?

42. How does the membrane structure of chloroplasts and mitochondria help them to carry out their functions?

43. How is the structure of mitochondria and chloroplasts related to modern-day prokaryotes? Why is this believed to be important?

**Conclusion**

44. Membranes keep the outside "______" and the inside "_____," allowing only certain molecules to cross and relaying messages via a chain of ___________ events.