

Cell Form and Function  
Chapter Three Study Guide

1. What is a cell?
2. What is the significance of the “modern cell theory”? Three key ideas?
3. Cells may vary in shape, thickness of layers, and surface structures. What terms are used to describe cell structure?
4. How many cells are there in the human body?
5. How are bacteria and humans alike?
6. How many bacteria are either in or on the human body? What is this called?
7. What metric system terms describe volume, weight, and length? (See Worksheet)
8. How many cells are there in the human body?
9. What is the diameter of a “typical” human cell?
10. What is the diameter of a RBC? Diameter of a capillary? Significance?
11. How far may a cell be from a capillary before it dies? Why? Significance?
12. Define the following terms: cytoplasm, cytosol, cytoskeleton, organelles, intracellular fluid, extracellular fluid, plasma membrane, and interstitial fluid.
13. What is the fluid mosaic model? Key idea? What is the difference between a plasma membrane and a unit membranes?
14. What are intergral proteins (also called transmembrane proteins)?
15. What are the different functions of transmembrane proteins?
16. What is the difference between a gate and a channel in a membrane?
17. What three stimuli may regulate membrane gates?
18. What is the structure and function of a second messenger system?
19. Why may hormones need to use a second messenger system to alter a cells metabolism?
20. What are the three proteins of the cytoskeleton? Significance?
21. What term describes the sugar molecules on the exterior face of the cell membrane? Significance?
22. What are microvilli? Function?
23. What is inside the core of a microvilli? Function?
24. What is a cilia? (compare size to microvilli)
25. What are the two cilia types? Function of each type of cilia?
26. What is cystic fibrosis? How is cystic fibrosis related to transmembrane proteins and cilia? Why is cystic fibrosis called a genetic disease?
27. What is a flagella? What human cell has a flagella?
28. Plasma membranes are described a semipermeable or selectively permeable. What does this mean?
29. What term best describes the middle portion of a plasma membrane?
30. When a small particle moves across a plasma membrane, it may move with or against its particle concentration gradient. In terms of energy, how do we describe these movement?
31. What is the energy source for cellular work? What is its nickname?
32. What is diffusion? Is is active or passive? What are the two types of diffusion?
33. What is osmosis? What is required?
34. What is filtration?

35. How is filtration defined in terms of osmosis?
36. What organ uses filtration to remove metabolic waste products from blood?
37. What are the three types of mixtures? What is the significance of each type?
38. What determines the direction of movement for a solute?
39. What is the difference between hydrostatic pressure and osmotic pressure?
40. What is osmolarity?
41. What term describes the ability of a mixture to change the volume of a cell?
42. Explain why osmosis has been described as the diffusion of water across a unit membrane. Why? What type of barrier must be present in order to demonstrate osmosis?
43. What is tonicity?
44. What term describes a solution that will cause a RBC to swell?
45. What is the osmolarity of our blood plasma?
46. What will happen to a RBC if it is placed in each of these solutions: 1) 600 mOsm 2) 300 mOsm 3) 100 mOsm?
47. What is "carrier-mediated transportation"? Use these terms in your answer: receptor, specificity, saturation and transport maximum.
48. What three terms describe how transmembrane mediated carriers move solute across a plasma membrane? (think about the directions and number of solutes)
49. What is the difference between facilitated diffusion, active transport, and secondary active transport?
50. What term maybe used to describe the movement of a solute from an area of low concentration to an area of high concentration?
51. Do large molecules (either liquid or solids) use channels, gates, or carrier mediated transport systems to cross the plasma membrane? Explain
52. What is the difference between endocytosis and exocytosis?
53. What is transcytosis?
54. What cell type uses phagocytosis and is described as a "garbage collector"?
55. What is an organelle?
56. What is the structure and function of these cell organelles? (nucleus, mitochondria, smooth endoplasmic reticulum, rough endoplasmic reticulum, Golgi complex, lysosomes, ribosomes, centrioles, peroxisomes, proteasomes)
57. What is DNA? Structure and function?
58. What term describes the coded segments on the DNA molecule? Nickname for these segments?
59. What type of molecule is made with the information encoded in DNA?
60. How do we describe the two different types of proteins that are encoded by DNA?
61. Outline the steps in protein synthesis: (gene to protein)
62. Where are proteins made?
63. What organelle makes a protein? What other components are required to make proteins?
64. How is protein synthesis different when proteins are used in the cytosol VS exported into the interstitial space?