

Cellular Form and Function
Chapter Three Study Guide (Part A)
Tortora & Derrickson

1. What is the significance of the “modern cell theory”? Key ideas?
2. Cells have a variety of sizes, layers, and shapes. What names describe the basic shapes and layers of cells?
3. What are the primary units for volume, weight, and length in the metric system? (Time to Learn the Metric System – See Worksheet)
4. What is the common unit of measurement when working with cells?
5. What is the diameter of a “typical” human cell?
6. What is the diameter of a RBC?
7. How many cells are there in the human body?
8. How far can a typical cell be from their source of nutrients before they die?
9. Define the following terms: cytoplasm, cytosol, cytoskeleton, organelles, intracellular fluid (tissue gel, matrix), extracellular fluid, plasma, and interstitial fluid.
10. What is the “fluid mosaic model”? What is the difference between a plasma membrane and a unit membranes?
11. What are intergral proteins (also called transmembrane proteins)?
12. What are gates and channels? Types and functions?
13. What are the three stimuli that may regulate gates?
14. What are the componets of the cytoskeleton?
15. What is the structure and function of a “Second Messenger”?
16. Why must some “hormones” use a second messenger system to alter a cells metabolism?
17. All plasma membranes of our cells have a “fuzzy exterior coat” that consist of sugar molecules (e.g. glycolipids). This is why our cells are said to be “sugar coated”! What is the name of this sugar coated layer?
18. What is the main function of the “fuzzy coat”?
19. What are microvilli? Function(s)
20. What is inside the core of a microvilli? Function?
21. What is a cilia? (compare to microvilli)
22. What are the two functional types of cilia? There functions?
23. What is cystic fibrosis and how is it caused by a faulty transmembrane protein?
24. What is a flagella? What is the only human cell to have a flagella?
25. Plasma membranes are selectively permeable. What does this mean?
26. What are two ways in which a substance may pass through a unit membrane? (think in terms of energy)
27. What is diffusion? Is is active or passive?
28. What is osmosis?
29. What is filtration?
30. What human organ uses filtration to detoxify blood?
31. What is the “primary” force which determines the direction of movement of a solute?

32. Explain why osmosis has been described as the diffusion of water across a unit membrane. Why? What must be present in order to demonstrate osmosis?
33. What is the difference between hydrostatic pressure and osmotic pressure?
34. How can we define filtration in terms of osmosis?
35. What is osmolarity?
36. What is tonicity?
37. What is the osmolarity of our blood plasma? What will happen to a RBC if it is placed in each of these solutions: 1) 600 mOsm 2) 300 mOsm 3) 100 mOsm?
38. What term do we use to describe a solution's ability to change the volume of a cell?
39. What term describes a solution that will cause a RBC to swell?
40. Explain the role of these terms as they relate to "carrier-mediated transport": a) receptor b) specificity c) saturation and d) transport maximum:
41. What are the three transmembrane carrier mediated transport systems? (note: number of solute transported and direction)
42. Explain the function of these mediated transport systems: facilitated diffusion, primary active transport, and secondary active transport
43. What term describes a transmembrane protein that moves a solute from an area of low concentration to an area of high concentration?
44. Do large molecules (either liquid or solids) use channels or carrier mediated transport systems to cross the plasma membrane? Explain
45. What is the difference between endocytosis, exocytosis, and phagocytosis?
46. What is transcytosis?
47. What is an organelle?
48. 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)
49. Outline the steps in protein synthesis: (from gene to finished protein)
50. Where within a cell are proteins made?
51. What organelle is required to make a protein?
52. What is the difference if the protein either stays in the cytosol or is exported out of the cell?
53. Where is the information to make a protein stored? What are the "recipes called?"
54. After a protein is made, where may it be used? Trace the two pathways protein follow after their formation?
55. What term best describes the middle portion of a plasma membrane?