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 may vary in size and shapes. Cells may also be arranged in layers. What names describe the basic shapes and layers of cells?
3. What are the units for volume, weight, and length in the metric system? (Time to Learn the Metric System – See Worksheet)
4. What unit of measurement do we use to describe the size of a cells?
5. What is the diameter of a "typical" human cell?
6. What is the diameter of a RBC? Diameter of a capillary? Significance?
7. How many cells are there in the human body?
8. How far can a cell be from a capillary? Significance?
9. Define the following terms: cytoplasm, cytosol, cytoskeleton, organelles, intracellular fluid (i.e. 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 the functions of transmembrane proteins?
13. What are membrane gates and channels? Types and functions?
14. What three stimuli may regulate gates?
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. What are the componets of the cytoskeleton? Significance?
18. Our plasma membranes 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?
19. What is the significance of this "fuzzy coat"?
20. What are microvilli? Function?
21. What is inside the core of a microvilli? Function?
22. What is a cilia? (compare size to microvilli)
23. What are the two cilia types? Significance?
24. What is cystic fibrosis? How is cystic fibrosis related to transmembrane proteins and cilia? Why is cystic fibrosis called a genetic disease?
25. What is a flagella? What human cell has a flagella?
26. Plasma membranes are selectively permeable. What does this mean?
27. What term best describes the middle portion of a plasma membrane?
28. When a small particle moves across a plasma membrane, it may move with or against the particles concentration gradient. In terms of energy, how do we describe the particles movement?
29. When a cell does work, what is the source of the energy?
30. What is diffusion? Is is active or passive?
31. What is osmosis?

32. What is filtration?
33. What human organ uses filtration to detoxify blood?
34. What determines the direction of solute movement?
35. 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?
36. What is the difference between hydrostatic pressure and osmotic pressure?
37. How can we define filtration in terms of osmosis?
38. What is osmolarity?
39. What term do we use to describe a solution's ability to change the volume of a cell?
40. What is tonicity?
41. What term describes a solution that will cause a RBC to swell?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?
42. How are these terms used to describe "carrier-mediated transport": a) receptor b) specificity c) saturation and d) transport maximum:
43. What three terms are used to describe how transmembrane mediated carriers move solute across a plasma membrane? (think about directions and number of solutes)
44. What is the difference between facilitated diffusion, active transport, and secondary active transport?
45. What term may describe movement of a solute from an area of low concentration to an area of high concentration?
46. Do large molecules (either liquid or solids) use channels or carrier mediated transport systems to cross the plasma membrane? Expalin
47. What is the difference between endocytosis and exocytosis?
48. What is transcytosis?
49. What is phagocytosis?
50. What is an organelle?
51. What is the structure and function of these cell organelles? (nucleus, mitochondria, smooth endoplastic reticulum, rough endoplasmic reticulum, Golgi complex, lysosomes, ribosomes, centrioles, peroxisomes, proteasomes)
52. What is DNA?
53. What term is used to describe segments of the DNA? Nickname for these segments?
54. What type of molecule is made with the information encoded in DNA?
55. How may we describe the functions of the molecule made from DNA?
56. Outline the steps in protein synthesis: (from gene to finished protein)
57. Where are proteins made? Different locations?
58. What organelle is required to make a protein?
59. How is protein synthesis different if the protein is used in the cytosol or interstitial space?