Chapter Three Study Guide
Cell Physiology (W2025)

1. What is the most important theory in biology? What are its three defining elements? What is believed to be the oldest original cell?

2. What is the size for the average cell (our benchmark)? Size for red blood cell?? What is a micrometer? How far may a cell be from a capillary? Significance?

3. What is diffusion? Through what type of substances may diffusion occur? Is it passive or active? What may influence diffusion?

4. What is osmosis? What must be present in order to demonstrate osmosis? What moves from one side to the other during osmosis? What causes the movement? Called? What is the difference between the osmotic pressure and hydrostatic pressure?

5. What are we measuring when we measure osmolarity? What is our benchmark for blood plasma osmolarity? What unit do we use?

6. What is filtration?

7. What is the definition of tonicity? What are the three different types of tonicity? What happens if you put a RBC into a beaker of each solution?

8. What are aquaporins? What moves through aquaporins? Why are aquaporins necessary?

9. What are the two major water compartments? Volumes of each? What volume is created by fluid between cells and inside blood vessels? Called what?

10. What are organelles? Is a plasma membrane an organelle? What type of compounds make the plasma membrane?

11. What is the difference between the cytoplasm and cytosol?

12. What is the fluid mosaic model of the plasma membrane? What is the relationship between peripheral proteins, trans-membrane proteins, and interstitial proteins? Significance?

13. What makes the surface of the plasma membrane sugar coated? Called what? Significance?

14. What are the six type of transmembrane proteins? Function of each type?

15. What is a second messenger system? Significance? Explain related to hydrophobic vs hydrophillic compounds?

16. Small particles may use membrane channels to cross the plasma membrane. What do these terms (uniport, antiport, symport) describe?

17. What is the significance if a small particle moves across the plasma membrane by either active or passive transport? Which requires ATP? Which move down the concentration gradient?

18. How is facilitated diffusion different than simple diffusion?

19. How is regulated facilitated diffusion different than facilitated diffusion? What are the three types of forces used to regulate the "gates"? Why do we call them gates?

20. What is the most important active antiport in the human body? Called? What type of ions are moved? Amount of each and direction? What percent of your daily calories are used to operate this pump? Why is it called a pump?

21. What are the four functions of the sodium-potasium ATP Pump?

22. How do we use the secondary active transport function to provide passive transport?

23. What is the difference between endocytosis and exocytosis? What size objects use this form of transport?

24. What type of transport is phagocytosis and what type of cell uses this mechanism?

25. What is the significance of a cells cytoskeleton? Constructed from?

26. You need to know the structure and function of these 13 organelles: plasma membrane, nucleus, centrioles, cilia, flagella, microvilli, endoplsmic reticulum (rough and smooth), golgi complex, ribosomes, lysosomes, peroxisomes, proeosomes, mitochondria. It is a good idea to make flash cards for these organelles.