Chapter 3 Study Guide
Cell Form and Function (2025/11/19)

1 What is the most important theory in biology? What are the three key ideas? What is the significance of this theory?

2 What is the benchmark for the size of the most common human cell? How far may a cell be away from a capillary? What is the size of a micron?

3 How many cells are in a human body? What is the diameter of a continuous capillary? What is the diameter of a RBC? Significance?

4 What is diffusion?

5 What is the difference between molarity and osmolarity? What do they both describe? How are they different? What is the osmolarity of your body fluids?

6 What is osmosis? What must be present for osmosis but not required for diffusion? What makes the water move from one area into another area? What is the difference between osmotic pressure and hydrostatic pressure?

7 What is filtration?

8 What is tonictiy? How will a RBC react if placed in a hypotonic, hypertonic, or isotonic solution?

9 What are the four fluid compartments in the human body? What percent of fluid is inside and outside of our cells?

10 What is the plasma membrane structure? Why is it described as a fluid mosaic model? What is inside the plasma membrane? What is the main molecule creating the structure of the plasma membrane? Is this membrane permeable? Expalin.

11 What is the difference between integral and peripheral proteins? How do these proteins change the structure of the plasma membrane? What type of a molecule are glycoproteins? Function? Called?

12 What are the functions of the six different transmembrane proteins?

13 What is the second messenger system?

14 How do we describe the three trans membrane proteins used to transport small solute across the plasma membrane? Direction and number of solute movement?

15 Why do water molecules need special transmembrane proteins call aquaporins to cross a plasma membrane?

16 What is the difference between active and passive transport across the plasma membrane? Characteristic of both?

17 What is the difference between simple diffusion, channel mediated facilitated, and carrier mediated facilitated diffusion?

18 What is the most important antiport in human physiology? What does it pump across the plasma membrane? Is it active or passive? If water molecules follow the solute then what is the next effect of this pump? How much of your daily energy is consumed by this pump?

19 What are the functions of the sodium potassium ATP pump?

20 How are large particles moved across the plasma membrane? What terms are used to describe movement direction? What special term do we use for WBC moving bacteria into their cytoplasm?

21 What are the three major components of the cytoplasm?

22 What is the cytoskeleton? What type of proteins are used to make the cytoskeleton? Functions?

23 What is the significance of the relationship between the cytoskeleton, peripheral proteins, transmembrane proteins, and extracellular proteins?

24 What are nano motors? What cytoskeleton protein do they use as their super highway?

25 What is the function and structure of these organelles:
nucleus
centrioles
cilia
flagella
microvilli
smooth and rough endoplasmic reticulum
Golgi complex
ribosomes (cytoplasmic and endoplasmic reticulum)
lysosomes
peroxisomes
proteosomes
mitochondria

26 You need to make flash cards for these organelles. Half the questions for Chapter 3 on Unit Exam Part A will be about these organelles!!!

27 What is inside the cell's nucleus (two notable items)? Function of each? Relative size of the nucleus?

28 What are the functions of the cenrioles? Why are they called birthing stations?

29 What are the two types of cilia? Functions? Is mucous on the tip of the cilia or between the cilia? Significance? What is the nightmare if a mother kisses a newborn and taste chloride ions? The disease? Explain

30 What is a flagella? What is the only cell with flagella?

31 What is the function of microvilli? Location?

32 What is the nickname for ribosomes? Two type?

33 What are the two type of endoplasmic reticulum? Function of each?

34 What is the function of the Golgi complex? How is product delivered to the Golgi complex and how is product shipped away from the Golgi complex? Nickname?

35 What is the function of the lysosome?

36 What is the function of the peroxisomes?

37 What is the function of the proteasomes?

38 What is the function of the mitochonria? Nickname? What functions occur inside the mitochondria? What must be present for ATP production? How are mitochondria different then all other organelles?