

STUDY GUIDE - Ch. 6.7 - Extracellular Components and Connections
Between Cells Help Coordinate Cellular Activities.
- Ch. 6.8 - A Cell is Greater than the Sum of its Parts

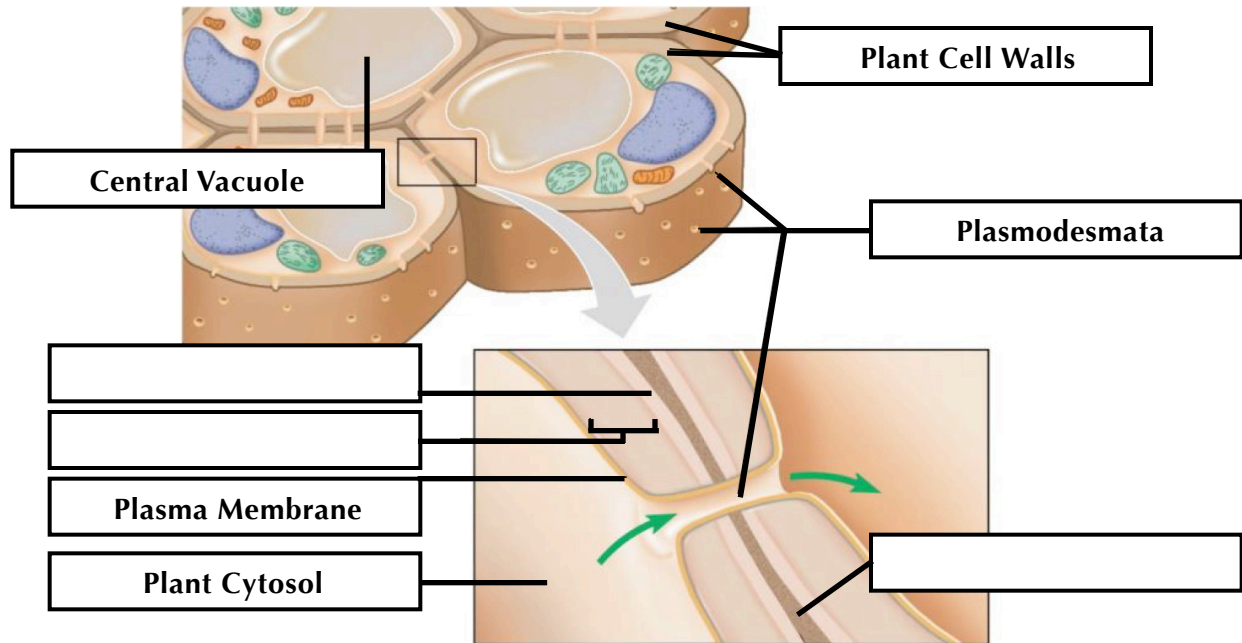
NAME: _____

- **PHYSICALLY PRINT OUT** this PDF and **HANDWRITE** (with a black or blue pen) your answers directly on this PDF. Typed or digitally-written work is not accepted. Do not answer questions on separate paper.
 - **Importantly, study guides are NOT GROUP PROJECTS!!!** You, and you alone, are to answer the questions as you read your assigned textbook. You are not to share answers with other students. You are not to copy any answers from any other source, including the internet.
 - **Get in the habit of writing LEGIBLY, neatly, and in a medium-sized font.** AP essay readers and I will skip grading anything that cannot be easily read so start perfecting your handwriting, and don't write so large you can't add all the relevant details and key elaborations in the space provided.
 - **SCAN physical documents in color and with good resolution. Then, upload your final work as PDFs to Archie.** Avoid uploading dark, shaded, washed-out, sideways, or upside-down scans of homework. Keep completed physical study guides organized in your biology binder to use as future study and review tools.
 - **READ FOR UNDERSTANDING and not merely to complete an assignment.** *First*, read a section quickly to get an overview of the topic covered. Then, read it a second time slowly, paraphrasing each paragraph out loud and analyzing every figure. Finally, read it a third time as you answer the study guide questions if assigned and start building your memory. Try to write answers out in your own words, when possible, and try to purposefully and accurately use all new terminology introduced.
1. a. **Animals do not have cell walls but bacteria and eukaryotic plant, fungal, and some protist cells do.**
What is a plant's cell wall?
- b. What are the four functions of the plant cell walls?
- 1.
 - 2.
 - 3.
 - 4.
- c. What is the composition of the cell wall?
- d. How is the plant cell wall made?
- e. What is the plant's primary cell wall?
- f. Where is the middle lamella found?
- g. What is the middle lamella?
- h. What is the middle lamella made of?
- i. What is the middle lamella's function?

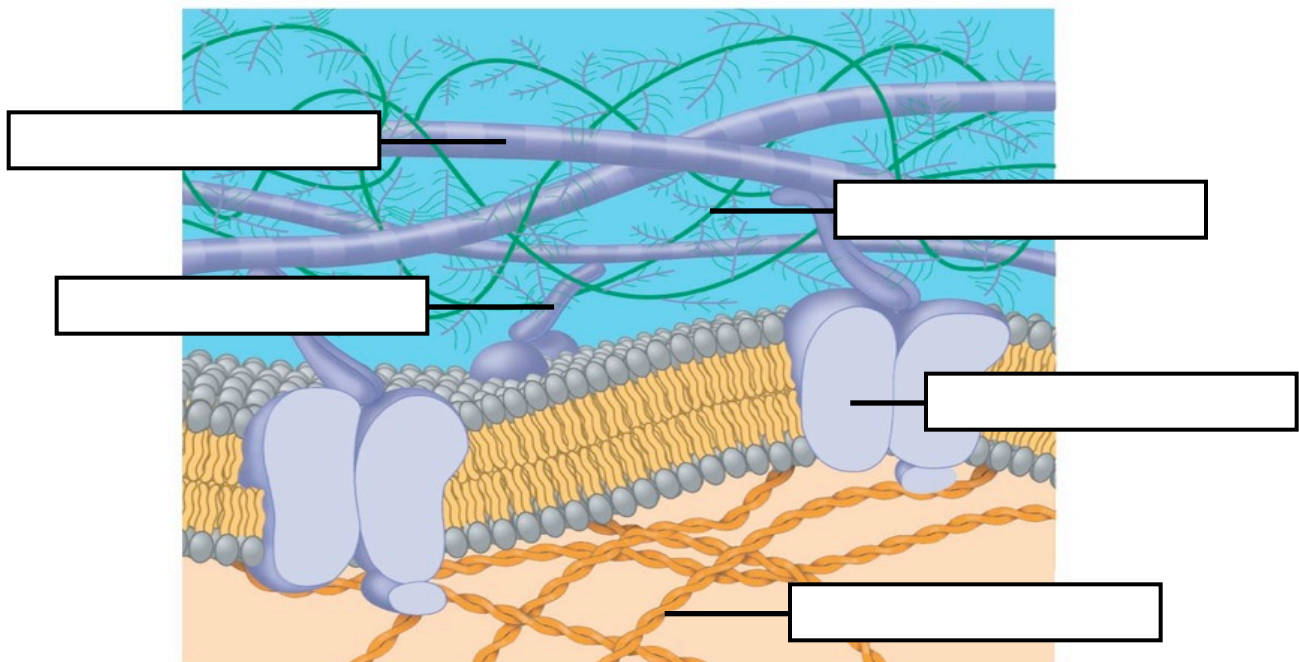
j. What is a **secondary cell wall**?

k. **Where are the secondary cell wall layers located** in relation to the primary cell wall and the plasma cell membrane?

2. On the sketch, label the **primary cell wall, secondary cell wall, and middle lamella**.

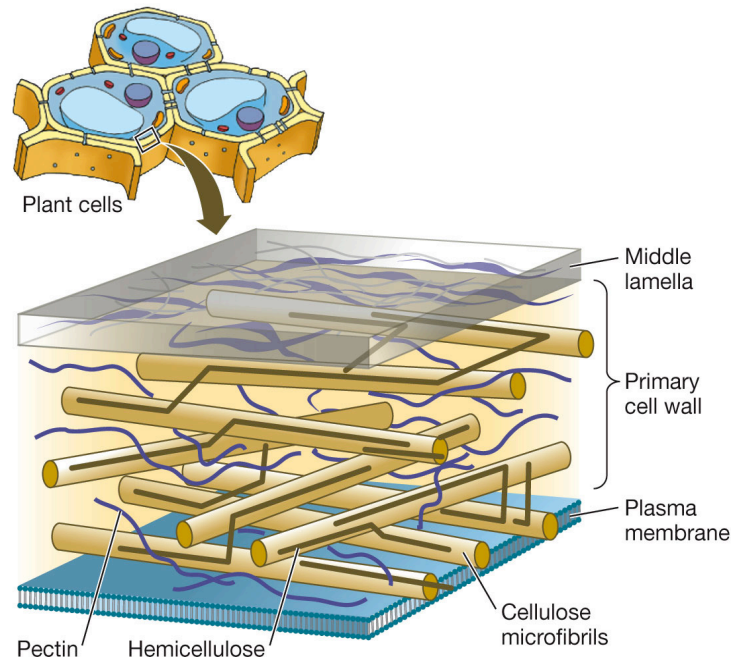


3. a. Animal cells do not have cell walls, but they do have an **extracellular matrix (ECM)** on the outer surface of their **plasma membrane**. On this figure, label the elements indicated.



- b. The **Extracellular Matrix can help regulate a cell's activities**. Explain how glycoproteins (like collagen) and other carbohydrate-containing molecules of the **ECM can communicate messages to the interior of a cell's cytoplasm**. Be sure to discuss the critical roles of ***fibronectins, integrins, and the cytoskeleton*** in this process.

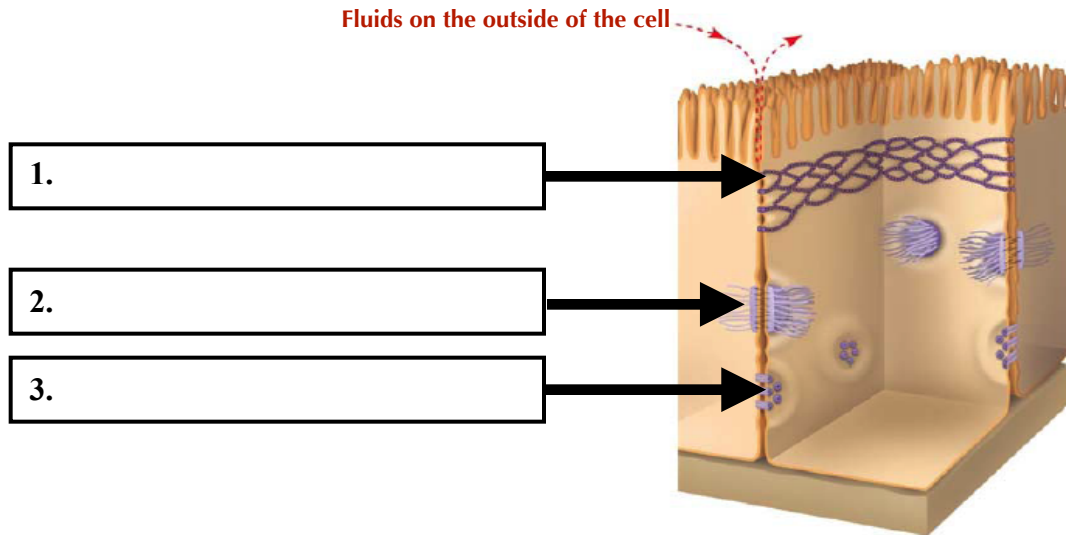
- c. **Note:** Understand that cell walls of bacteria, plants, fungi, and some protists, and the ECM of animals, are **NOT** impermeable to necessary solutes. They are **porous**, meaning that ions and compounds in the environment surrounding the cell can pass through these extracellular structures and reach the cell's plasma membrane.



4. **Cells must often adhere, interact, and communicate with neighboring cells**. These interactions may involve physical contact.
- What is the name of the ***intracellular junction found in plant cells***?
 - Describe the ***structure of this junction***.

c. Describe the **role of this intercellular junctions**. Be sure to explain **what is able to pass through** these junctions?

d. Animal cells do **not** have plasmodesmata. This figure shows the **three types of intercellular junctions** seen in animal cells. Label each. Then summarize their **role and importance** in the three boxes below.



1.

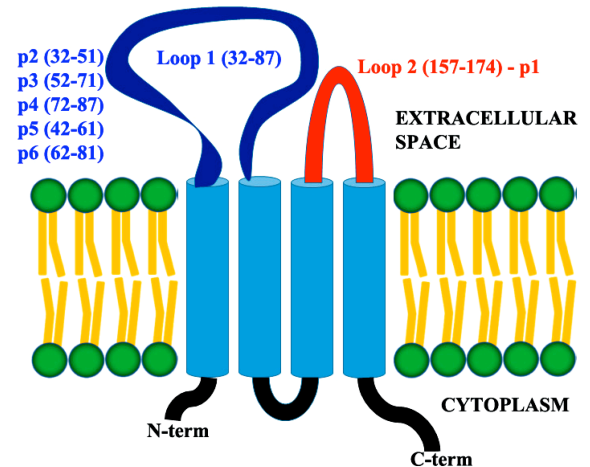
2.

3.

5. In what way are the cells of (multicellular) plants and animals structurally different from single celled eukaryotes?
(Check your answer by going to the [Ch.6.7 Concept Check Question #1](#) answer in Appendix A)

6. *Think.* If the plant cell wall or the animal extracellular matrix were impermeable, what effect would this have on the cell's function? (Check your answer by going to the [Ch.6.7 Concept Check Question #2](#) answer in Appendix A)
7. *Let's apply the knowledge you have learned previously in order to connect it and apply it to what you are learning now, a skill you must master for the AP Biology exam:*

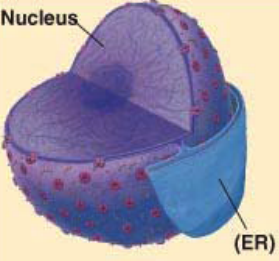

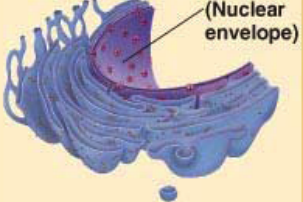






Tight junction proteins are made up of one polypeptide. The polypeptide chain that makes up a tight junction protein weaves back and forth through the plasma membrane four times, having two extracellular loops to the outside of the cell and one loop plus the C-terminal and N-terminal tails in the cytoplasm. Looking back at Figure 5.14 in chapter 5, what would **you** predict about the amino acid sequence of the tight junction protein?



(Check your answer by going to the [Ch.6.7 Concept Check Question #3](#) answer in Appendix A)

8. Let's move on to Ch.6, Section 8. Read carefully all of figure 6.32, then, answer the following questions.
- What is a **nucleosome**? Remember, nucleosomes wrap around each other forming a 30nm wide **chromatin**, the material from which chromosomes of eukaryotes is composed on.
 - What happens during **DNA Transcription**?
 - What happens during **mRNA Translation**?
 - The figure showcases one type of motor protein (myosin) carrying a transport vesicle to or from the endoplasmic reticulum along a cytoskeletal fiber. There is another myosin motor protein walking along a microfilament in the picture. What organelle is being moved by that motor protein?

9. Here's a mini refresher of key organelles and what they do – **STUDY IT!**

	Cell Component	Structure	Function
Concept 6.3 The eukaryotic cell's genetic instructions are housed in the nucleus and carried out by the ribosomes	Nucleus 	Surrounded by nuclear envelope (double membrane) perforated by nuclear pores. The nuclear envelope is continuous with the endoplasmic reticulum (ER).	Houses chromosomes, made of chromatin (DNA, the genetic material, and proteins); contains nucleoli, where ribosomal subunits are made. Pores regulate entry and exit of materials.
	Ribosome 	Two subunits made of ribosomal RNA and proteins; can be free in cytosol or bound to ER	Protein synthesis
Concept 6.4 The endomembrane system regulates protein traffic and performs metabolic functions in the cell	Endoplasmic reticulum 	Extensive network of membrane-bound tubules and sacs; membrane separates lumen from cytosol; continuous with the nuclear envelope.	Smooth ER: synthesis of lipids, metabolism of carbohydrates, Ca^{2+} storage, detoxification of drugs and poisons Rough ER: Aids in synthesis of secretory and other proteins from bound ribosomes; adds carbohydrates to glycoproteins; produces new membrane
	Golgi apparatus 	Stacks of flattened membranous sacs; has polarity (<i>cis</i> and <i>trans</i> faces)	Modification of proteins, carbohydrates on proteins, and phospholipids; synthesis of many polysaccharides; sorting of Golgi products, which are then released in vesicles.
	Lysosome 	Membranous sac of hydrolytic enzymes (in animal cells)	Breakdown of ingested substances, cell macromolecules, and damaged organelles for recycling
	Vacuole 	Large membrane-bound vesicle in plants	Digestion, storage, waste disposal, water balance, cell growth, and protection
Concept 6.5 Mitochondria and chloroplasts change energy from one form to another	Mitochondrion 	Bounded by double membrane; inner membrane has infoldings (cristae)	Cellular respiration
	Chloroplast 	Typically two membranes around fluid stroma, which contains membranous thylakoids stacked into grana (in plants)	Photosynthesis
	Peroxisome 	Specialized metabolic compartment bounded by a single membrane	Contains enzymes that transfer hydrogen to water, producing hydrogen peroxide (H_2O_2) as a by-product, which is converted to water by other enzymes in the peroxisome

10. Study the information you gained from each section of Ch.6. Then, complete the Self-Quiz at the end of your chapter. *Do your best to try it from memory first in order to test how well you grasped the material.*

1. _____ 2. _____ 3. _____ 4. _____ 5. _____