Name_____ Date_____

Totally Cellular

All living things are made of cells. A simple organism like an **amoeba** is just one cell, while complex organisms like humans are made of trillions of cells. We have hundreds of different types of cells in our bodies that we need in order to live. Cells of the same kind work together in our body as **tissues, organs, and systems** to make up an entire person! Each kind of cell has a job to do. Your outer layer of skin is made up of flat, scaly cells called **epithelial** cells. You are constantly making new skin cells as the old ones die and fall off. Your body needs these cells for protection and waterproofing. In your blood, you have special **red blood cells** that carry oxygen to your muscles. In your brain, you have **neurons**, which are cells that can send messages to one another, allowing you to learn and respond to your environment.

Cells are the basis for organization in all living things. Every cell is surrounded by a **cell membrane**. This keeps a cell separate from other cells or fluid around it. A cell membrane is strong, but it is also able to move and change shape. Cell membranes control what can go in or out of a cell. This allows cells to take in things that it needs and get rid of waste but also keep things out that would be harmful. Cell membranes have channels in them that are a lot like gates that open to allow bigger molecules to come inside. All cells also have **cytoplasm**, which is the substance inside of a cell that surrounds the organelles.

Cells are very small, but they can do many different jobs because they are made up of even tinier parts called **organelles**. A cell is much like a tiny factory with each organelle doing a specific job. If you look at a cell under a microscope, the organelle that is biggest and easiest to see is the **nucleus**. Most kinds of cells only have one nucleus. The nucleus is the part of the cell that contains the cell's genetic material or **DNA**. The nucleus is in charge of many things including **cell division,** which is the way we make more cells. Without a nucleus, a cell would not be able to replace itself if it was worn out. When cell division is happening too fast, cells can grow out of control causing cancer.

There are other organelles that also have important jobs in a cell. The **mitochondria** are called the powerhouse of the cell. This is where the food that we eat is changed into energy that our bodies can use. You have many mitochondria per cell, especially in cells that work very hard like muscle cells.

Another key organelle is the **endoplasmic reticulum**. This organelle is near the nucleus and acts like a conveyor belt to get molecules to other parts of the cell. There are two types of endoplasmic reticulum: **rough** and **smooth**. Rough endoplasmic reticulum has tiny organelles called **ribosomes** in and on it. Ribosomes are the place in a cell where **proteins** are made. Proteins are very important because they help chemical reactions like digesting our food to occur, and they also make up structures like our hair, nails, and muscles.

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Totally Cellular (cont')

Plant cells have a few unique organelles that are not found in animal cells. In addition to a cell membrane, plant cells have a rigid **cell wall.** Plant cells also have **chloroplasts,** which are amazing organelles that plants use to change the sun's energy into food they can use.

It is pretty amazing that a cell, which we cannot even see without the help of a microscope, has so many parts. Cells are very complicated and when they are not working properly, diseases can occur. One example is called **sickle cell** disease. Sickle cell disease affects the red blood cells that carry oxygen throughout our bodies. Red blood cells travel through our blood stream delivering oxygen to muscles and organs that need it. Normally, a red blood cell has a shape similar to a donut that allows it to move through even the tiniest blood vessels. When someone has sickle cell disease, the protein inside of their red blood cells is not made properly. This causes the whole cell to become shaped like a crescent moon. Cells with this sickle shape do not flow through the blood stream very well. People with sickle cell disease have a lot of pain especially around their joints, and they don't get enough oxygen to their muscles to run or play hard.

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Totally Cellular Questions

Now that you have read all about cells and some of the jobs they perform in our bodies, use what you have learned to answer the questions below.

1. True or False: All living things are made of at least one cell.

2. Fill in the blanks for the levels of organization in our bodies:
   Cells › _____ › organs › _____ › entire person!

3. Name a specific **kind of cell** that can be found in a human body **and** the job it does.

4. What is the strong but flexible structure that surrounds every kind of cell?
   Cell _____

5. What is the name for the substance that surrounds the organelles **inside** of a cell?
   a. DNA
   b. Cytoplasm
   c. Protein
   d. Cell wall

6. What is the organelle that is also called the powerhouse of a cell?

7. What cell organelle is responsible for making proteins?

8. Which type of cell would be more likely to have many mitochondria: A fat cell or a muscle cell?

9. Name one structure that can be found in plant cells but not animal cells.

10. What type of cells is not working properly in someone that has sickle cell disease?

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Totally Cellular Answers

1. True
2. Cells › tissues › organs › systems › entire person!
3. Name a specific kind of cell that can be found in a human body and the job it does.
   Ex. epithelial – protection, or red blood cells – carry oxygen…
4. Cell membrane
5. b.
6. mitochondria
7. ribosome
8. muscle cell
9. cell wall or chloroplast
10. red blood cells

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