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How to Use Literacy for Anywhere

This is a *Literacy for Anywhere* level 5 book. This text is designed for students in year one or grade one in school. Ideally, first grade students will be reading level one texts independently by the end of the year, second grade students will be reading level two texts, and so on. Of course, we realize that every student, classroom, and school is different, so the book level may not always correspond to the class or grade level.

If your school or library uses another system for leveling books, you can use the chart below to add *Literacy for Anywhere* books into the collection. Levels are based on the following study: *Supplemental Information for Appendix A of the Common Core State Standards for English Language Arts and Literacy: New Research on Text Complexity.*

Literacy for Anywhere	U.S. Common Core Band	The Lexile Framework®	Flesch-Kincaid
Starter	Very basic books for those just starting!		
1	<2nd	<420	<1.98
2	2nd - 3rd	420 - 620	1.98 - 3.5
3	2nd - 3rd	620 - 820	3 - 5.3
4	4th - 5th	740 - 880	4.5 - 6.1
5	4th - 5th	850 - 1010	5.5 - 7.7

Cells

Literacy for Anywhere

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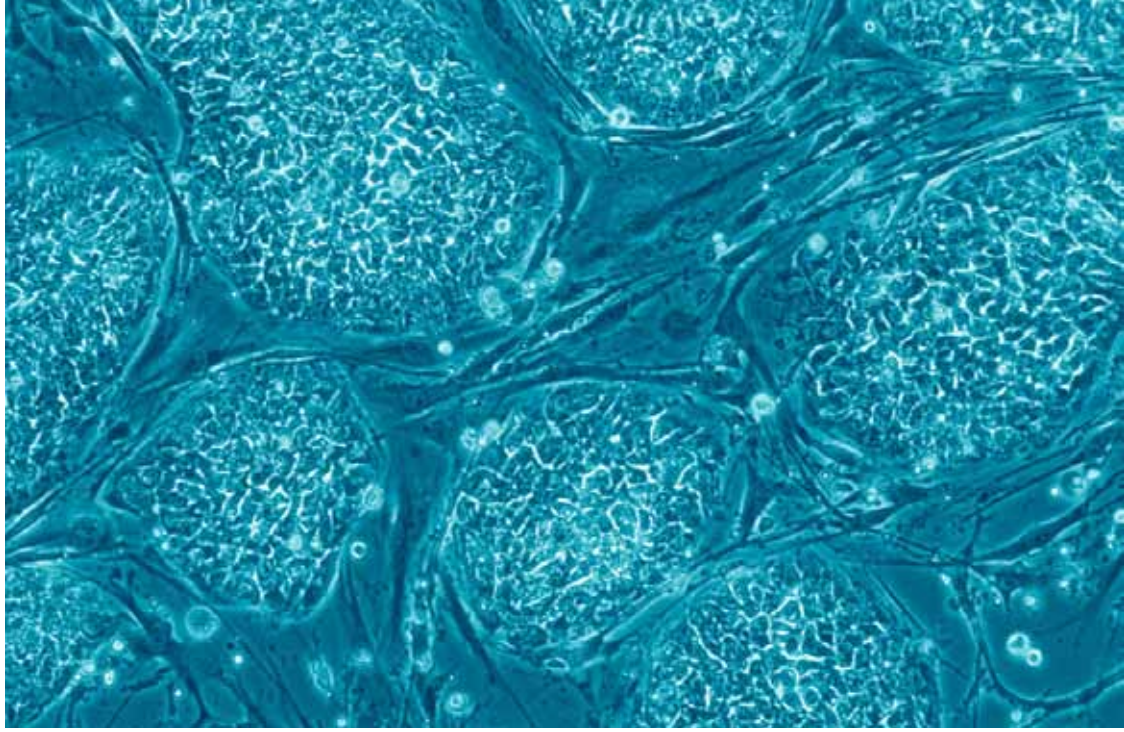
Cells

Level 5



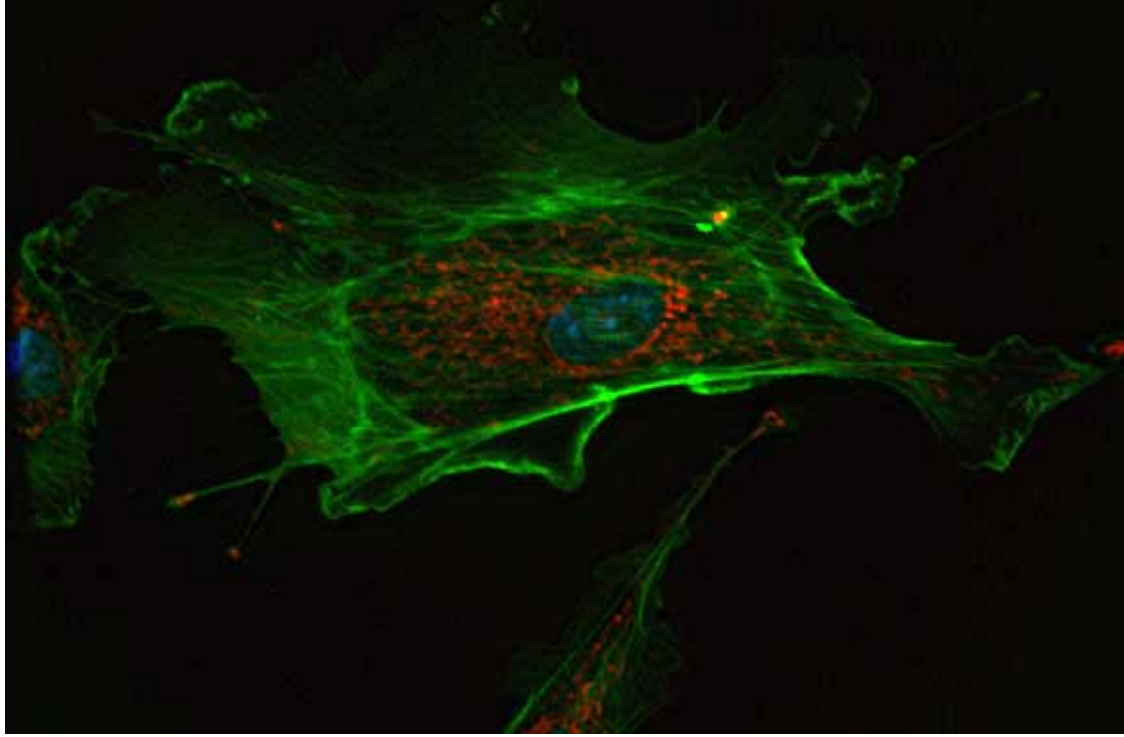
Everything in the universe is made up of smaller parts. A book is made up of pages, which are made of paper. The paper is made of fibers, which are made of molecules. Molecules are made of atoms.

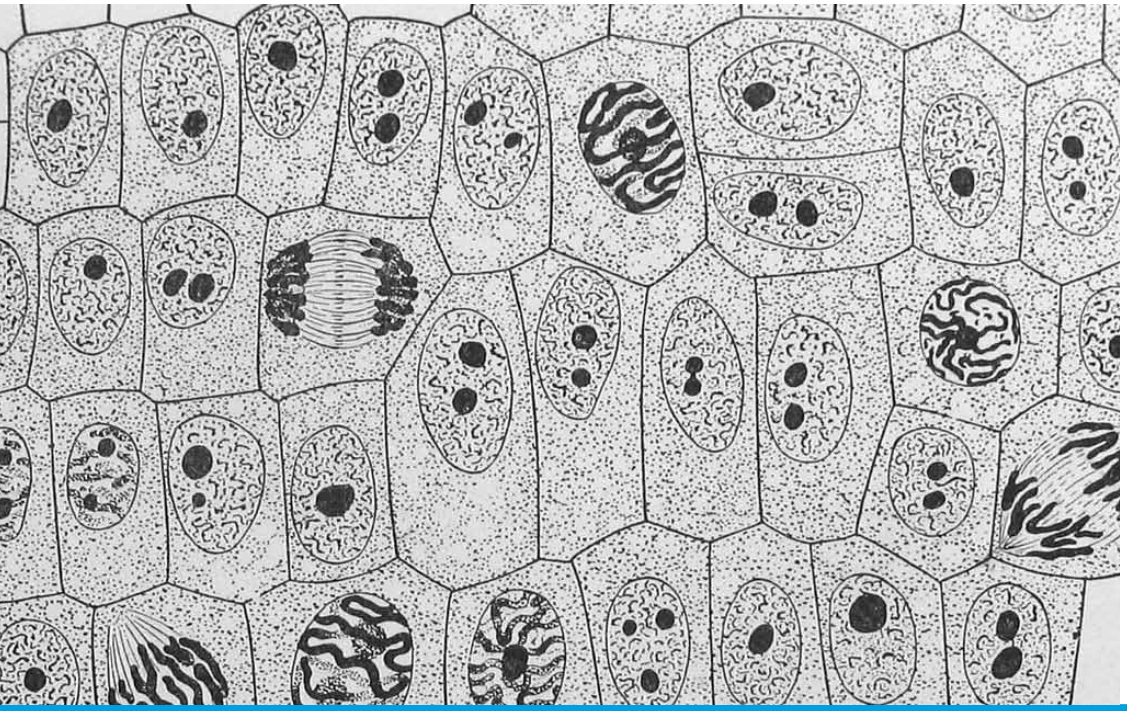
If you keep breaking anything into smaller parts you will eventually be left with atoms, the building blocks of the universe. Stars, people, and everything in between are made up of atoms.

Even atoms have parts. Atoms are made of electrons and protons, which are negative and positive energies. You can't see atoms because they are so very small.

In plants and animals, atoms come together to form molecules, which come together to form all the parts of a cell. Cells are called the building blocks of life. A cell is the smallest living thing that can function on its own.

Cells are the basic unit of all living things: plants, animals, fungi, and single celled organisms. Cells join together to perform different tasks. Each cell is a separate entity, but they are able to send and receive chemical messages to communicate. By coming together to form tissues, which come together to form organs, cells work together to make us eat, grow, reproduce, respond to our environment, and adapt, things that all living creatures (even single-celled organisms) have to do.





Different organisms have cells that work differently. For example, plants move very slowly and differently than animals, so they do not need muscle cells. Animals do not turn sunlight into food, so they do not need the same kind of cells that plants do. Every type of organism needs special cells.

Most organisms you can see have many different types of cells. Your muscle cells are much different from your skin cells and the cells that make up your teeth are very different from the cells that make up the gums around them. Cells are different so that they can do different jobs.

Even though organisms like us are made of huge numbers of cells (humans have about 37.2 trillion), some organisms are only one cell. These are called unicellular organisms.

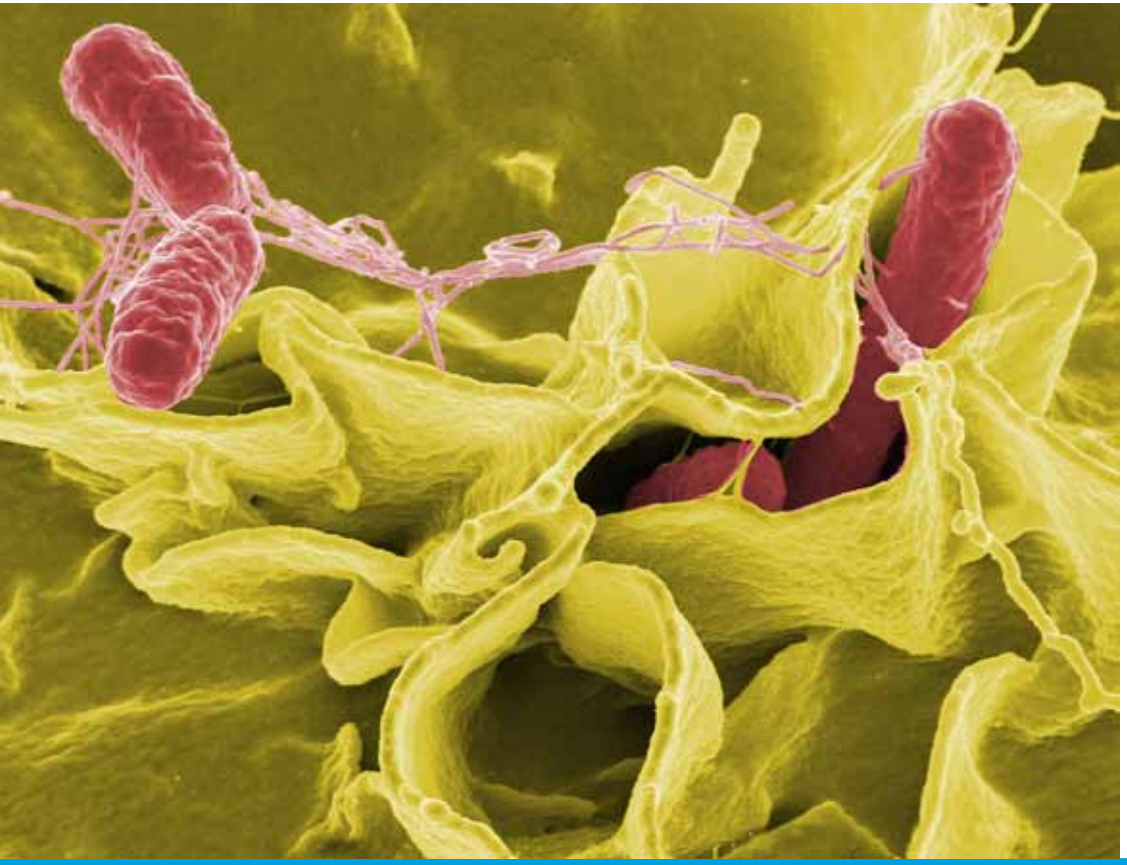
Unicellular organisms must get their own food. Some unicellular organisms also have special parts, like whip-like “tails” called flagella, that help the cell move around. These cells can eat other unicellular animals and usually reproduce by splitting in two. Pictured on the left is Giardia, a unicellular organism that can make humans sick if it gets inside us.

One really big unicellular organism is Valonia ventricosa, a type of algae. You can see and touch it. However, most unicellular organisms are so small you can’t see them without a special tool.

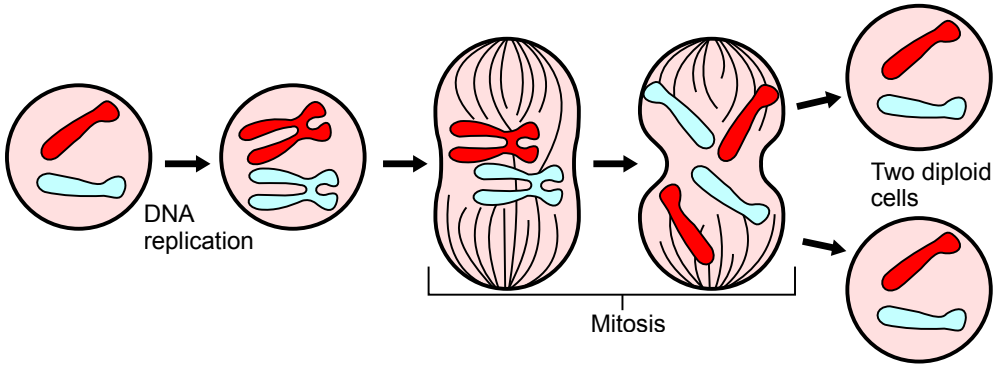
Algae are a special type of organism that can be unicellular or multicellular. Unicellular algae are usually very small, but multicellular algae like kelp can grow up to 50 meters.

Bacteria are a kind of unicellular organism. Some bacteria attack our cells and hurt them, other bacteria work with our cells to help us turn food into energy and do other jobs.

Below is salmonella attacking human cells. Salmonella grows in uncooked meat. Salmonella is one reason it is so important to cook meat. Salmonella can even live on a spoon or plate that touched raw meat or raw eggs earlier that day. Be careful, these guys would love to attack your cells too!



Mitosis



In multicellular organisms like plants and animals, cells have to work together. They communicate and share resources so that organisms can survive.

Cells communicate with each other in many ways. For example, when it is hot outside, the outer cells know about it first and tell the inner cells so they can cool down.

One of the most important ways that cells share information is when they reproduce. The cells you have now are not the same you had when you were born. Cells reproduce and are replaced when they die. This is how we can live longer than our cells do.

The information about how cells work and are made is stored inside every cell. When a new cell is made, its information is copied and one cell splits into two identical cells. This way, both cells are the same and can do the same things. This is called mitosis.

Most of the information in cells is stored in something called the nucleus. The nucleus and other parts of a cell are called organelles. Organelles, like organs in an animal, do different things for the cell.

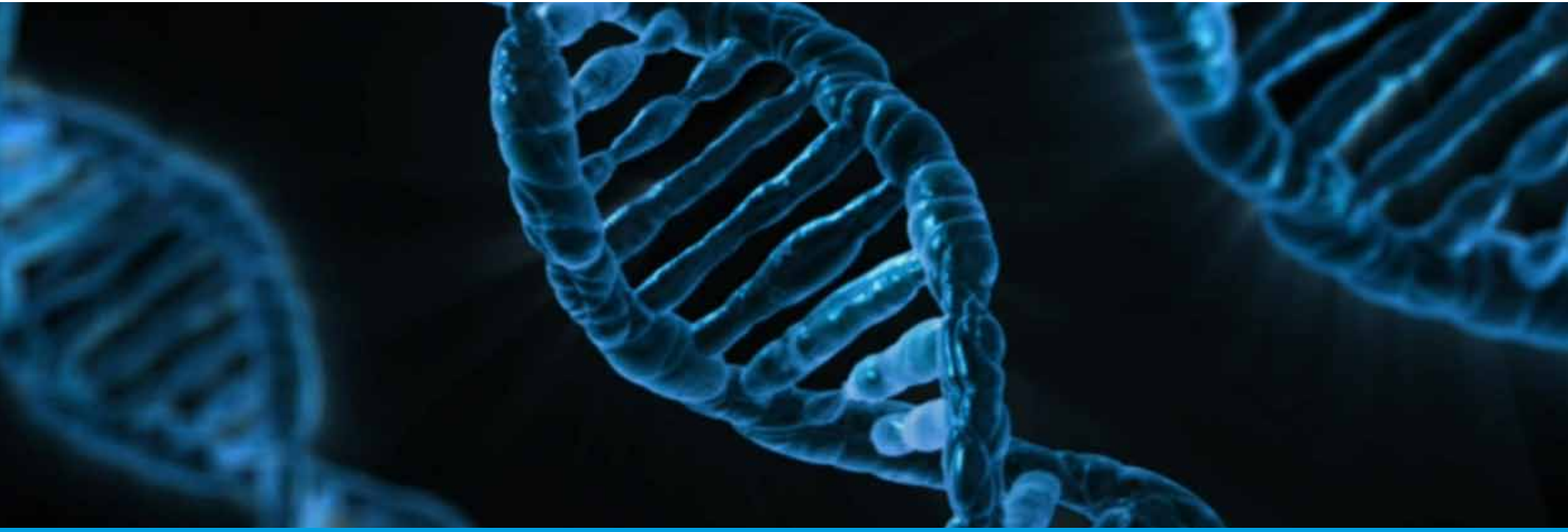
The nucleus holds the majority of the information and has some control over what the cell does. The nucleus is like a brain for the cell.

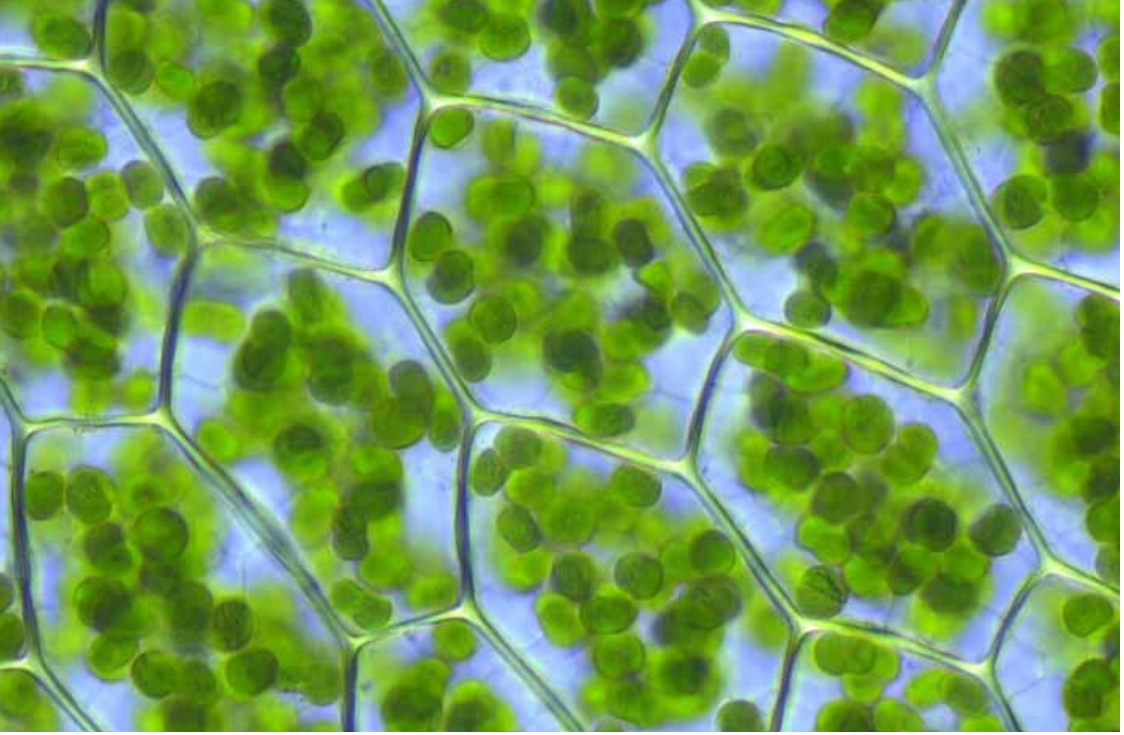
A membrane called the nuclear envelope separates the nucleus from the rest of the cell. The information in the cell is safe in the nucleus because things only move in and out when they need to.

The information that the nucleus stores is called DNA. DNA is important because it allows that cell to make more cells and also tells it what to do.

DNA tells the cell membrane what it can let into the cell and what might be dangerous. It is the DNA that gives the organelles instructions on how to do their jobs.

DNA is very important and every organism has unique DNA. DNA is part of the reason why you are you. It contains the information that determines the color of your hair and eyes, and so much more.



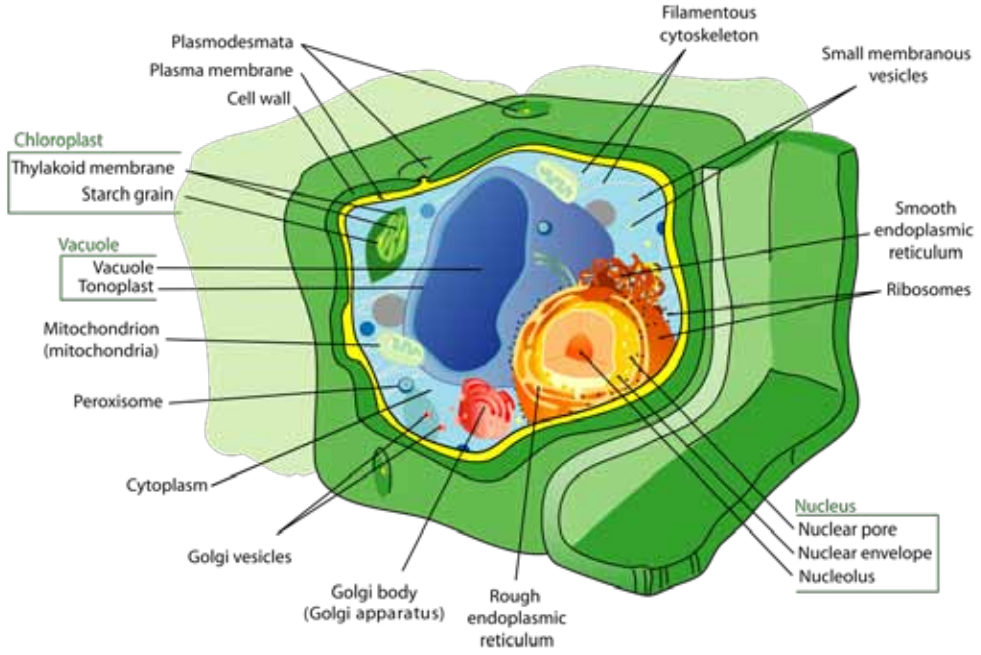


DNA holds the information that makes organisms, and their cells, different.

Plant cells are different from animal cells in a way that is easy to see. All cells have cell membranes, but plants have harder walls that help them maintain their rigid shape. Animals have bones to keep them upright, but plants rely on their cell walls and hard fibers.

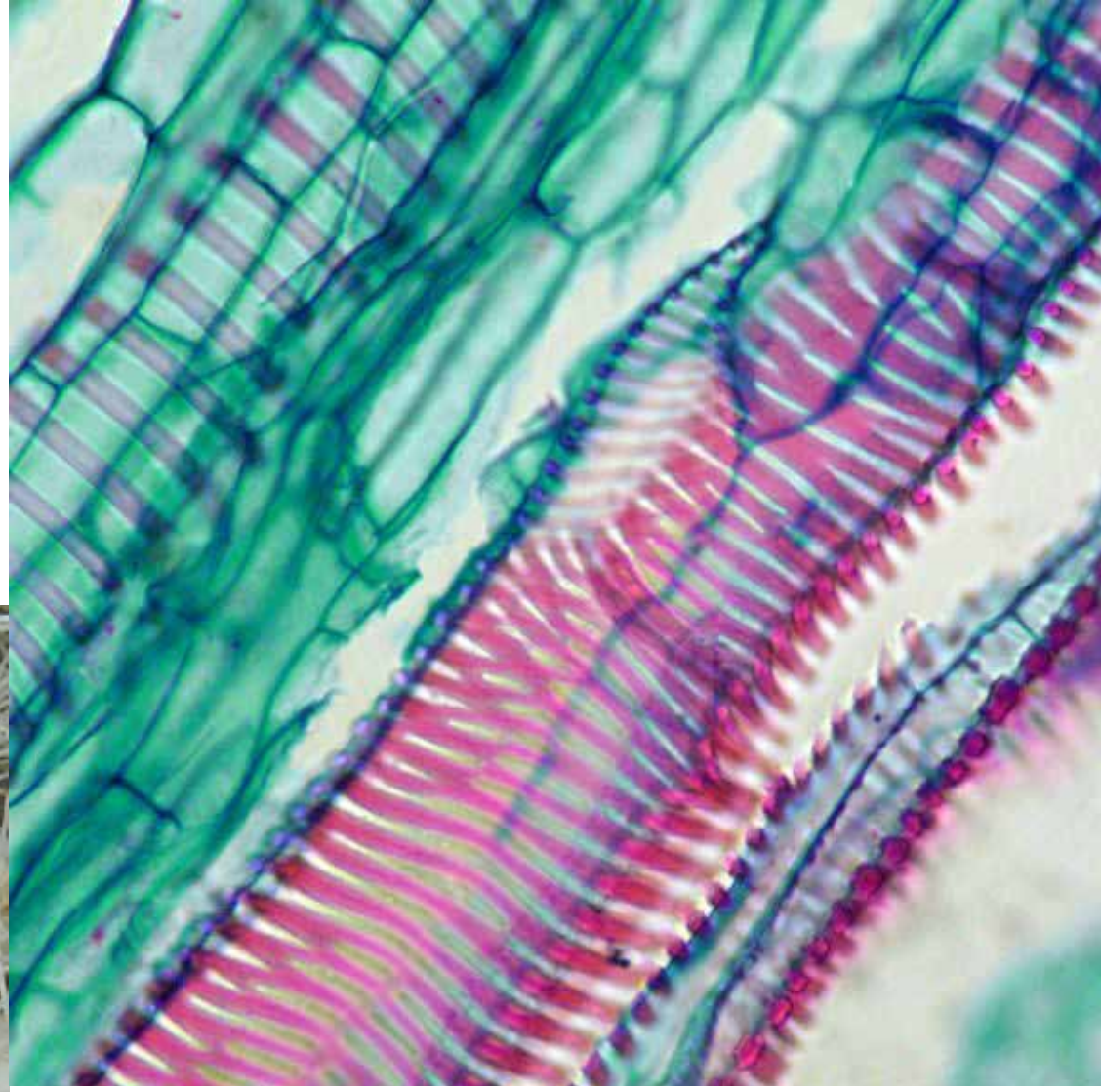
Other important organelles for a plant cell are its chloroplasts. Chloroplasts are the organelles that make plants green and allow them to turn sunlight into food. The chloroplasts can even move around inside the cell to find the best sunlight. The green color helps the chloroplasts capture the energy of the sun.

A Plant Cell



Plant roots are generally underground and are made of cells that can take nutrients from the soil just like how the intestinal cells of animals take nutrients from food.

Roots are long and thin, reaching far into the soil. The thinner and longer the root is the more soil it can touch. Some root cells give the soil different chemicals in order to collect food from the soil. Some soil needs to be treated just right by the roots in order for it to give up its nutrients. Plants have evolved to do this very well for the type of soil they call home.



Plants also have phloems and xylems, which look like a little bit like straws. These help move food and water from one part of the plant to another. The cells along these straws are hard in order to keep the plant upright and to allow the food and water to move easily through them.

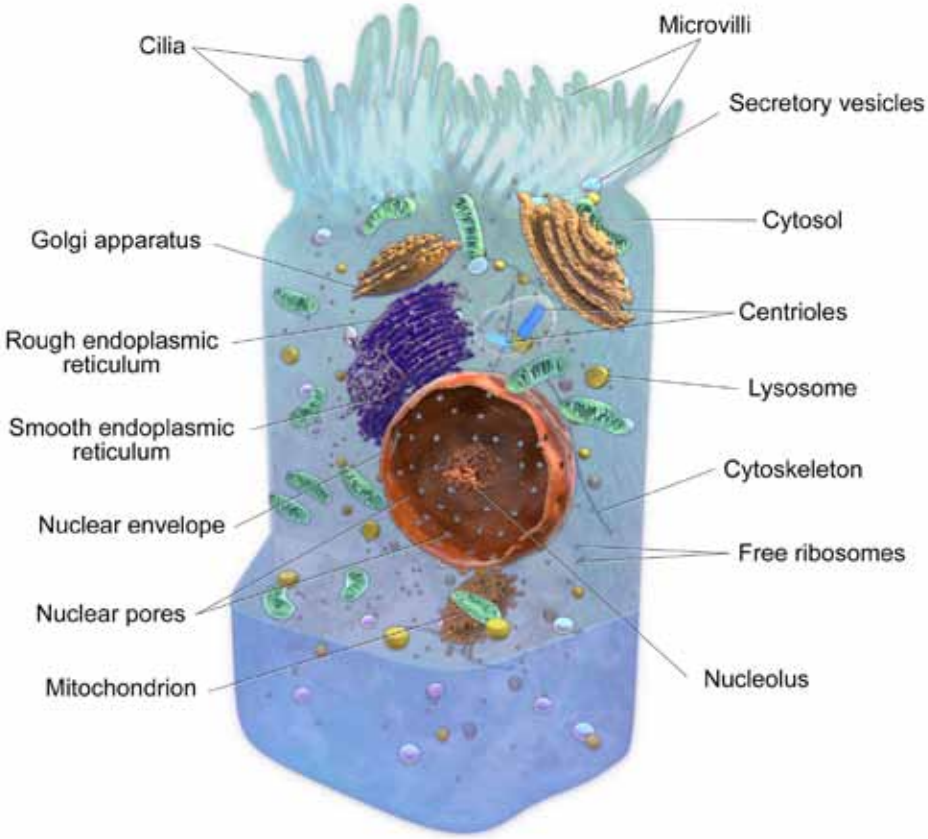
Even though plants have these special organelles, animal and plant cells have a lot in common. Both are part of a group of organisms called eukaryotes. Eukaryotes are complex organisms with cells that have many different parts. Animals, plants, algae, and fungi are all eukaryotes.

Both plant and animal cells have a cell membrane that separates the individual cell from the others around it, but the membrane behaves differently in animals. For plants, as you read above, the membrane is stiff like a wall. In animals, the membrane is softer.

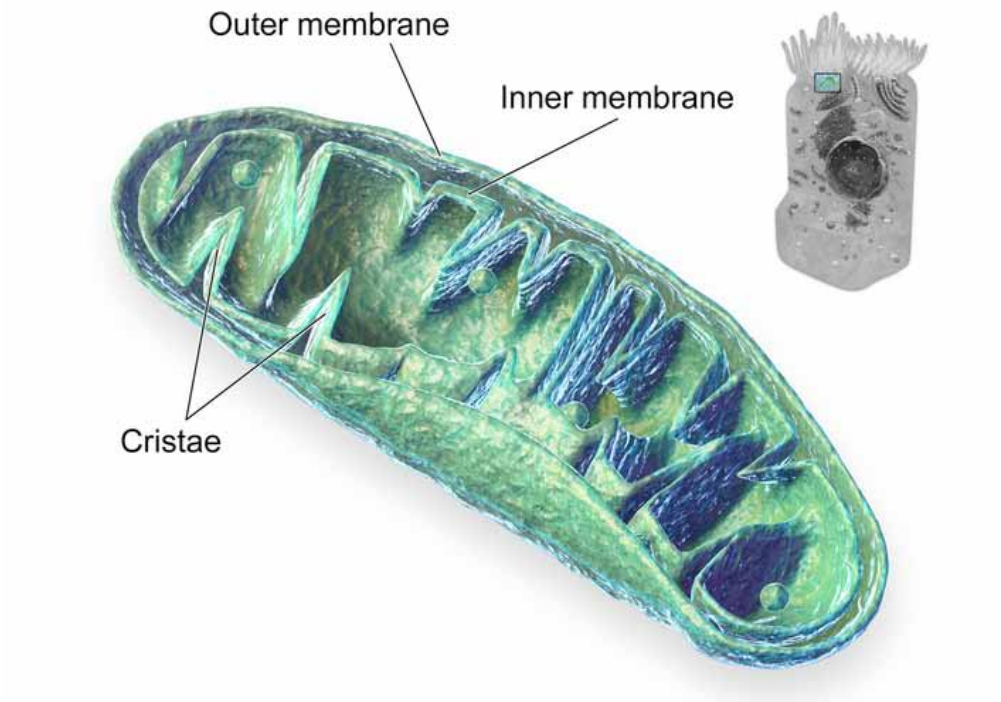
In both plants and animals, the membrane does not completely shut the cells off from each other. Cells rely on each other; they share food with each other because they may need something else later. Also, cells spread information to each other in order to help the body. There are special bridges that allow information and food to pass from cell to cell.

Both plant and animal cells have something called a vacuole that holds water and food. However, in plants the vacuole takes up almost all the space in the cell. The vacuole collapses when it loses water, but as the plant is watered the vacuole fills back up.

An Animal Cell



Mitochondria

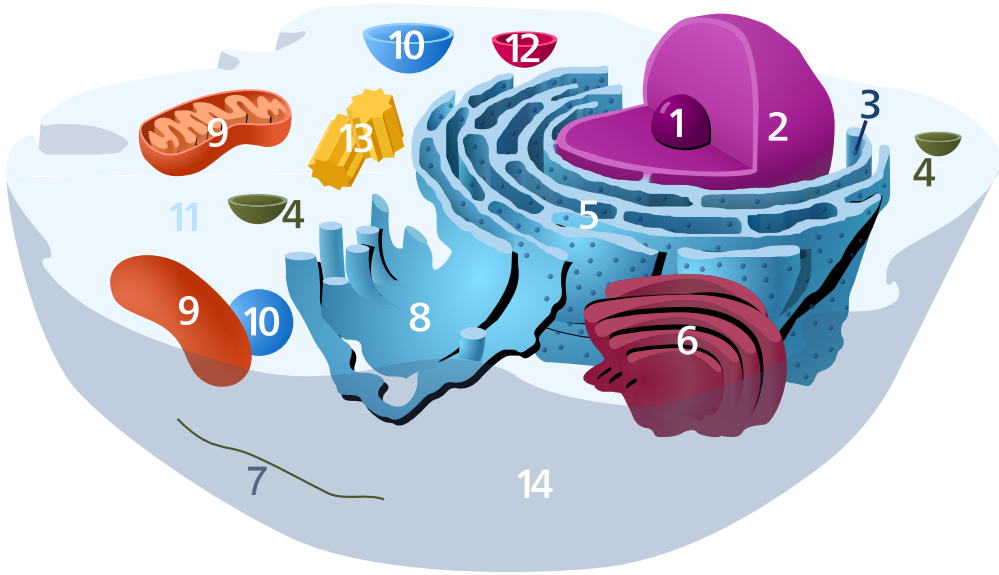


Mitochondria are important organelles found in plant and animal cells. Mitochondria create energy for the cell and can control when the cell reproduces and dies. Some cells have only one mitochondrion while others have many.

Mitochondria are surrounded by a membrane that separates it from the rest of the cell. Like the cell membrane, the membrane surrounding the mitochondria has gateways to let chemicals in and energy out.

Cytoplasm is another important part of a cell. It fills up the spaces between organelles and allows things to travel through it. Cytoplasm is gooey and surrounds all of the organelles except for the outer cell membrane. Cytoplasm is mostly made of water, and holds extra water for the cell. Energy and information float in the cytoplasm to reach and feed other parts of the cell.

Floating In Cytoplasm

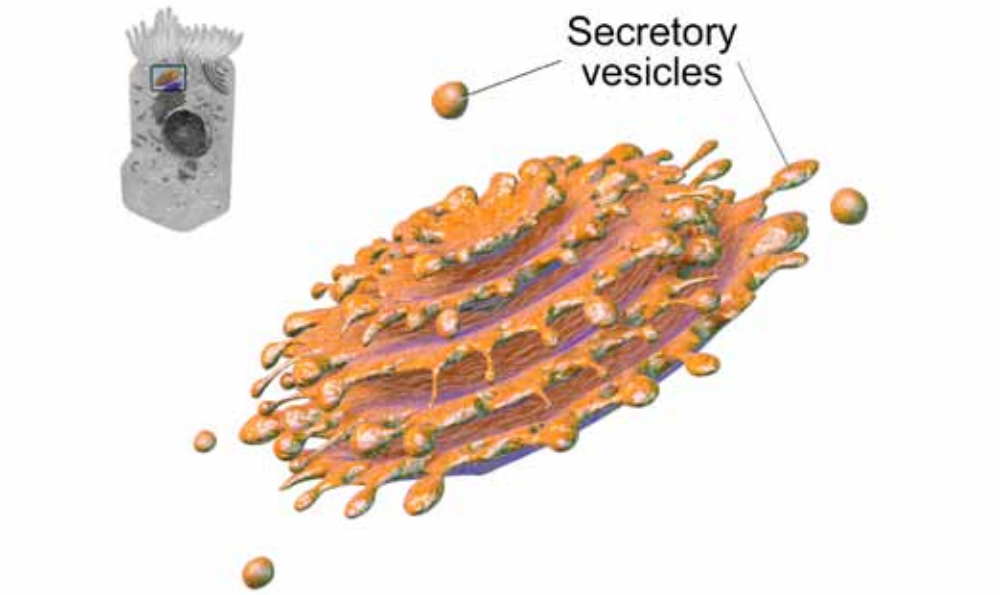


Another look at an animal cell. Here, you can see all of the ogranelles floating in the cytoplasm: 1) Nucleolus, 2) Nucleus, 3) Ribosome, 4) Vesicle, 5) Rough endoplasmic reticulum, 6) Golgi body, 7) Cytoskeleton, 8) Smooth endoplasmic reticulum, 9) Mitochondrion, 10) Vacuole, 11) Cytosol, 12) Lysosome, 13) Centrosome, 14) Cell Membrane.

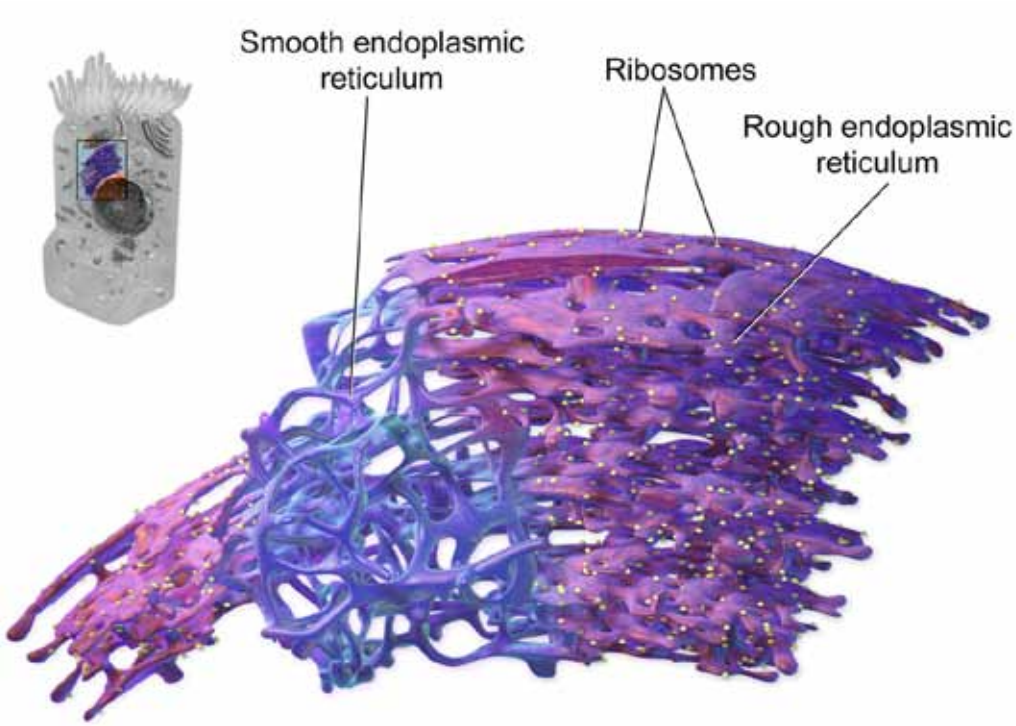
The Golgi body is an organelle that helps cells use energy. It is made of flat membrane-enclosed discs that lie close together. Not everything that comes into the cell is in the best form to be used. It is similar to how humans cook food; the cell needs to change its food to eat it. The Golgi body's job is to change the chemicals and food into something that the cell can use.

The Golgi body also packages food for the cell to send to other cells. When the cell has too much of one kind of chemical it puts it together in a package to send to another cell.

Golgi Body



Endoplasmic Reticulum

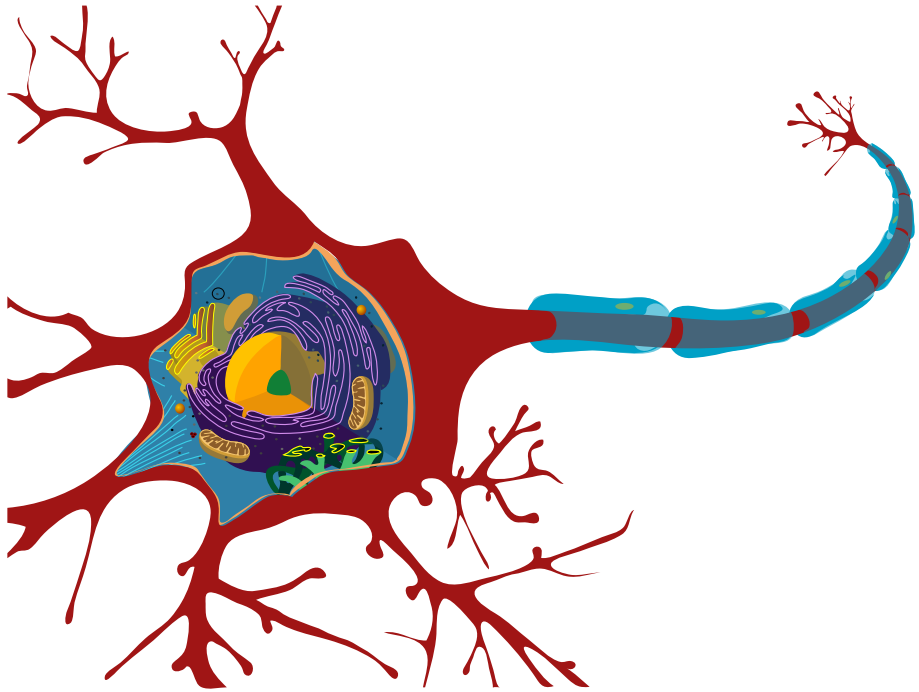


The endoplasmic reticulum, called ER, is located around the nucleus. There are two types of ER, one that is smooth and one that is rough. They both have similar jobs inside the cell. The ER moves food, chemicals, and information from the nucleus, sorts them and takes them to the Golgi body so that they can be packaged and made usable.

If you have ever scraped your knee or cut your finger, you know that blood is red. Blood is made mostly of special cells called blood cells. These cells are free flowing inside your veins and arteries, which are like the roads for food and information inside your body.

If cells need to send food or information far away, like when your lungs breathe in oxygen to supply your brain, blood is how it moves. Your heart pumps the blood to every corner of your body. As blood flows, it picks up new and used resources and helps them get where they need to go.

Nerve Cell

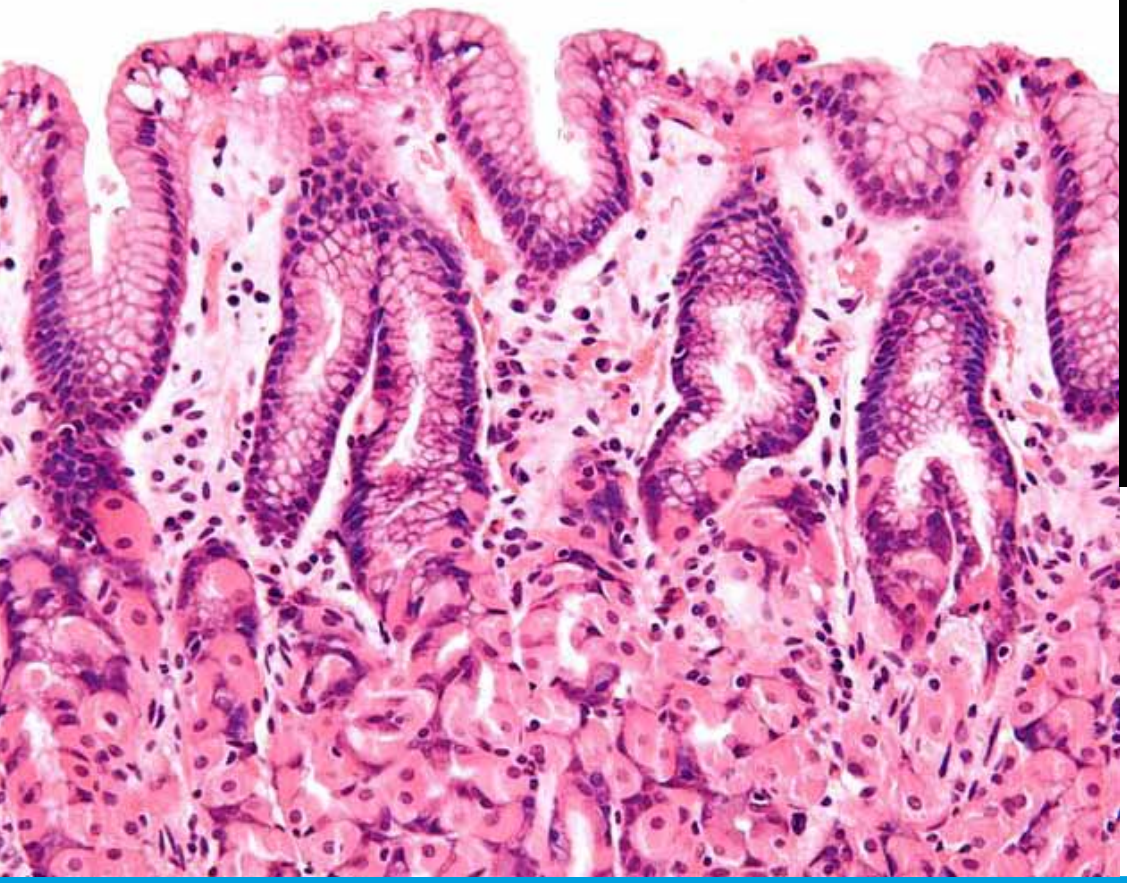


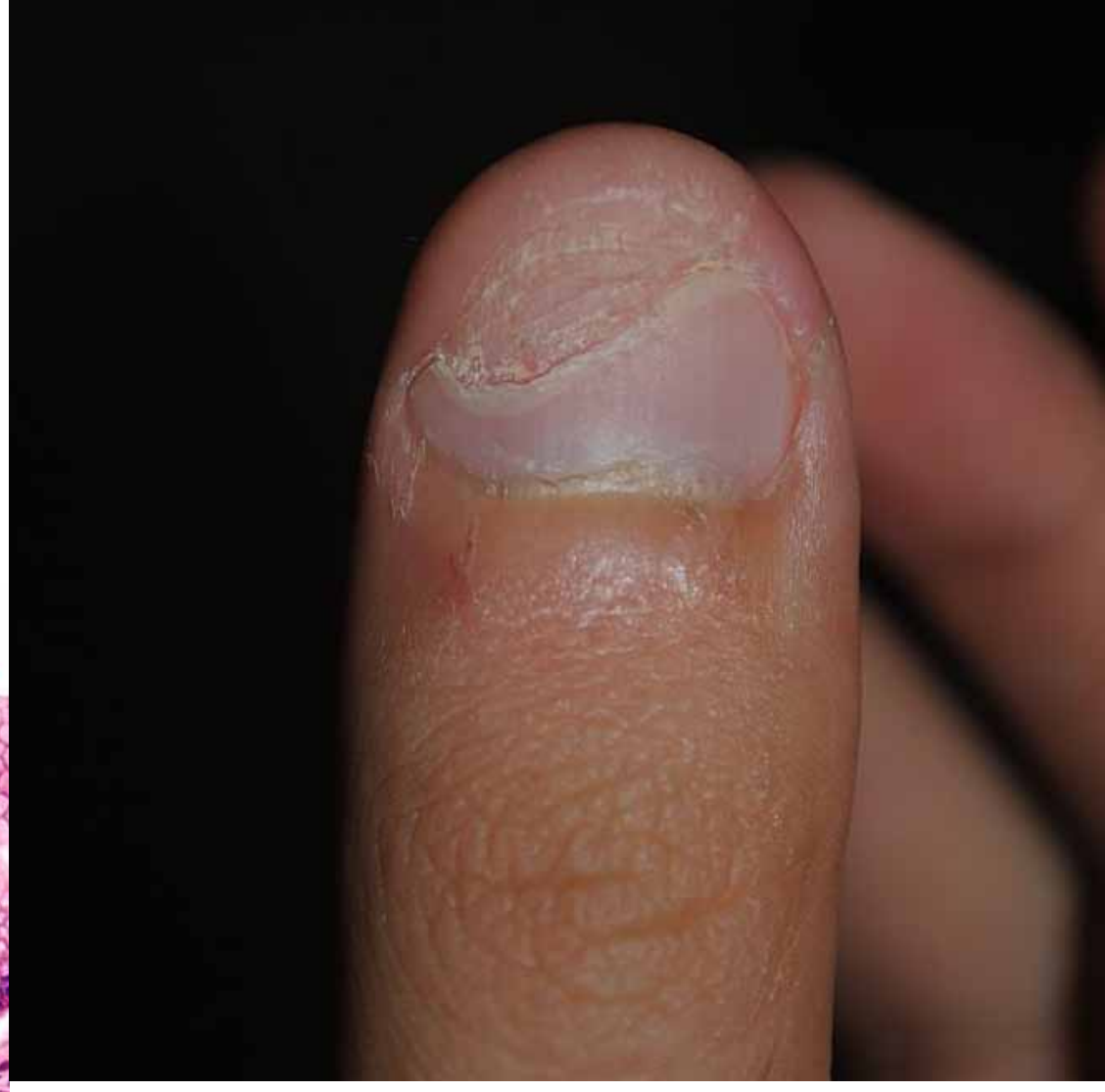
Nerve cells are specialized cells that allow you to feel. These cells have a special way to send information. They use electricity instead of blood to send sensations and thoughts.

These cells are long and connect your brain to the rest of your body. When you touch something with your finger, the signal travels from your finger all the way to your brain where it tells you how it feels. Your brain is a large cluster of these nerve cells and other cells that allow you to remember, think, and feel.

Intestinal cells are special too. They take the important resources out of the food you eat and let the other materials pass on through. Your body doesn't use everything you eat which is why all organisms produce waste.

As a lump of food moves through your intestines, thin layers of cells try to snag the food you need and move it into your blood to be taken to the rest of your body. These cells absorb resources before they move down the intestines and out the other end.

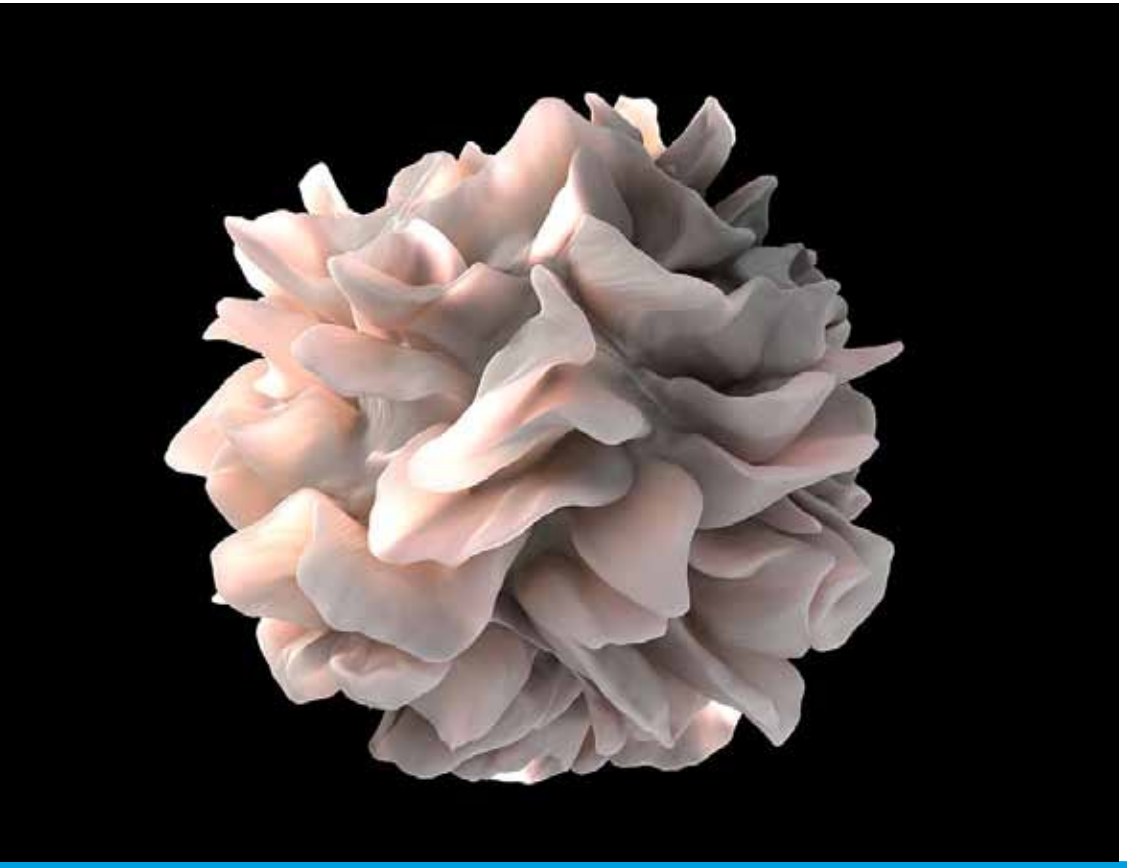




Nail cells are hard and grow out from the base of the nail. Just like the nails of a dog or the horns of a goat, your nail cells are mostly made of something called keratin. Nail cells are hard in order to protect the end of your fingers and toes from injury.

Cells help us in everything we do. Our bodies are made of cells, and it is important to know how they work. The chemicals and food that cells use need to be moved around and changed in very complicated ways.

Sometimes, our cells can't do the job alone. Doctors need to know how to heal sick cells and make sure the cells are getting what they need. Sometimes, like when a person is infected with HIV, cells don't work properly and we need to know how and why. Learning about cells can improve the lives of people whose cells aren't working.



Cells

Review Questions!

1. What is a cell? What do they do for organisms?

2. What are some ways that plant and animal cells are different?

3. If an animal cell gets a new resource, what organelle will turn it into energy it can use?

4. What do unicellular organisms use to move around?

5. Why is it good that nerve cells can send signals using electricity instead of waiting for the blood to carry them to your brain? What would happen if it took a whole minute to feel something hot or sharp on your hand?

Cells

Write About It!

A scientist wants to add a new kind of cell to your body. Choose what kind of cell they add and write about your new life. Maybe you can collect energy from the sun, or grow and grow forever like a plant.

Think about how your life would change and what negative side-effects the new cell might have. If you had plant cells in you, how would that change your ability to move?

Attributions

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