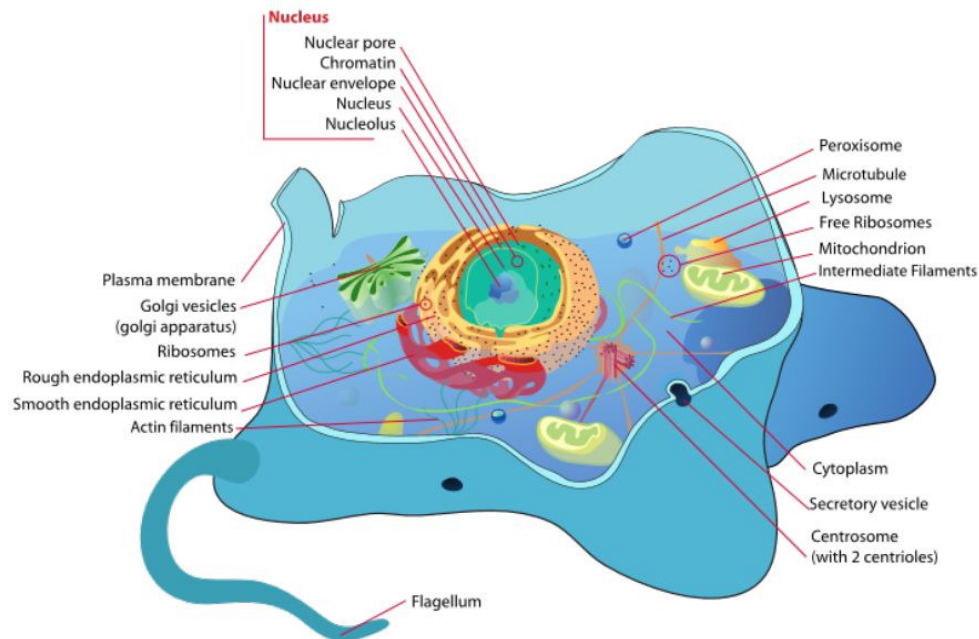


The Cells That Make Us

by ReadWorks



"Mom, I'm hurt," said Mike.

"What happened?" asked Mike's mom.

"I stumbled and fell while playing football at the playground today. I scraped my knee," said Mike.

"You poor dear. Here, let's put a Band-Aid on your knee," said his mom.

Mike's mom gingerly wiped his bleeding knee with a wet cloth and pasted a Band-Aid on it. Mike wondered aloud, "Our bodies are made of arms and legs. The arms and legs are made of blood and bones. But what are these blood and bones made of?"

Mike's mom replied, "Everything in our body is made of small units called cells. Think of it this way. Just like hundreds of thousands of bricks form a house, millions of cells form our blood, muscles, bones, skin, and hair-eventually coming together to form the human body."

As Mike looked at his bandaged knee, he wondered, "Wow, can I see these cells?"

"You cannot see your cells directly," said his mom. "A cell is tiny and is as small as the bacteria and other microorganisms that we cannot see with our naked eye. A cell is the smallest unit that can be said to be alive. You can see a cell if you have a powerful enough microscope, just like you'd see bacteria or microbes under a microscope."

"So, every part of my body consists of cells?" Mike said.

"Yeah. Not just your body, mine too," said Mike's mom. "Your pet dog, Tommy? He's made of cells. Your friend Jim's cat? She's made of cells, too. The lions we saw on safari last year, the spiders in our storeroom. Every creature on earth is made of tiny cells, just like you and me."

"Wow, so an ant or an amoeba is built up of cells, like so many Lego blocks?"

"Yes, just like Lego blocks. Only some creatures have just a single cell, like an amoeba. They are called unicellular organisms. Others, like us human beings, are collections of cells. These are called multicellular organisms. Multicellular organisms can range in size from brown algae to large animals like elephants, whales, and giraffes, which have trillions of cells."

"But what does a cell look like?"

"A cell is tiny, of course. But if you did manage to peer into a cell with a microscope that was powerful enough, you could see that a cell consists of different parts, too."

"So what parts are these?"

"Just like parts of our body are responsible for different activities (legs for movement, stomach for digestion, eyes for seeing, etc.), different parts within cells are responsible for different functions. These different parts perform the activities that keep the cell alive."

"Wow, so how does this teeny weeny cell stay alive?"

"The different parts of the cell work together to keep the cell alive. The nucleus is the 'brain' of the cell. It controls and coordinates all activities of the cell. The nucleus is surrounded by the nuclear membrane, which is like a blanket that protects the nucleus. The cell membrane is the outer covering of the cell, much like the nuclear membrane is the covering of the nucleus. The cell membrane is like a tap which controls what enters and leaves the cell. It can allow certain substances (food and water) to enter the cell, and block out other substances (waste or poisonous substances)."

"So the cell membrane is like a sieve that lets in some things and blocks other things?"

"Yeah. Or like an electric switch, if you think of it that way. Then there is the cytoplasm, which is a jellylike fluid that fills the cell, much like blood fills our body."

"Or like air fills the atmosphere around us?"

"Exactly! Only, all of this is within the tiny cell you can only see with the help of a microscope."

"Wow. This is like a tiny machine!"

"Yeah. But that's not all. All plant, fungal and some animal cells also have vacuoles, which is a cavity that works like a storage container."

"And what goes inside it?"

"It depends. Mostly, vacuoles are used to isolate harmful and waste material from the rest of the cell and help get rid of it."

"And what else?"

"Water; in plants, vacuoles help maintain the right water pressure. Animal cell vacuoles also help to store fats, starches, and glycogen which are all energy products."

"Is energy produced inside the vacuoles too?"

"No. Energy production happens in a part of the cell called the mitochondrion. These mitochondria are shaped like kidney beans. They convert food into chemical energy for the cells."

"And all the millions of cells keep me alive."

"Absolutely. With the accumulated energy in every one of the millions of cells, you and I get the strength to move our arms and legs, to think, move about, and to live."

"Wow. But each cell is tiny, so each cell would produce only a tiny amount of energy."

"Yeah. So these cells have to work together. A group of cells band together and form a tissue. There are many types of tissues. For example, connective tissues include blood or bones. These form connections between parts of the body. Muscle tissues form muscles, which help us move. Nervous tissues help parts of our body transmit messages-or 'think' and react to things that happen around us. Epithelial tissues are outer tissues that form protective layers."

"Like, skin?"

"Exactly! These tissues are specialized for different functions, so they work together in unison. For instance, all the cells in the muscle tissue in your calf muscles work together so that you can walk or run."

"...and the tissues in my biceps help me wave my hand," said Mike, waving his hand from side to side.

"That's not all," said Mike's mom. "Often, tissues cannot function or operate by themselves. So, these tissues team up to form organs."

"Just like me and my friends together form a football team," said Mike, reminded of his scraped knee.

"Yeah, just like you can't play football by yourself, a tissue cannot do anything by itself. It teams up with other tissues, and together, they perform the body's activities. So, a group of tissues team up to form your nose and help you smell. Other tissues in your pancreas help you digest food. So, each organ performs its specific function because of the tissues that constitute it."

"And the tissues, of course, are formed by the teeny weeny cells. Wow, so even if a cell by itself cannot smell anything, or a tissue by itself cannot smell anything, a collection of tissues can actually smell? That is so cool!"

"Unless you're a unicellular organism, one cell can't do much on its own. But in unity, there is strength. When millions of cells work together, magic happens. When cells combine to become tissues and tissues combine to become organs, the organs can perform the everyday activities like digestion, breathing, smell, taste-and just about everything else you do."

"Wow, all because of a teeny weeny cell! That is truly magical."

accumulate

ac · cu · mu · late

Advanced Definition

transitive verb

1. to amass; collect.

Now a millionaire, the tycoon began to accumulate many priceless paintings from Europe.

intransitive verb

1. to become greater; increase.

Dust accumulated under all the furniture.

Evidence of the harmful effects of the pesticide accumulated to the point where its use was banned by the government.

Snow quickly accumulated on the roof.

Water accumulated in the leaky basement.

Spanish cognate

acumular: The Spanish word *acumular* means accumulate.

These are some examples of how the word or forms of the word are used:

1. Over millions of years, many more mutations will accumulate and eventually the entire population of fish will be blind. This is called the neutral mutation hypothesis.
2. A group of students dressed identically had accumulated at the corner and they were shivering in the cold air of dawn. He nodded to his classmates, all too tired to have a decent conversation.
3. As the mothers and fathers lined up the traditional food items of their native countries on little tables, they wiped off the beads of sweat that had accumulated on their foreheads. April is the hottest month in Bangkok, Thailand, and they were all feeling it.

cell

cell

Definition

noun

1. a single unit of animal life or plant life. The human body is made of many kinds of cells.
2. a small room in a prison or jail.

The prisoner had to stay in his cell most of the day.

Advanced Definition

noun

1. a microscopic unit of plant or animal life, usually containing a nucleus and surrounded by a very thin membrane.
2. a very small room for a monk, nun, prisoner, or recluse.
3. any small compartment or group within a larger space or group.

a terrorist cell

4. a device for generating electricity by chemical means, as in a battery.

Spanish cognate

célula: The Spanish word *célula* means cell.

These are some examples of how the word or forms of the word are used:

1. Low-level inflammation is marked by an increase in certain immune cells, called cytokines, in the blood.
2. When you sniff a strawberry, invisible chemicals are drawn into your nose. Those odors make contact with receptor cells lining the nasal cavity, a large fluid-filled space behind the nose.
3. The cochlea is a snail-shaped structure in the inner ear that is filled with a special fluid. When the vibrations move the hair cells (our receptors) on the cochlea, they send signals to the brain.
4. Asexual reproduction is the process in which one organism produces a copy of itself without the help of another organism. For example: a bacteria can split into two cells on its own, tulips can reproduce through bulbs, and strawberries through stems.
5. This is why we need to water plants-so they will grow. They use their roots to suck water up into their bodies, and the little openings on their leaves to breathe in carbon dioxide. Once they have water and carbon dioxide, plants need light. Leaves are made up of a bunch of tiny cells.

function func · tion

Definition

noun

1. the purpose for which an object or a person is used.

The function of a police officer is to keep the peace.

The function of scissors is to cut things.

verb

1. to run or operate.

The city cannot function in a normal way without electricity.

The heart functions by pumping blood.

Advanced Definition

noun

1. the purpose or role that an object or person fulfills or is suited for.

Listening to the confession of sins is one of the functions of a Catholic priest.

The function of a paper clip is to fasten things together.

2. a social or official gathering, usu. elaborate and formal.

He hates attending functions where he has to wear a tuxedo.

3. a factor or quality that is dependent upon one or more other factors or qualities.

Sweetness is a function of the amount of sugar that is added.

4. in grammar, part of speech or grammatical role.

This word's function in the sentence is that of a noun.

intransitive verb

1. to run or operate, esp. in a manner that is desired or considered normal.

He really can't function since his wife died.

I don't function well if I don't get enough sleep.

The city cannot function without electricity.

The heart functions by pumping blood.

Spanish cognate

funcionar: The Spanish word *funcionar* means function.

These are some examples of how the word or forms of the word are used:

1. After some types of surgeries, physical therapy is absolutely essential to help people regain **function** and feel back to normal.
2. Kids and teens need at least nine hours of sleep a night. Too little shut-eye can have an effect on brain **function** and emotions, which can make anxiety worse.
3. All metals heat up when given an electrical charge, and electrical circuits can break down if they overheat. But tantalum easily releases its heat, allowing the circuitry in cell phones to **function** smoothly.

unison

u · ni · son

Advanced Definition

noun

1. (prec. by in) the simultaneous sounding of voices, or of musical tones in the same pitch or in octaves.
2. agreement; accord.

They acted in unison to fight the enemy.

Spanish cognate

unísono: The Spanish word *unísono* means unison.

These are some examples of how the word or forms of the word are used:

1. When they're jumbled up together, the sounds at an amusement park can become a roar. At the arcade, there is booming music and the sound of quarters clinking into slots. Two girls jump in unison as they compete in a dance game.
2. "Don't go too far, girls!" shouted Sally's mother through the open kitchen window. "We won't!" said Sally and Angelica in unison.

Name: _____ Date: _____

1. According to Mike's mom, what is a cell?

- A. another name for an amoeba
- B. the smallest unit of life
- C. a group of tissues
- D. a jellylike fluid

2. How does Mike's mom compare the nuclear membrane and the cell membrane?

- A. Both the cell membrane and nuclear membrane are protective coverings.
- B. The cell membrane is like a blanket, while the nuclear membrane is like a sieve.
- C. The nuclear membrane is like an electric switch, while the cell membrane is like a sieve.
- D. Both the cell membrane and the nuclear membrane allow substances to enter the cell.

3. Read the following sentences from the passage: "Only some creatures have just a single cell, like an amoeba. They are called unicellular organisms. Others, like us human beings, are collections of cells. These are called multicellular organisms. Multicellular organisms can range in size from brown algae to large animals like elephants, whales, and giraffes, which have trillions of cells."

What can be concluded about cells based on this information?

- A. Unicellular organisms were once part of collections of cells.
- B. Cells in multicellular organisms are stronger than unicellular organisms.
- C. Cells can only support life if they are part of a multicellular organism.
- D. Some cells can support life independently. Other cells support life collectively.

4. Read the following sentences: "A group of cells band together and form a tissue. There are many types of tissues. For example, connective tissues include blood or bones. These form connections between parts of the body. Muscle tissues form muscles, which help us move. Nervous tissues help parts of our body transmit messages-or 'think' and react to things that happen around us."

Based on this information, what can you conclude about tissues?

- A. All tissues in the body have similar functions.
- B. All tissues band together to form organs.
- C. Each kind of tissue has a different function.
- D. There are only four kinds of tissues in the human body.

5. What is this passage mostly about?

- A. how the parts of the cell, tissues, and organs work together
- B. the importance of mitochondria in the life of a cell
- C. how tissues are made from groups of cells to serve different functions
- D. the differences between unicellular and multicellular organisms

6. Read the following sentences: "Just like you can't play football by yourself, a tissue cannot do anything by itself. It teams up with other tissues, and together, they perform the body's activities. So, a group of tissues team up to form your nose and help you smell. Other tissues in your pancreas help you digest food. So, each organ performs its specific function because of the tissues that **constitute** it."

As used in this sentence, what does the word "**constitute**" most nearly mean?

- A. take away from something
- B. give something energy
- C. make up the parts of something
- D. change in shape or size

7. Choose the answer that best completes the sentence below.

_____ a tissue by itself cannot digest food, a collection of tissues can work together as an organ to digest food.

- A. Thus
- B. Although
- C. Above all
- D. For instance

8. Why do tissues "team up" to form organs?

9. Why are all the different parts of the cell necessary?

10. "When different parts of an organism work together in unison, things can be accomplished that could not happen otherwise." Explain this statement, using the interactions between different parts of the cell, tissues, and organs to support your answer.
