

I

The Blood Brain Barrier

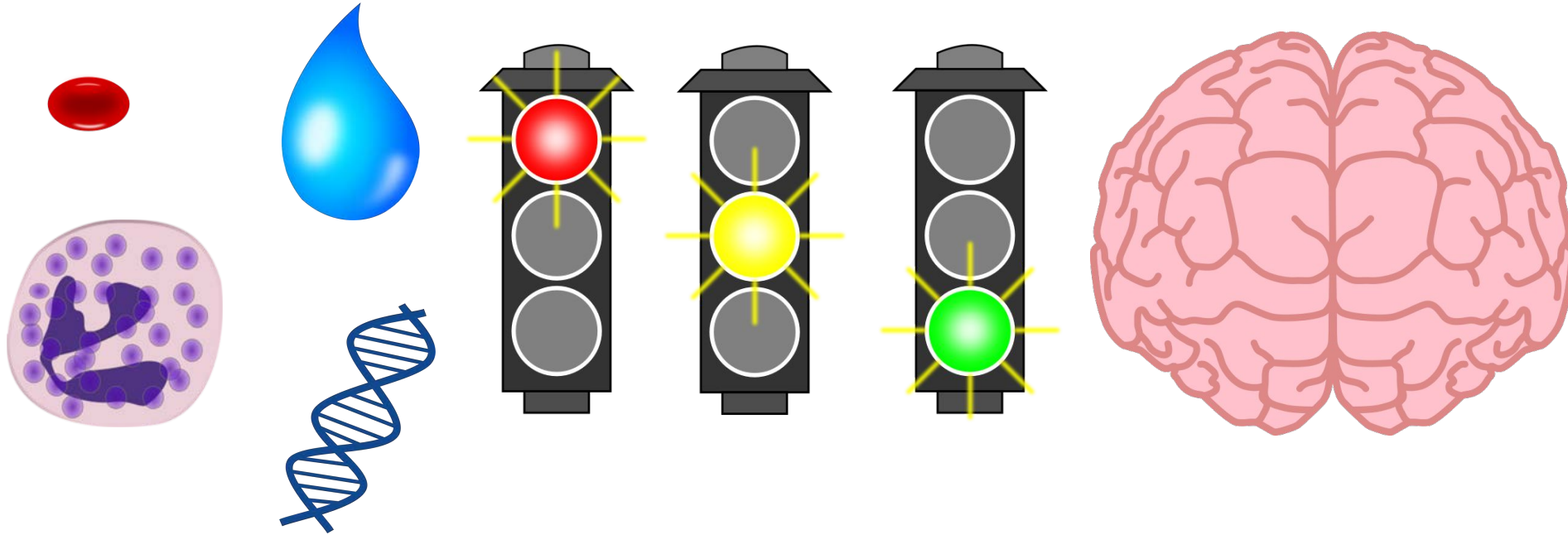
— What can get through? —

What is the blood brain barrier?

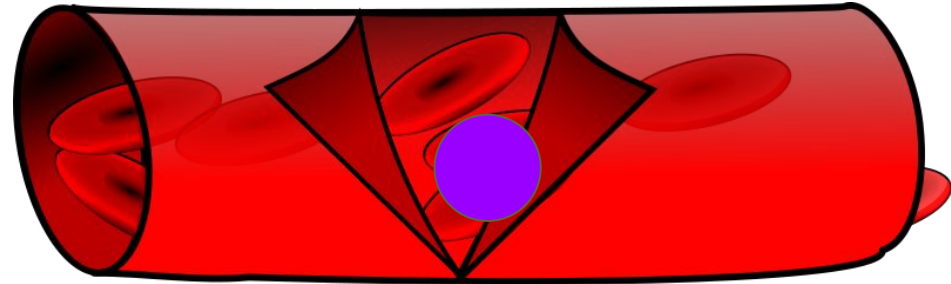
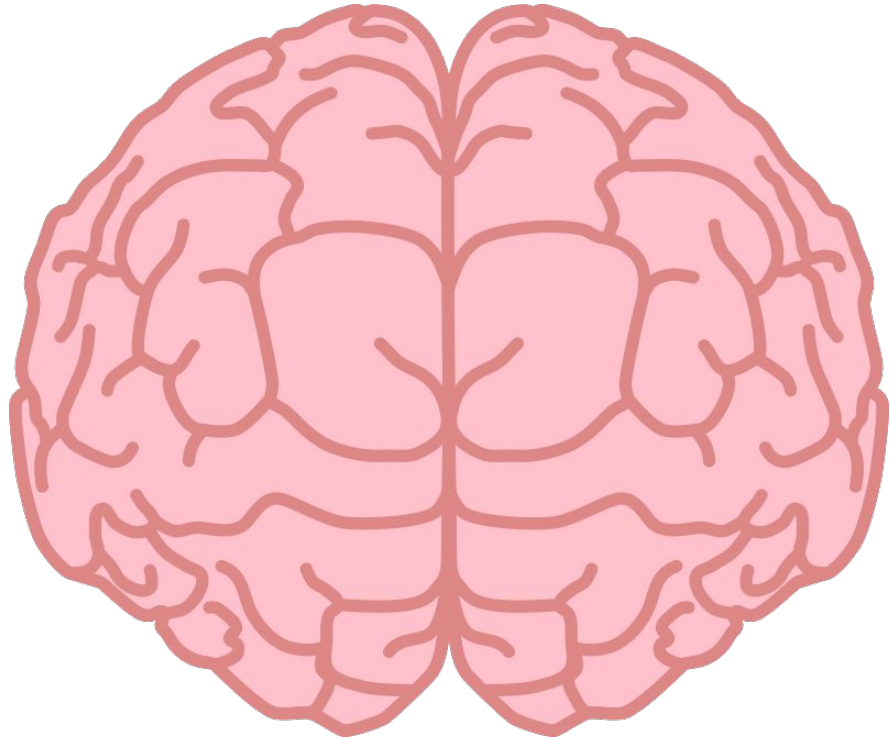
The blood brain barrier is like a gate that only lets certain things pass through it. This means that things in the blood have to go through this gate in order to get into the brain. If the gate doesn't let something through, then it won't be able to get in the brain and it will stay in the blood.

The brain is very sensitive and can be easily hurt by things that are normally helpful to the rest of our body. The blood brain barrier helps protect the brain from things in the blood that might hurt it.

See if you can guess what can cross the blood brain barrier and move from the blood into the brain!

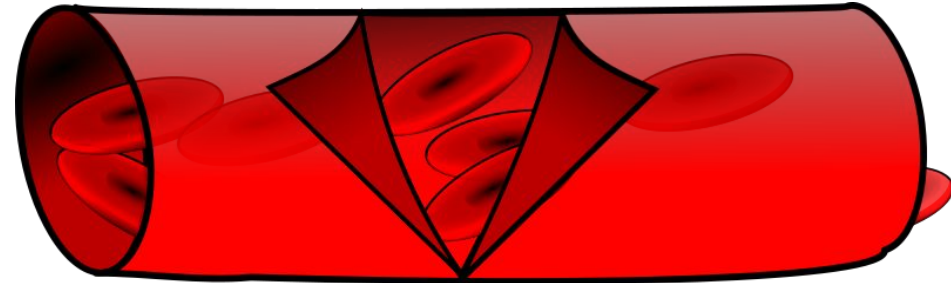
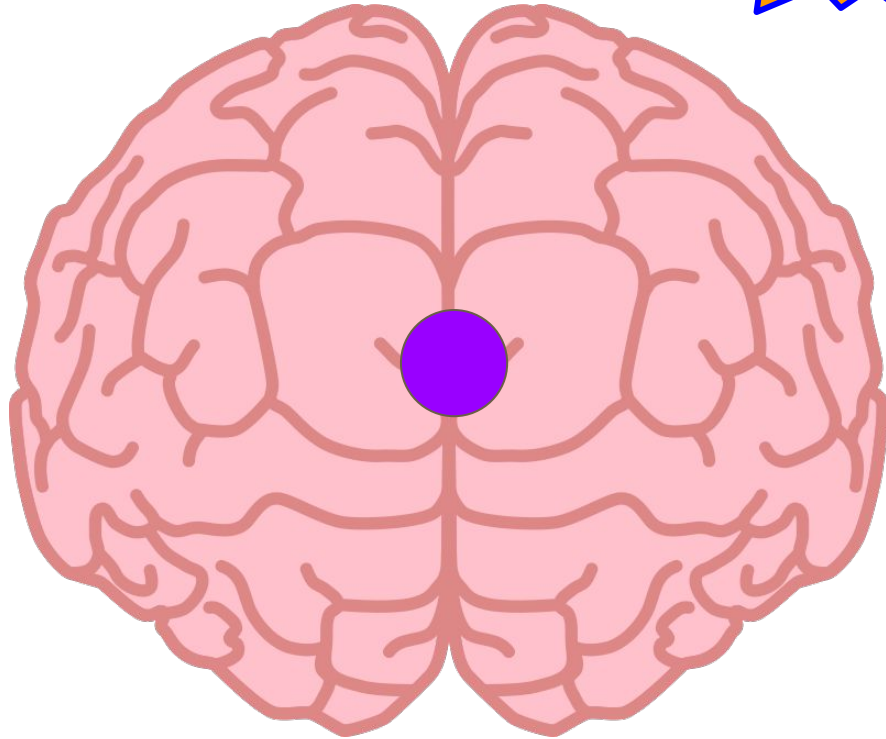


Can **oxygen** cross the blood brain barrier and move from the blood into the brain?



Can **oxygen** cross the blood brain barrier and move from the blood into the brain?

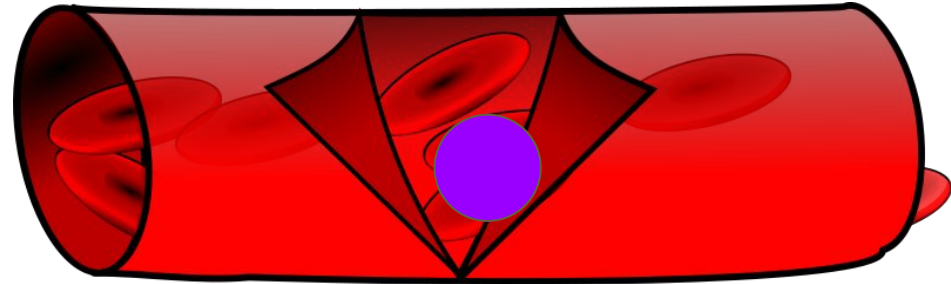
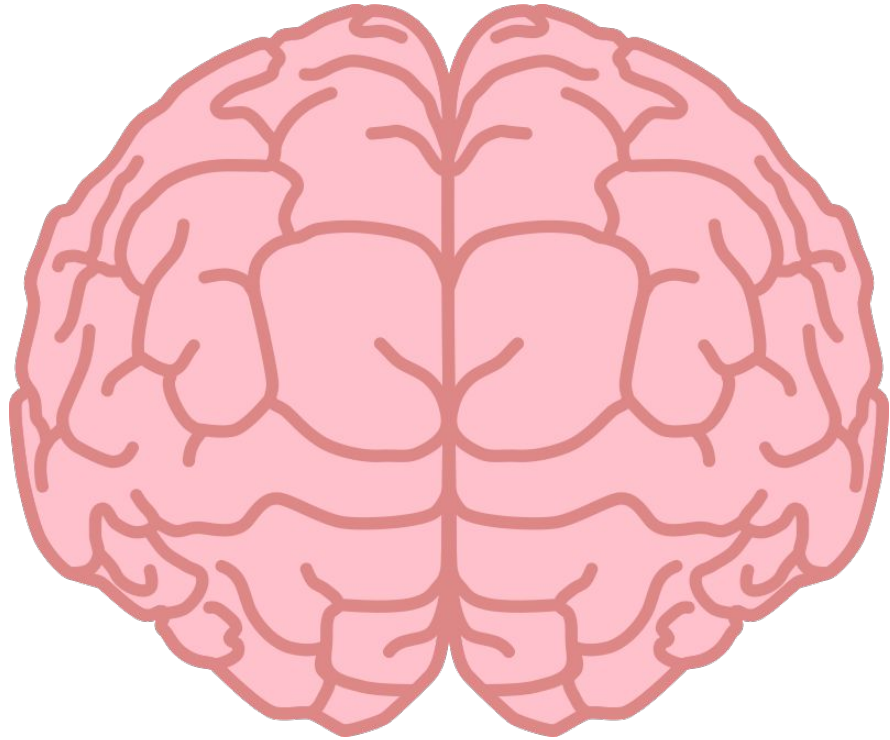
Yes!



What is oxygen?

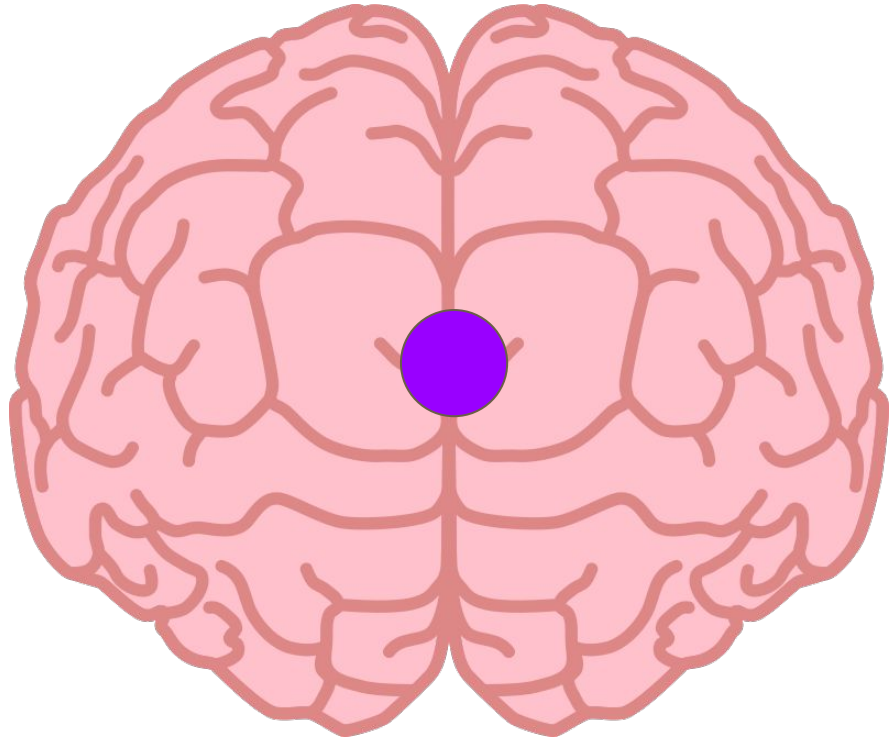
Oxygen is part of the air that we breathe in every day and is important to keep our body working normally. The brain works really hard all day helping you move and think, and it needs a lot of oxygen to keep doing it!

Can **carbohydrates** cross the blood brain barrier and move from the blood into the brain?



Can **carbohydrates** cross the blood brain barrier and move from the blood into the brain?

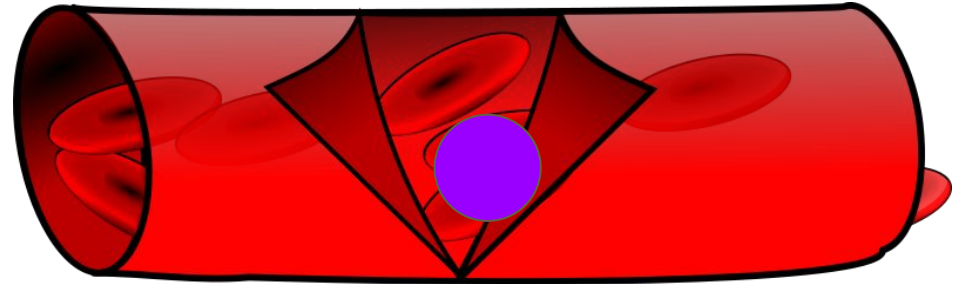
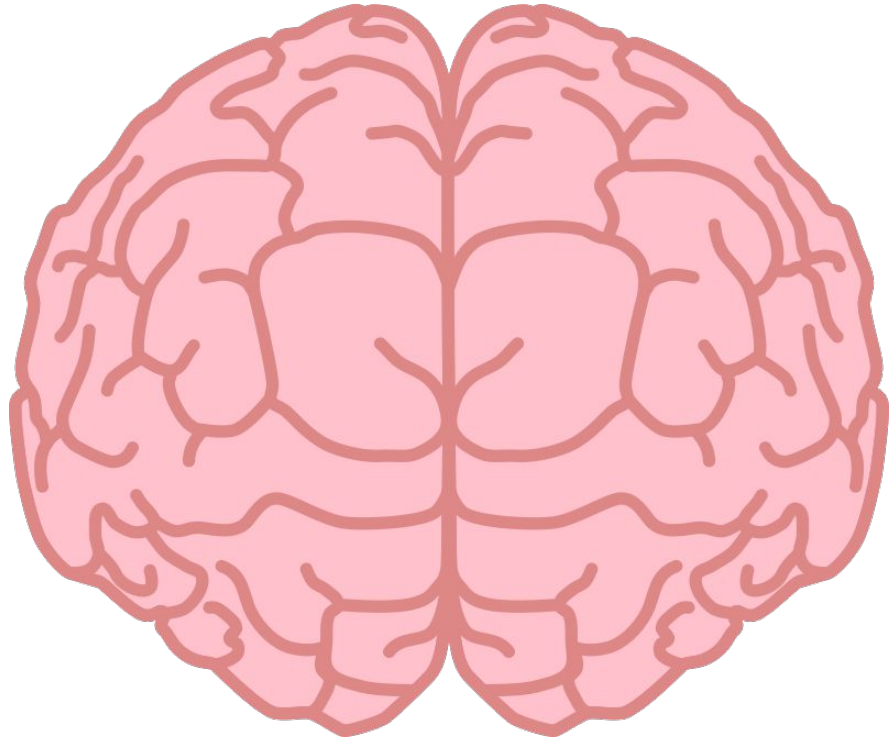
Yes!



What are carbohydrates?

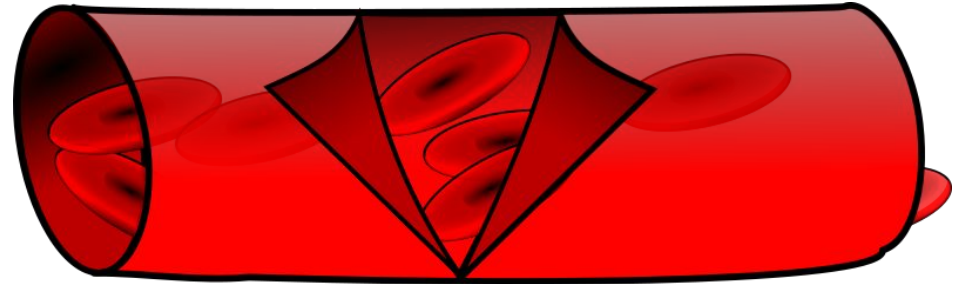
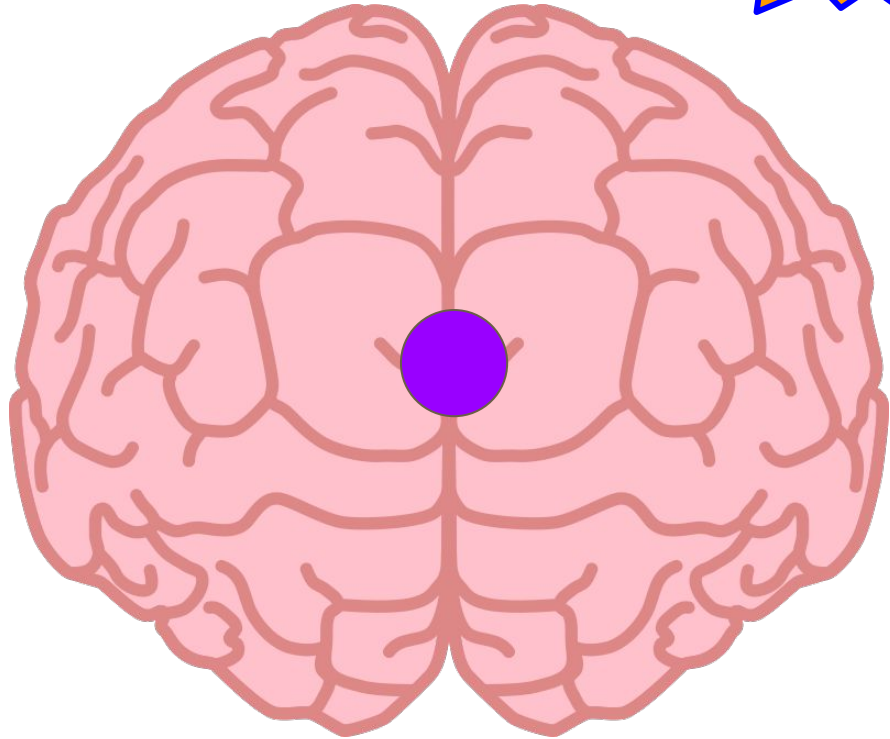
Carbohydrates are made up of sugar molecules, and are a main source of energy for your body. It's important for the cells in your brain to get carbohydrates from the blood so that it can have the energy it needs to keep working all day.

Can **lipids (fat)** cross the blood brain barrier and move from the blood into the brain?



Can **lipids (fat)** cross the blood brain barrier and move from the blood into the brain?

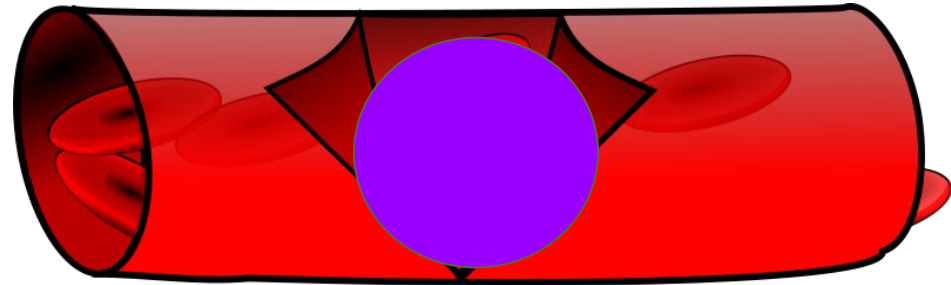
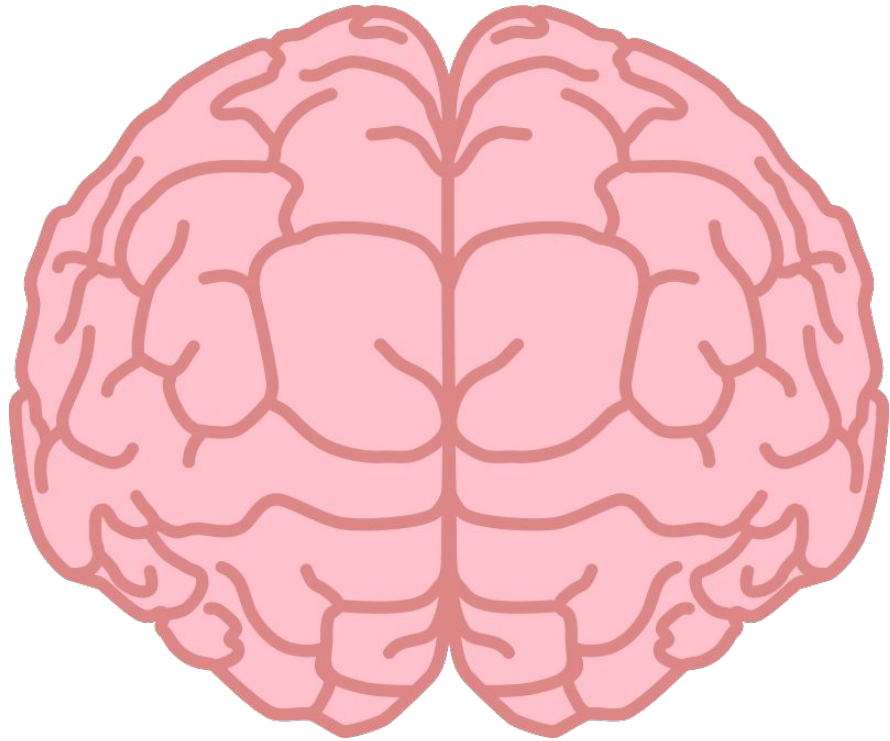
Yes!



What are lipids?

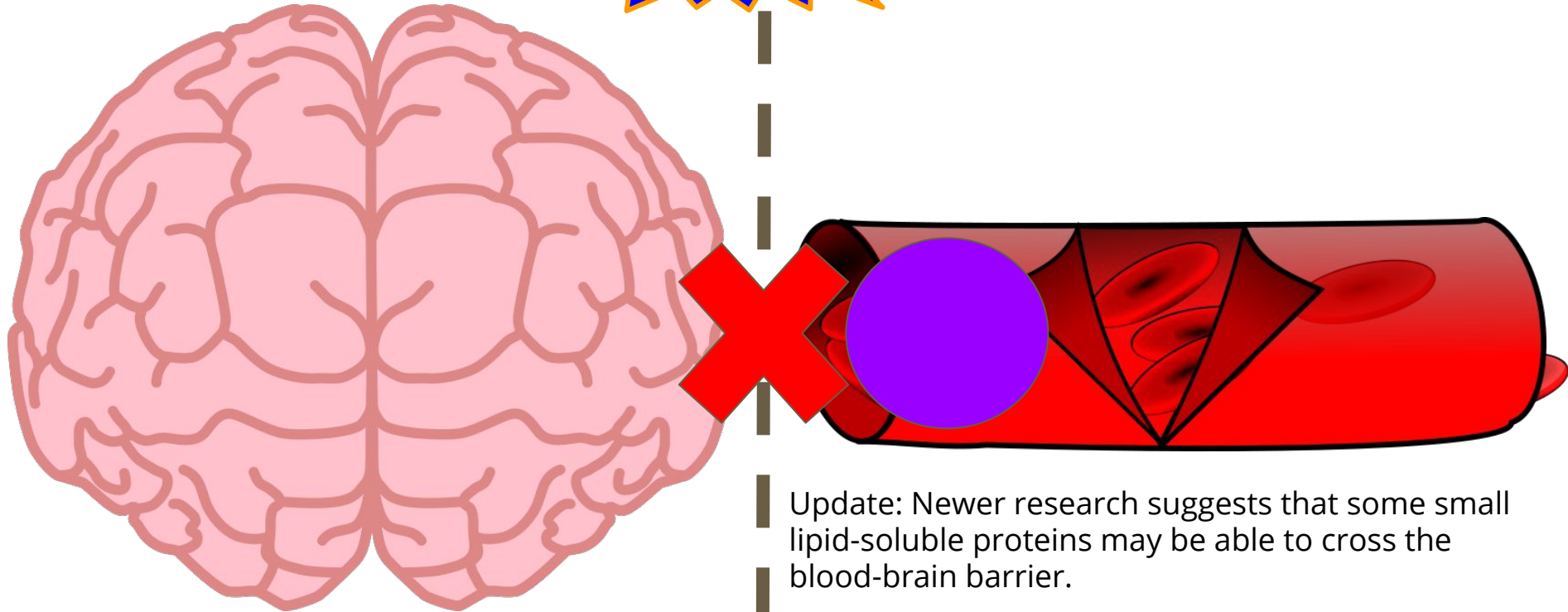
Lipids make up the structural part of a cell, like walls in a house. They help cells stay in the right shape so they're able to do their jobs.

Can **proteins** cross the blood brain barrier and move from the blood into the brain?



Can **proteins** cross the blood brain barrier and move from the blood into the brain?

No!

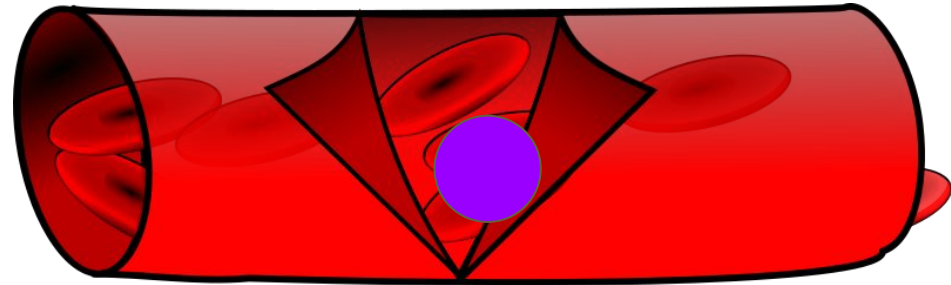
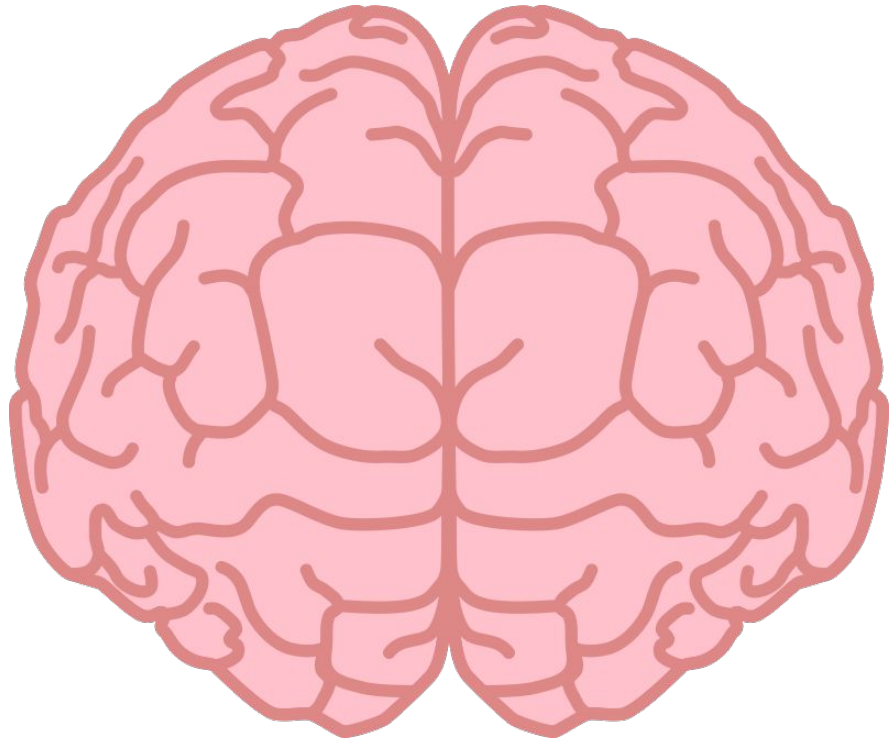


Update: Newer research suggests that some small lipid-soluble proteins may be able to cross the blood-brain barrier.

What are proteins?

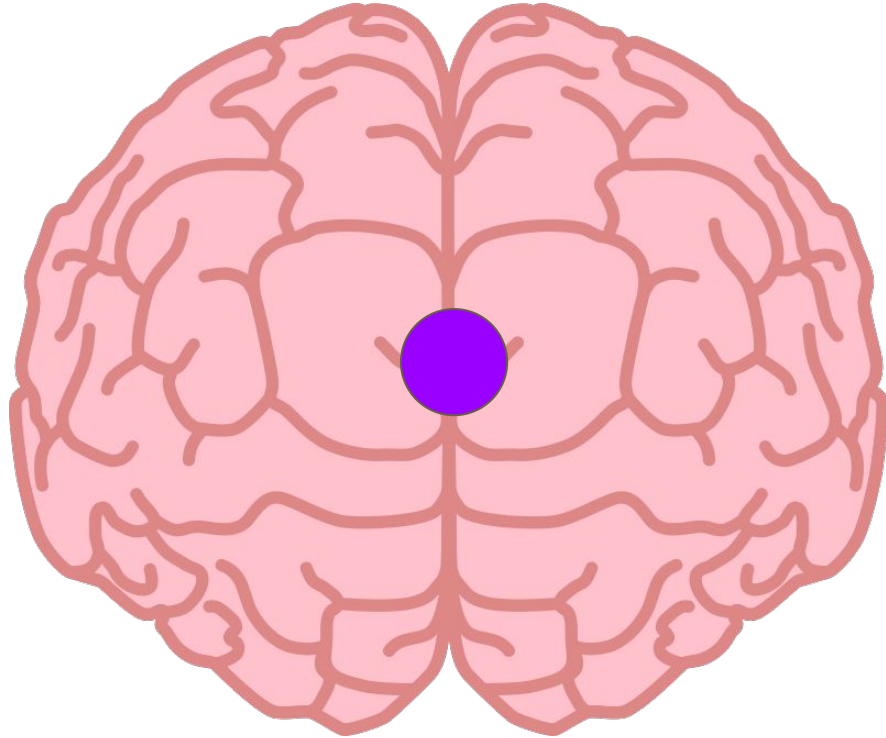
Proteins are important for building muscles. Proteins are actually really big molecules, and are too big to be able to fit through the blood brain barrier to get into the brain.

Can **nucleic acids** cross the blood brain barrier and move from the blood into the brain?



Can **nucleic acids** cross the blood brain barrier and move from the blood into the brain?

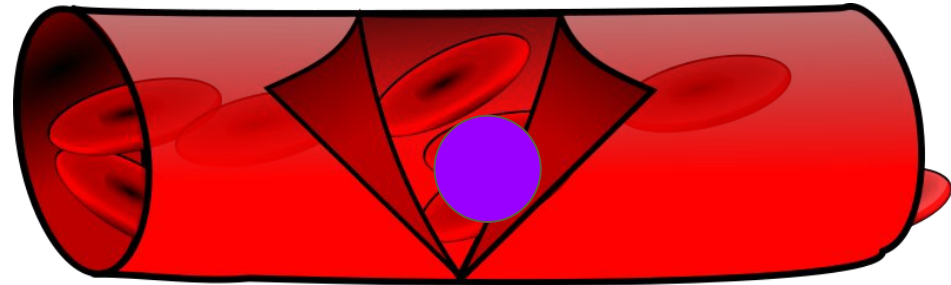
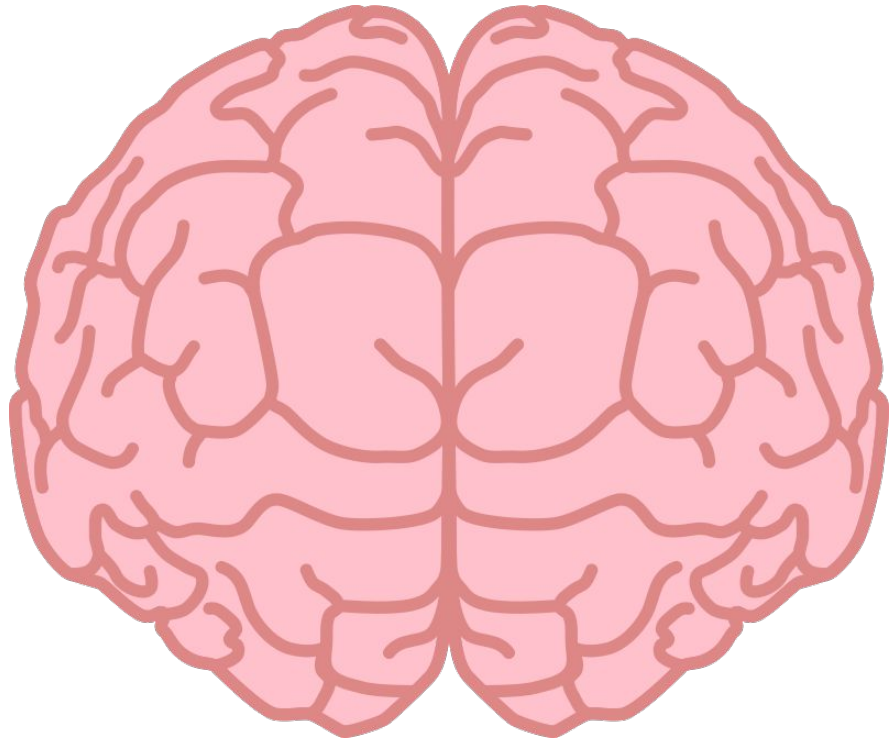
Yes!



What are nucleic acids?

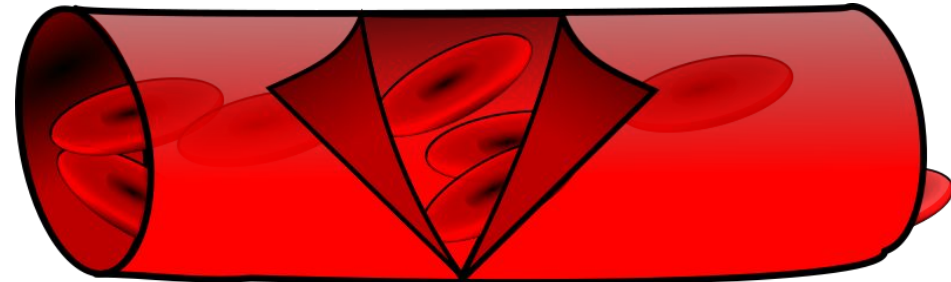
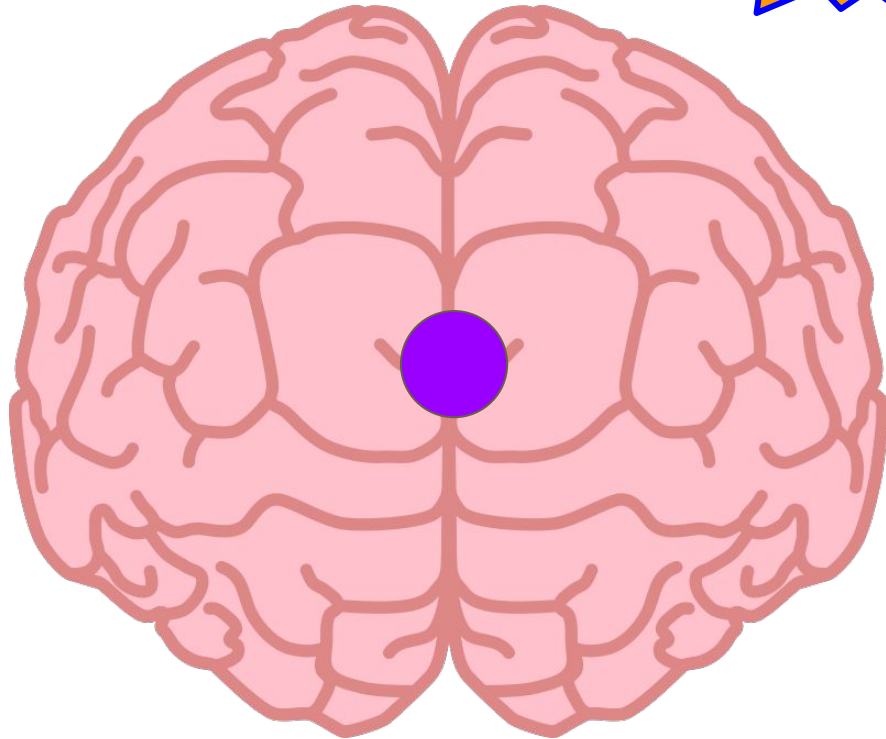
Nucleic acids carry important information. DNA is an example of nucleic acids, which has all of the information to make up a living organism like you or your pet.

Can **water** cross the blood brain barrier and move from the blood into the brain?



Can **water** cross the blood brain barrier and move from the blood into the brain?

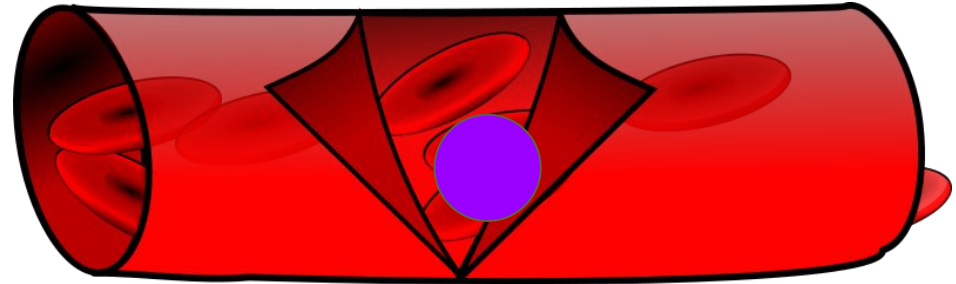
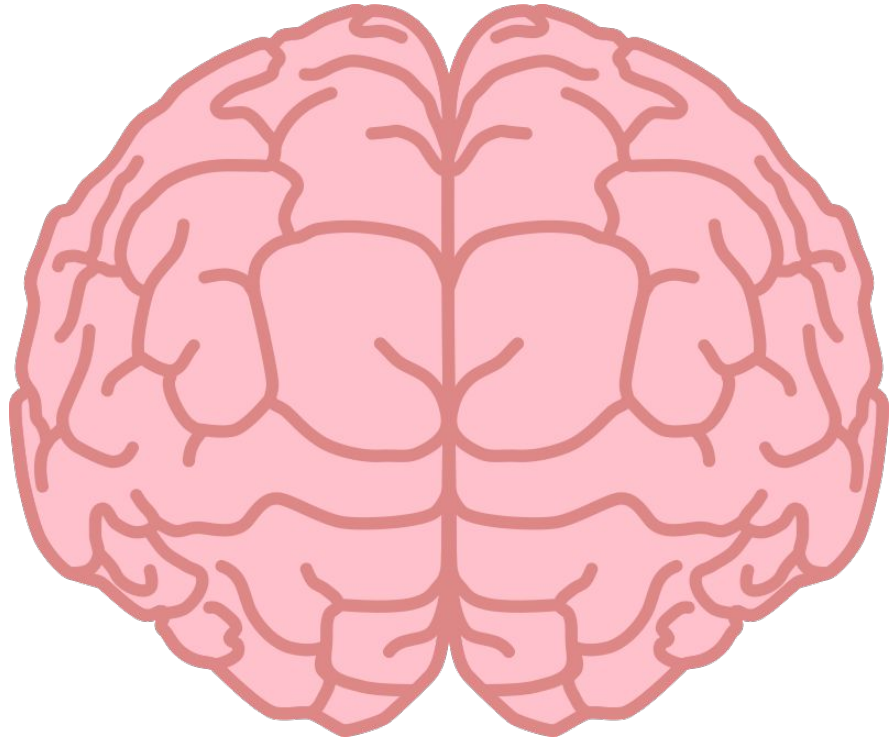
Yes!



What is water?

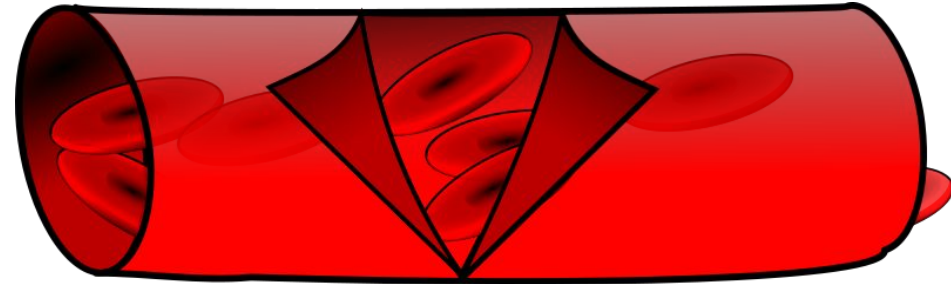
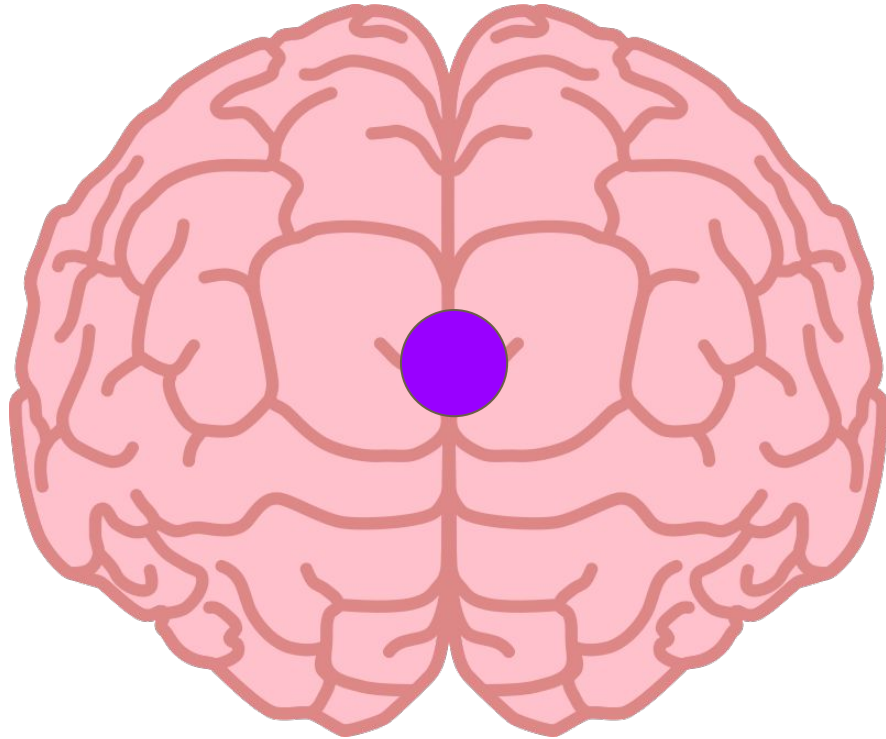
Water is really important to keep your body healthy. Your body uses water for a lot of important things, especially for your brain.

Can **red blood cells** cross the blood brain barrier and move from the blood into the brain?



Can **red blood cells** cross the blood brain barrier and move from the blood into the brain?

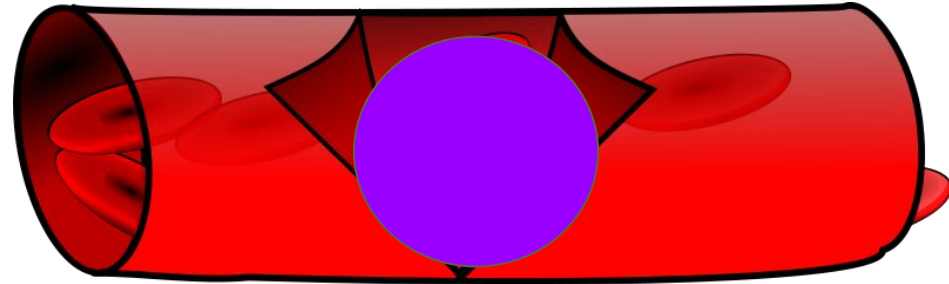
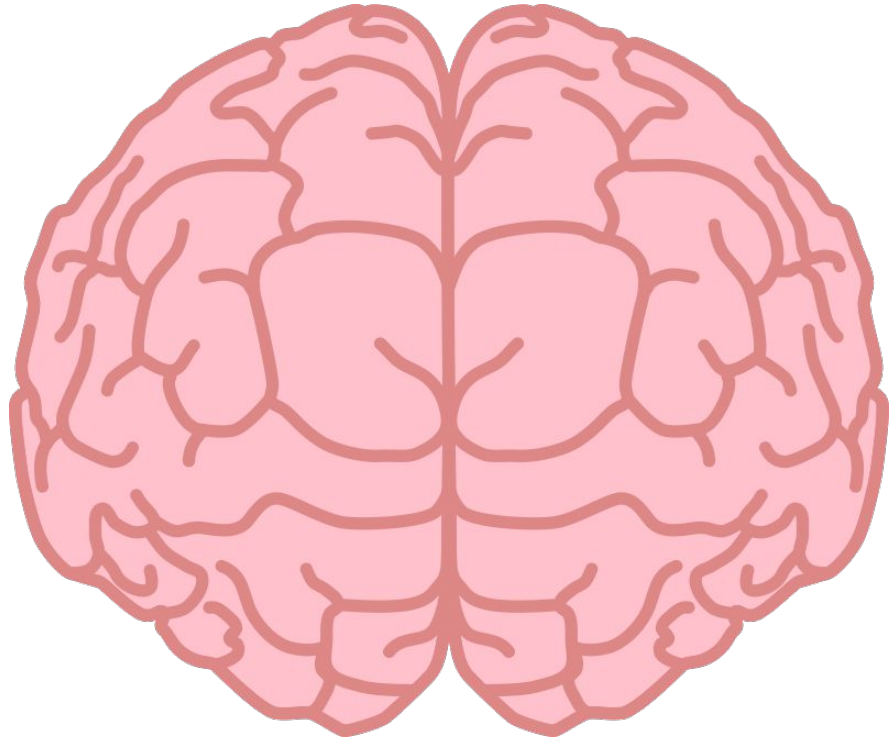
Yes!



What are red blood cells?

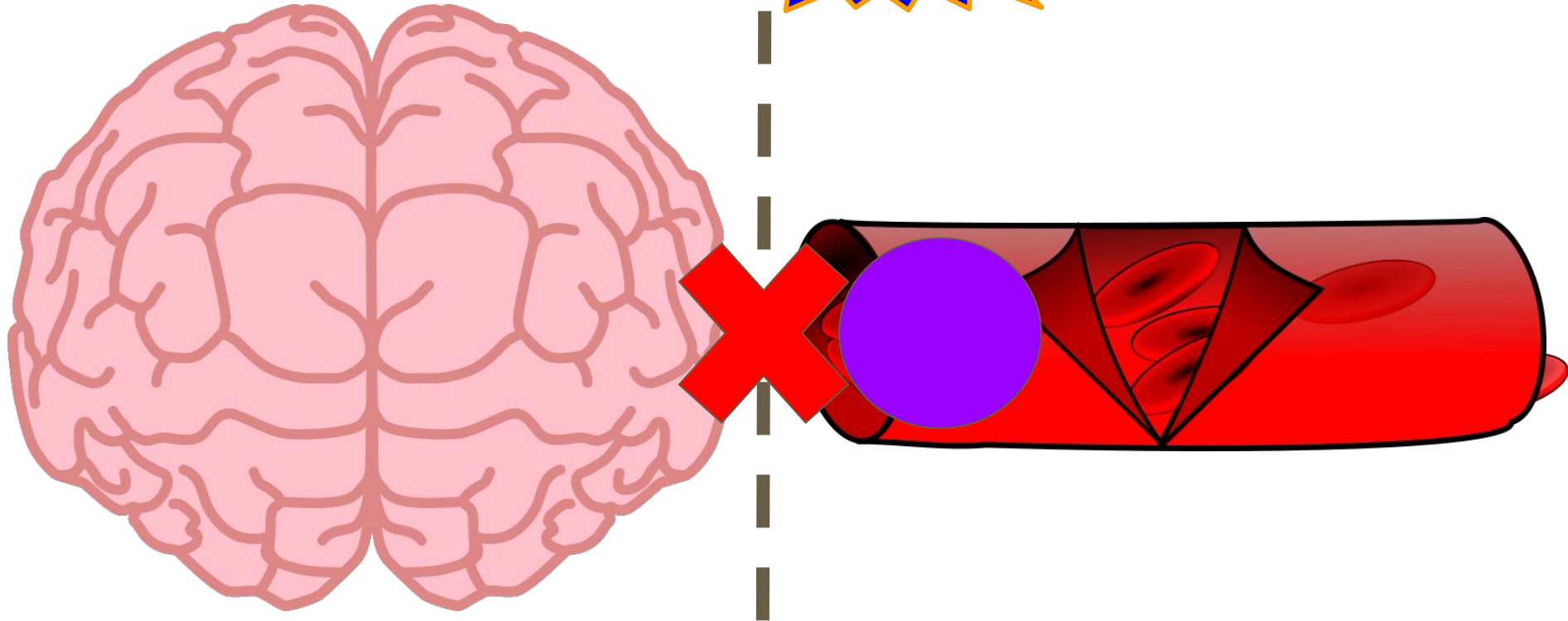
Red blood cells are in charge of carrying oxygen throughout the body. They bring all the oxygen to your brain that it needs to keep working every day.

Can **white blood cells** cross the blood brain barrier and move from the blood into the brain?



Can **white blood cells** cross the blood brain barrier and move from the blood into the brain?

No!



What are white blood cells?

White blood cells are part of the immune system, which help make you feel better when you get sick. White blood cells in your body are too big to get through the blood brain barrier and into the brain. But don't worry, the brain has its own special white blood cells to keep it safe if it gets sick!