



How Your Brain and Your Body Talk (🧠 A Brain Facts Story) (3rd Grade – 8-9 yrs)

This story describes how the brain is able to send information to and from the body.

- 🧠 The brain is made up of billions of cells called neurons. (like puzzle pieces – afferents & efferents)
- 🧠 There are 2 main ways that neurons “talk” – chemically and electrically. (both are REALLY fast)
- 🧠 Neurons connect different parts of the brain together and they connect the brain to different parts of the body. (nerves)

♥SLIDE #1 - INTRODUCTION:

Good Morning (Afternoon)!

My name is _____ and I (describe who you are and give your relation to neuroscience – ex. you are a Neuroscientist, you study neuroscience, you have a friend that is a neuroscientist or you have recently been learning a lot about neuroscience).

Neuroscience, that's a really big word! But, a neuroscientist is a person who knows a lot about the brain.

I am here today to talk to you about how you can help to make your brain healthy – feeling good. It is REALLY easy and anyone can do it.

I love to talk about Brain Health because it's SPECTacular!!! SPECTacular means “GREAT”. When your brain is SPECTacular, you are a happy and healthy person.

This is a Brain Facts story. We have to know and understand some things about the brain if we are going to understand how to keep our brain healthy.

♥SLIDE #2 – YOUR BRAIN AND YOUR BODY TALK

Your brain and your body talk to each other all the time.

In this story, we are going to talk about how communication between the brain and the body happens.

♥SLIDE #3 – HOW?

We know that our brain helps us to do everything that we do. In order for your brain to do that, your brain has to be talking to your body all the time.

Your brain talks to your muscles, your organs (stomach, heart, lungs, skin etc.).

And, we already know that your body needs to be talking to your brain all the time.

So...How does that work?

♥SLIDE #4 – SIGNALS

Your brain and your body do not use “words” to talk to each other. They use two kinds of signals; chemical and electrical.

So, your brain uses the chemical and electrical signals like we use “words”.

♥SLIDE #5 – NEURONS

To understand how this works, we need to think about what makes up the brain.

Just like other parts of the body, your brain is made of cells – little pieces – called neurons.

There are actually billions – yes, BILLIONS with a “B” - of these cells that make up your brain.

♥SLIDE #6 – NERVOUS SYSTEM

Well, actually – these neurons do not just make up your brain, they make up the entire **nervous system**.

The brain is part of the nervous system. Your brain is the part of the nervous system that is in your head.

♥SLIDE #7 – BRAIN TALKS TO SPINAL CORD

But, in order for the neurons in your brain to be able to talk to different parts of your body, you also have neurons outside of your head.

Some of these neurons are in an area in your back, known as your **spinal cord**.

The spinal cord contains neurons that are found in bones that you can feel in your back – **vertebrae**.

Your brain uses the spinal cord to talk to your body.

♥SLIDE #8 – NEURONS

Your brain and your body talk to each other using neurons.

Some of these neurons are outside of your brain and spinal cord – such as in your sensory systems.

The brain uses some of these neurons to talk to your body AND your body uses some of these neurons to talk to the brain.

♥SLIDE #9 – NEURONS

Let's first look at how the neurons that are in your brain, spinal cord, and body “talk” to the different parts of your body.

It turns out that neurons are very social little cells. Neurons LOVE to “talk” to other cells.

In fact, neurons have to talk to other cells – or else they die.

♥SLIDE #10 – PARTS OF A NEURON

To understand how neurons can communicate with the different parts of your body, you need to understand a couple of things about the neurons.

Neurons are made of a cell body, just like other cells, but neurons have finger-like processes that come out of the cell body called **dendrites**.

Dendrites are the main part of the neuron that **gets** information.

Neurons also have one process that comes out of the cell body, called an **axon**.

This is the main part that the neuron uses to **send** information. The information is in the form of chemical or electrical signals.

♥SLIDE #11 – PARTS OF THE NERVOUS SYSTEM

If we were to look at picture of a person without any skin, muscles, bones, organs – we would see a picture that looks like this.

This is a picture of a human nervous system.

We see the brain, which is usually in the head.

We see the spinal cord, which is normally in those bones you feel in your back.

And, then we see all of these cable-like things. These are your nerves. Nerves are actually the axons of lots of neurons coming together.

♥SLIDE #12 – NERVES

The nerves are actually like a highway carrying information in both directions.

There are neurons, outside of the brain that are sending information to the brain (afferents).

There are neurons in the brain and spinal cord that are sending information to the body (efferents).

♥SLIDE #13 – CHEMICAL SIGNALS

So, how does the information get passed along?

When neurons talk to other neurons or other parts of the body, they release a chemical.

It is kind of like one neuron spitting out a chemical at another neuron or another part of the body.

The other neuron or other part of the body then “catches” the chemical using something called a **receptor**.

That is main way that neurons communicate with other neurons and with other parts of the body.

♥SLIDE #14 – ELECTRICAL SIGNALS

Neurons can also “talk” to other neurons by spitting out electrical charges (positive and negative) to each other.

This is faster than spitting out chemicals because the neurons actually are touching when the electrical charges are getting passed along.

♥SLIDE #15 – CONNECTIONS MATTER

Now, if you have billions of neurons spitting out chemicals, or electrical charges, all the time, how does the right information get to the right place so things can get done?

It turns out that neurons in different parts of the brain are connected to different parts of the body.

This makes it possible to raise our hand when we have a question instead of kicking our foot.

Or, it makes it possible for us to sing along to a song instead of screaming the lyrics.

Or, it makes it possible for us to pedal a bike down the hill instead of rolling your body.

Or, it makes it possible for us to scrub your hands to wash before dinner instead of licking them.

Or, it makes it possible for us to control the video game with your fingers instead of your toes.

Or, it makes it possible for us to walk into the grocery store instead of slithering in like a snake.

So, connections REALLY do matter and having neurons talking to the right body parts is important.

♥SLIDE #16 – STRONGER CONNECTIONS MEANS LESS NEURONS NEEDED

One of the really interesting things about all the communication that goes on within the nervous system is the more “talking” that neurons do with each other or with the body, the stronger the connections become.

This is important because it takes a lot of energy for the brain and body to talk to each other.

If the connections between neurons and other neurons (or other parts of the body) become stronger, you do not need as many neurons joining in on the conversation.

So, you need less neurons and less energy.

♥SLIDE #17 – EXAMPLE

Let’s think about this...

Let’s say that you are just learning how to dribble a basketball while you are running.

At first, you need lots of neurons to do these behaviors.

You need to run at the right speed, you need to learn how dribble – applying the right amount of pressure to get the ball to bounce, and then you need to figure out how to do it together while moving around on the basketball court.

♥SLIDE #18 – PRACTICE MAKES PERFECT

Once you learn how to run and dribble, then you can practice running and dribbling at the same time while moving quicker and quicker with the ball.

Then, you don’t need lots of neurons to be talking at the same time, you only need neurons in a particular part of the brain to be active when you dribble and run.

You do not have to “think” anymore about what you need to do first, then second, then third, and so on.

When you learn how to dribble and run at the same time, your neurons get used to “talking” to each other so that you can dribble and run around the court. The connections between the neurons and the parts of your body get stronger, so you do not need as many neurons.

Pretty soon, you are running REALLY fast and dribbling without thinking about it at all. Your brain and your body talk and do it for you.

This is also what happens when you practice doing something and why “practice makes perfect”.

You may not be doing it perfectly, but you will be doing it very efficiently because your neurons that are needed for running have made strong connections with other neurons and parts of your body that are needed for dribbling.

♥SLIDE #19 – CONCLUSION

Thank you all for letting me talk to you about how your brain and body talk.

I have enjoyed spending time with you today talking about the brain. I hope that you have had some fun and learned something about your brain.

REMEMBER, you have LOTS of neurons both in your brain and outside of your brain. Those neurons talk to each other using chemical and electrical signals. When neurons talk to each other, their connections get stronger and that makes it easier (and more energy efficient) for you to do all the behaviors that you need and want to do. The more you practice doing behaviors, the easier it is for your brain to do all the work. So, if you understand how the brain and body talk to each other, then you will be able to help your brain stay healthy and that is SPECTacular.

THANK YOU SO MUCH FOR ALL OF YOUR HELP!!! Brain Health is not just SPECTacular...it is FUN!!!