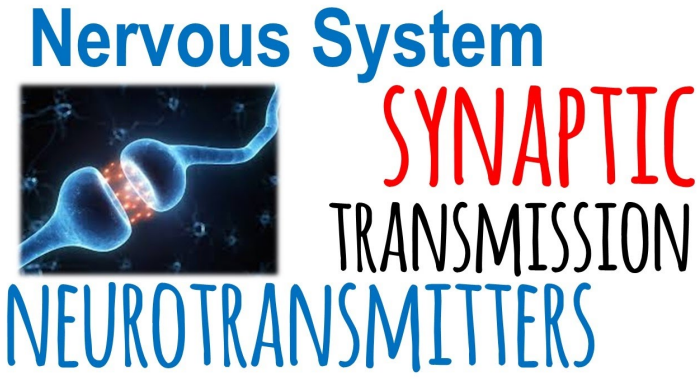
The Function of Neurotransmitters



This short video will help you understand the function of neurotransmitters:

Video @ https://vimeo.com/597790244 (4:27 minutes)

Like people, neurons need to communicate with each other in order to work together to function. In this lesson, we'll examine neurotransmitters, including what they do, how they do it, and what happens after they've done their job.

Picture this...you're in class and you decide that you want to pull a prank on your teacher. You decide to tell your best friend Kyle and some of the other kids in class to all stand up at once and start reciting the Pledge of Allegiance right in the middle of class! The only problem is, you don't sit next to Kyle, and you can't very well just shout across to him. You decide to write him a note. After writing it, you fold it into a paper airplane, and when the teacher's not looking, you send it soaring over to Kyle. He reads it, grins, and then sends it soaring over to another student.

Neurons are cells that are found in the nervous system, including the brain. Brain activity occurs when neurons communicate with one another. One neuron doing something won't really impact much, but a bunch of them together can really make a statement. Kind of like you standing up and saying the Pledge isn't so great, but the entire class doing it will have a major impact!

But like you and your classmates, neurons need a way to pass messages back and forth among themselves. Let's look closer at neurotransmitters, the chemicals that pass messages between neurons, and how they work. Let's go back to the classroom for a second. You want to get a message to Kyle so that he'll help you coordinate the other students in a big activity. So you send him a note in a paper airplane.

Neurotransmitters are chemicals in the brain that carry messages from one neuron to another. Just like the paper airplane, they move from one neuron to the next. To understand how this works, think about you and Kyle. You aren't next to him, and you need a way to communicate, so you send your message on a paper airplane, and then he passes it on to another person, and so on, until the whole class knows the plan and is ready for action.

Like you and Kyle, neurons don't touch each other. There's a small gap between neurons called a synapse. When one neuron fires - that is, it becomes active - it sends a neurotransmitter across the synapse to the next neuron, like a paper airplane. It enters the second neuron, which then fires and sends a neurotransmitter to another neuron. This continues on and on until a bunch of neurons are all working in coordination. So, just like you sending the paper airplane message to Kyle, who then passes it on to another student, who passes it on to another student, and so on, neurotransmitters are sent from neuron to neuron across synapses.

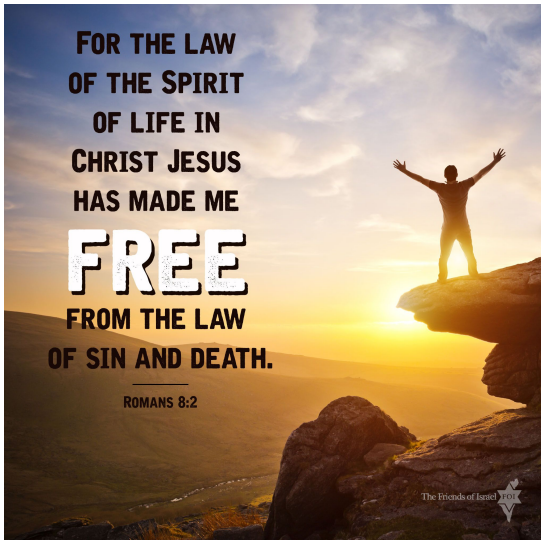
Reuptake & Degradation: Let's say that you want to send your message to Kyle, but you know that flying paper airplanes aren't always accurate. Some of them go where you want them to, but not all of them do. To be sure that Kyle gets the signal, you decide to make several paper airplane messages and send them Kyle's way. That way, hopefully at least one will end up on Kyle's desk.

Neurotransmitters are like that, too. When a neuron wants to send a message, it shoots a bunch of a specific neurotransmitters into the synapse. Some of that is picked up by the next neuron, but some of it isn't. It's kind of like if you sent a bunch of airplanes to Kyle, and some ended up on his desk, but some ended up on the floor or somewhere else.

So, what happens to the neurotransmitter that doesn't reach the next neuron? Well, it doesn't make sense for it to just hang out in the synapse, so the brain cleans it up with one of two methods.

Reuptake is when a neurotransmitter is reabsorbed by its original neuron. It would be like a paper airplane not getting to Kyle, so you pick it up and put it in your book bag so that the teacher doesn't find it and know you were the one who planned the stunt.

The other way the brain cleans up extra neurotransmitters is through degradation, or breaking down excess neurotransmitters with enzymes. It's as if the airplane that didn't make it to Kyle was torn up and thrown away by another student who was hanging out nearby. Neither you nor Kyle got rid of it, but the third person (the enzyme) destroyed it.



The following passage is a neurospiritual Scripture because it describes processes that take place in the brain.

"For the law of the Spirit of life in Christ Jesus has made me free from the law of sin and death." Romans 8:2

"The law of the Spirit of life in Christ Jesus" refers to how God designed the human brain (mind & heart) to function well with the Holy Spirit and His Word's help. "The law of sin and death" refers to how God designed the human brain to become very destructive on its own without the Holy Spirit's help through the Word of God!

The battle between "the law of sin" and "the law of the Spirit" is a spiritual battle. It is also a biological battle involving neurons and neurotransmitters.

The Function of Neurotransmitters

Test and Answers

Explain how Kyle's Pledge of Allegiance prank compares to neurons sending messages so the body can perform a task?

Picture this...you're in class and you decide that you want to pull a prank on your teacher. You decide to tell your best friend Kyle and some of the other kids in class to all stand up at once and start reciting the Pledge of Allegiance right in the middle of class! The only problem is, you don't sit next to Kyle, and you can't very well just shout across to him. You decide to write him a note. After writing it, you fold it into a paper airplane, and when the teacher's not looking, you send it soaring over to Kyle. He reads it, grins, and then sends it soaring over to another student.

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But like you and your classmates, neurons need a way to pass messages back and forth among themselves.

How does Kyle throwing the airplanes compare to neurons sending messages from one neuron to the next?

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Like you and Kyle, neurons don't touch each other. There's a small gap between neurons called a synapse.

How does Kyle throwing numerous airplanes apply to the Reuptake & Degradation of neurotransmitters?

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