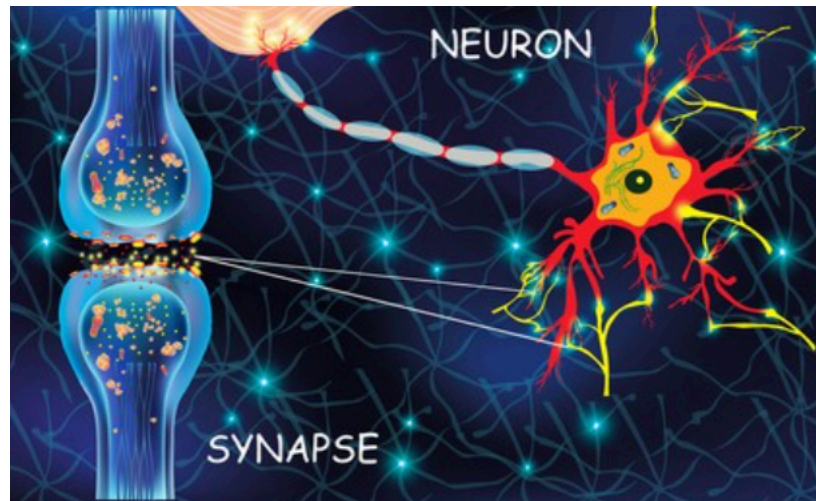


Synaptic Cleft: Definition & Function



This brief video will help you understand the synaptic cleft:

Video @ <https://vimeo.com/597816807> (4:40 minutes).

Here are some definitions from Ronnie that will help you with this lesson:

Synapse: A junction between two nerve cells

Synaptic: relating to synapse or synapses between nerve cells

Cleft: an opening

Synaptic Cleft: The space between neurons where the chemical message (neurotransmitter) resides when the axon sends it and before the dendrite receives it.

The following lesson is adapted from LauraGrace Allen @ study.com:

Your brain is like a machine with many different parts that all work together. The synaptic cleft may not be the most well known part of the brain, but it is vital for brain function. Read on to find out more about what it does and why it matters.

Your brain is an amazing machine with lots of work to do. The neurons, or nerve cells, in the brain are responsible for communications that make all processes possible. Communication can happen two ways: electrically or chemically. When communication is chemical, the synaptic cleft comes into play.

The synaptic cleft, by definition, is a tiny opening between neurons. When scientists study the synaptic cleft, they are looking at how information is relayed from one neuron to another, but we will dive deeper into this later on in the lesson.

The synaptic cleft is seemingly just an empty space, so you may think that it isn't important, but don't be fooled. Think of neuron communication like traveling to a different country—neurons don't all speak the same language. So you may be wondering, how does the information get translated? That's right...the synaptic cleft helps to decode the message. When the electrical signal reaches the presynaptic ending, it is translated into a chemical message that then diffuses across the synaptic cleft to the postsynaptic cell. The receiving neuron takes this information and translates the chemical message back into electrical signals, which then heads into the next neuron where the process is repeated.

Let's take a look at how other parts of the brain come into play and how they work together.

The Neuron: Neurons are the most basic unit of the brain. Your brain has billions of neurons that use electrical signals to communicate with other neurons about all types of things, such as sending hunger pains or picking up a pencil. Neurons have projections called axons and dendrites. Axons bring information away from the cell, and dendrites carry information to the cell. The spot where neurons come together to communicate is called a synapse.

The synapse is like a wire that connects two cells together. Neurons pass information to each other through the synapse.

The synaptic cleft, as we know, is the space located between the presynaptic and postsynaptic endings.

When one neuron communicates with another, it sends an electrical impulse through the presynaptic ending. This releases neurotransmitters into the synaptic cleft, or the space between presynaptic ending and postsynaptic cell. Now, the neurotransmitters can move across the synaptic cleft and bind together with the postsynaptic cell.

(adapted from Lauragrace Allen @ study.com)

Romans 8:5-7 is neurospiritual because it describes both a spiritual and biological process that takes place in the human brain (heart & mind).

Romans 8:5-8 (NKJV)

5 For those who live according to the flesh set their minds on the things of the flesh, but those *who live* according to the Spirit, the things of the Spirit.

6 For to be carnally minded *is* death, but to be spiritually minded *is* life and peace.

7 Because the carnal mind *is* enmity against God; for it is not subject to the law of God, nor indeed can be.

8 So then, those who are in the flesh cannot please God.

The following phrases in Romans 8:5-7 represent the choice to reject God and His Word: “Live according to the flesh,” “Set their minds on the things of the flesh” and “to be carnally minded.” The human brain (neurons, neurotransmitters, synaptic clefts) was not designed to work well on this physical level alone.



The following phrases in Romans 8:5-7 represent the choice to receive God and His Word: “Live according to the Spirit,” set their minds on “The things of the Spirit” and “To be spiritually minded”. The human brain (neurons, neurotransmitters, synaptic clefts) was designed to work very well on both a physical and spiritual level.



Synaptic Cleft: Definition & Function

Test and Answers

Define the following words:

Synapse: A junction between two nerve cells

Synaptic: relating to synapse or synapses between nerve cells

Cleft: an opening

Synaptic Cleft: The space between neurons where the chemical message (neurotransmitter) resides when the axon sends it and before the dendrite receives it.

Explain how neuron communication traveling through the synaptic cleft is like traveling to a country where the people speak different languages:

The synaptic cleft is seemingly just an empty space, so you may think that it isn't important, but don't be fooled. Think of neuron communication like traveling to a different country—neurons don't all speak the same language. So you may be wondering, how does the information get translated? That's right...the synaptic cleft helps to decode the message. When the electrical signal reaches the presynaptic ending, it is translated into a chemical message that then diffuses across the synaptic cleft to the postsynaptic cell. The receiving neuron takes this information and translates the chemical message back into electrical signals, which then heads into the next neuron where the process is repeated.

The place where neurons come together to communicate about things like hunger pains or picking up a pencil is called what?

Let's take a look at how other parts of the brain come into play and how they work together. The Neuron: Neurons are the most basic unit of the brain. Your brain has billions of neurons that use electrical signals to communicate with other neurons about all types of things, such as sending hunger pains or picking up a pencil. Neurons have projections called axons and dendrites. Axons bring information away from the cell, and dendrites carry information to the cell. The spot where neurons come together to communicate is called a synapse.

Explain the difference between presynaptic and postsynaptic endings?

The synaptic cleft, as we know, is the space located between the presynaptic and postsynaptic endings. When one neuron communicates with another, it sends an electrical impulse through the presynaptic ending. This releases neurotransmitters into the synaptic cleft, or the space between presynaptic ending and postsynaptic cell. Now, the neurotransmitters can move across the synaptic cleft and bind together with the postsynaptic cell.

Why is Romans 8:5-7 a neurospiritual passage?

Romans 8:5-7 is neurospiritual because it describes both a spiritual and biological process that takes place in the human brain (heart & mind).

“For those who live according to the flesh set their minds on the things of the flesh, but those who live according to the Spirit, the things of the Spirit. For to be carnally minded is death, but to be spiritually minded is life and peace. Because the carnal mind is enmity against God; for it is not subject to the law of God, nor indeed can be.” Romans 8:5-7

Write the three phrases in Romans 8:5-7 that represent the choice to reject God and His Word:

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