









# Neurotransmitters Defined

<b>ADRENALINE</b>	<b>NORADRENALINE</b>	<b>DOPAMINE</b>	<b>SEROTONIN</b>
			
Fight or flight neurotransmitter	Concentration neurotransmitter	Pleasure neurotransmitter	Mood neurotransmitter
<b>GABA</b>	<b>ACETYLCHOLINE</b>	<b>GLUTAMATE</b>	<b>ENDORPHINS</b>
			
Calming neurotransmitter	Learning neurotransmitter	Memory neurotransmitter	Euphoria neurotransmitter

This short video will help you understand what neurotransmitters do:

Video @ <https://vimeo.com/597782260> (3:03 minutes)

The human nervous system relays information throughout the body by using different types of neurotransmitters with their own functions. Neurotransmitters are chemical signals that can affect such feelings as mood, hunger, anxiety and fear.

Inside your brain, muscles and glands you have nerve cells called neurons that have the job of passing signals. An easy way to think of these cells is to imagine them as baseball players passing a baseball around the field. The 'baseballs' are the chemical signals that are thrown between the players. The neurotransmitters are thrown across the synaptic gap from one neuron's terminal branch (or pitching hand) to another neuron's dendrites (or catching hand). The catcher gets excited by the chemical signal, an electrical current travels through the pitching arm, or axon, and the terminal branches at the end of the axon fire off the neurotransmitters.

In the human body, there are billions of little neurons, and they're not all the same. Some have short pitching arms and some have pitching arms up to three feet long! Some neurons throw neurotransmitters at the speed of one mph, and others throw fastballs up to 268 mph! Different neurons play different positions too. Your sensory neurons fire signals to your brain neurons, and your brain neurons in turn fire signals off to your motor neurons. Your nerves pass information about what you see and hear to your brain, which sends out signals to your muscles, so you can react. So when you see a ball flying through the air towards you, your brain neurons send signals to your arms to reach out and catch the ball.

The type of neurotransmitter that is fired depends on the function of the particular neuron firing it. On the receiving end, only certain types of neurons can receive these chemical signals. Neurons are team players, and each player has a position on the team.

Because the neurons that are receiving the neurotransmitters have different functions, neurotransmitters affect different types of behavior.

Types of Neurotransmitters: For example, your levels of the neurotransmitter serotonin regulate your appetite, sex drive, moods and ability to sleep. Low levels of serotonin may lead to anxiety or depression. Some anti-depressant drugs can help raise serotonin levels.

Lesson Summary: So, neurons are the cells that pass the information, and neurotransmitters are the chemicals that carry that information. The details of how these function are the continuing work of neuroscientists today.

(adapted from Ryan Villard @ study.com)

ROMANS 7:15

I DO NOT UNDERSTAND WHAT I DO.

FOR WHAT I WANT TO DO I DO NOT DO,

BUT WHAT I HATE I DO.

**In the passage below, the phrases in red point out that sin “dwells” in our minds to imprison (hijack) our brains:**

<sup>17</sup> But now, *it is* no longer I who do it, but **sin that dwells in me**.

<sup>18</sup> For I know that in me (that is, in my flesh) nothing good dwells; for to will is present with me, but *how* to perform what is good I do not find.

<sup>19</sup> For the good that I will *to do*, I do not do; but the evil I will not *to do*, that I practice.

<sup>20</sup> Now if I do what I will not *to do*, it is no longer I who do it, **but sin that dwells in me**.

<sup>21</sup> I find then a law, that evil is present with me, the one who wills to do good.

<sup>22</sup> For I delight in the law of God according to the inward man.

<sup>23</sup> But I see another law in my members, warring against the law of my mind, and bringing me **into captivity to the law of sin** which is in my members.” Romans 7:17-23



**In the passage below, the phrases in purple point out that the Holy Spirit “dwells” in our minds to heal and renew our brains.**

<sup>9</sup> But you are not in the flesh but in the Spirit, if indeed **the Spirit of God dwells in you**. Now if anyone does not have the Spirit of Christ, he is not His. <sup>10</sup> And if Christ *is* in you, the body *is* dead because of sin, but the Spirit *is* life because of righteousness. <sup>11</sup> But if the Spirit of Him who raised Jesus from the dead **dwells in you**, He who raised Christ from the dead will also give life to your mortal bodies through **His Spirit who dwells in you**.” Romans 8:9-11

## Romans 8:9-11

You, however, are not in the flesh but in the Spirit, if in fact the Spirit of God dwells in you. Anyone who does not have the Spirit of Christ does not belong to him. But if Christ is in you, although the body is dead because of sin, the Spirit is life because of righteousness. If the Spirit of him who raised Jesus from the dead dwells in you, he who raised Christ Jesus from the dead will also give life to your mortal bodies through his Spirit who dwells in you.

Romans 7:17-23 and Romans 8:9-11 are neurospiritual passages because they point to both biological and spiritual activities that occur in the brain (“inward man”). These passages describe a spiritual war that is also a biological war involving neurons and neurotransmitters.



## **Neurotransmitters Defined**

### Test and Answers

#### **What do neurotransmitters do?**

Neurotransmitters are chemical signals that can affect such feelings as mood, hunger, anxiety and fear.

#### **Explain the baseball illustration used to describe how neurotransmitters work?**

Inside your brain, muscles and glands you have nerve cells called neurons that have the job of passing signals. An easy way to think of these cells is to imagine them as baseball players passing a baseball around the field. The 'baseballs' are the chemical signals that are thrown between the players. The neurotransmitters are thrown across the synaptic gap from one neuron's terminal branch (or pitching hand) to another neuron's dendrites (or catching hand). The catcher gets excited by the chemical signal, an electrical current travels through the pitching arm, or axon, and the terminal branches at the end of the axon fire off the neurotransmitters.

#### **What are the speeds which neurotransmitters are sent?**

In the human body, there are billions of little neurons, and they're not all the same. Some have short pitching arms and some have pitching arms up to three feet long! Some neurons throw neurotransmitters at the speed of one mph, and others throw fastballs up to 268 mph!

## Explain the difference between the neuro and the neurotransmitters?

Lesson Summary: So, neurons are the cells that pass the information, and neurotransmitters are the chemicals that carry that information.

## What are the three phrases in Romans 7:17-23 that point out that sin “dwells” in our minds to imprison (hijack) our brains:

<sup>17</sup> But now, *it is* no longer I who do it, but **sin that dwells in me**.

<sup>18</sup> For I know that in me (that is, in my flesh) nothing good dwells; for to will is present with me, but *how* to perform what is good I do not find.

<sup>19</sup> For the good that I will *to do*, I do not do; but the evil I will not *to do*, that I practice.

<sup>20</sup> Now if I do what I will not *to do*, it is no longer I who do it, but **sin that dwells in me**.

<sup>21</sup> I find then a law, that evil is present with me, the one who wills to do good.

<sup>22</sup> For I delight in the law of God according to the inward man.

<sup>23</sup> But **I see another law in my members, warring against the law of my mind, and bringing me into captivity to the law of sin** which is in my members.” Romans 7:17-23

## What are the four phrases in Romans 8:9-11 which point out that the Holy Spirit “dwells” in our minds to heal and renew our brains.

<sup>9</sup> But you are not in the flesh but in the Spirit, if indeed **the Spirit of God dwells in you**. Now if anyone does not **have the Spirit** of Christ, he is not His. <sup>10</sup> And if Christ *is* in you, the body *is* dead because of sin, but the Spirit *is* life because of righteousness. <sup>11</sup> But if **the Spirit** of Him who raised Jesus from the dead **dwells in you**, He who raised Christ from the dead will also give life to your mortal bodies **through His Spirit who dwells in you**.” Romans 8:9-11

## Why are Romans 7:17-23 and Romans 8:9-11 neurospiritual passages?

Romans 7:17-23 and Romans 8:9-11 are neurospiritual passages because they point to both biological and spiritual activities that occur in the brain (“inward man”). These passages describe a spiritual war that is also a biological war involving neurons and neurotransmitters.