



In December of 2020 we asked Doctor Tiffany Rogers to do a 6<sup>th</sup> grade educational level neuroscience video on the brain's reward system.

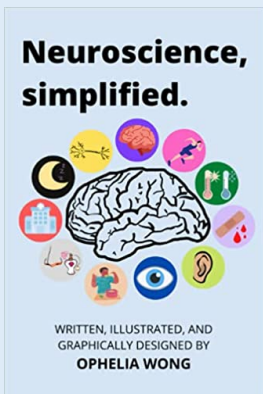
**Here is her Bio:**

2012 - Doctor of Philosophy, Experimental Psychology The University of Memphis, Department of Psychology Research Area: Neuroscience

2009 - Master of Science, General Psychology The University of Memphis, Department of Psychology

**Below you will find Dr. Rogers' Neuroscience Made Simple video (6 minutes).**

**We have also divided her presentation into short video clips and transcripts.**

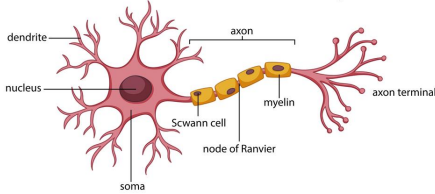


In this video, Doctor Tiffany Rogers explains neuroscience on a 6<sup>th</sup> grade level:

[Full 6-minute Video](#)

**Below you will find brief video clips and transcripts to help you understand how the brain's reward system works:**

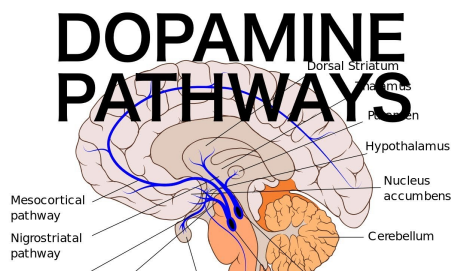
### Neuron Anatomy



### [The Neuron Video](#) – (less than 1 minute)

**Transcript of Video**

If we zoom in to see the cells that make up all of our brain structures, including the limbic system, we can see that they have round cell bodies with several small branches called dendrites and then a long branch called an axon. These cells are called neurons. Neurons use dendrites and axons to send and receive chemical messages. The tips of the axon send out chemical messages and the dendrites of nearby cells receive those messages. It's similar to how people communicate with each other. We use our mouths to speak and our ears to receive those messages. Our voices usually convey the message between one person's mouth and another person's ears. In the case of neurons, they use chemicals to talk between each other.

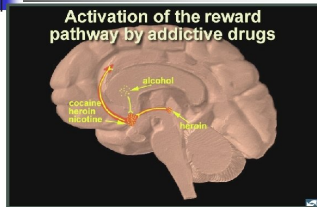


## The Reward (dopamine pathway)

### Transcript of Video

Neurons can use many different types of chemicals, but one of these is particularly important for the reward pathway. The reward pathway is considered a dopamine pathway, because dopamine is the primary chemical used to communicate between these cells.

### Activation of Reward



## The activation of the dopamine pathway (less than 1 minute)

### Transcript of Video

Remember that this pathway is a dopamine pathway. Which means that whenever becomes active, dopamine is released in the Nucleus Accumbens. Scientists can measure how much dopamine is released to determine how motivating something might be. So, things in our environment that can activate this pathway, causing dopamine release, will likely be things that we like and likely be things that we are motivated to pursue. So, what kind of things can activate this reward pathway? Basically, anything that we like. Food, particularly salty fatty or

sugary foods, physical touch, sex, music, winning games or competitions, playing video games, getting money.

These are all rewarding. Things like food and sex are called natural rewards, because we don't have to learn to be motivated for them. Things like money are called learned rewards, because our environment teaches us that it is rewarding. Some of these are really necessary for our survival. We need to want to eat, reproduce, and even compete in certain circumstances.



## [Some Activities Can Hijack Our Reward System](#) - (less than 1 minute)

Transcript of Video

In our modern world, we also need to earn money to survive, but you could also quickly see how too much motivation for any of these could be harmful. In the same way, drug of abuse can cause the reward pathway to produce too much dopamine and our motivations driven by this pathway are overtaken by the pursuit of these drugs.

Drugs of abuse have a particular advantage in activating the reward pathway. Remember that the neurons and the reward pathway are talking via chemicals. Drugs of abuse have chemical structures that allow them to get in on this conversation directly. Even more they can communicate with the pathway more directly than natural rewards. For example, imagine that

you've just eaten a slice of pizza, signals from your mouth have to be sent up to your brain to tell the brain that you've just eaten something tasty. However, when you consume a drug, it can reach the brain much more quickly, but not having to wait on these internal signals. So, while the reward pathway is important for motivation and for deciding what things the environment, we like it, can also easily be hijacked creating excessive motivation for behaviors, like eating, winning, or sex or for certain chemicals like drugs of abuse.

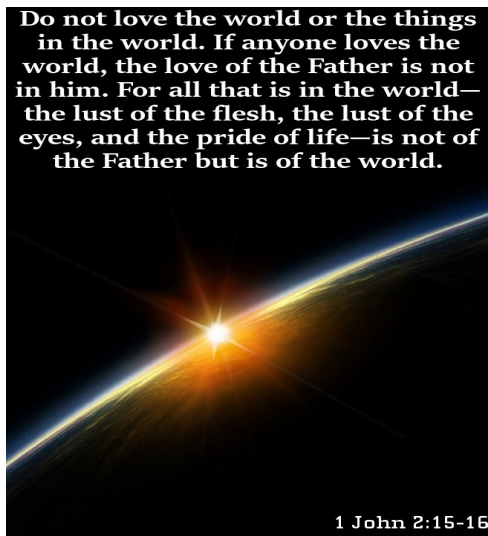
(Dr. Tiffany Rodgers)

## **Now let's consider a Neurospiritual explanation of the brain's reward system:**

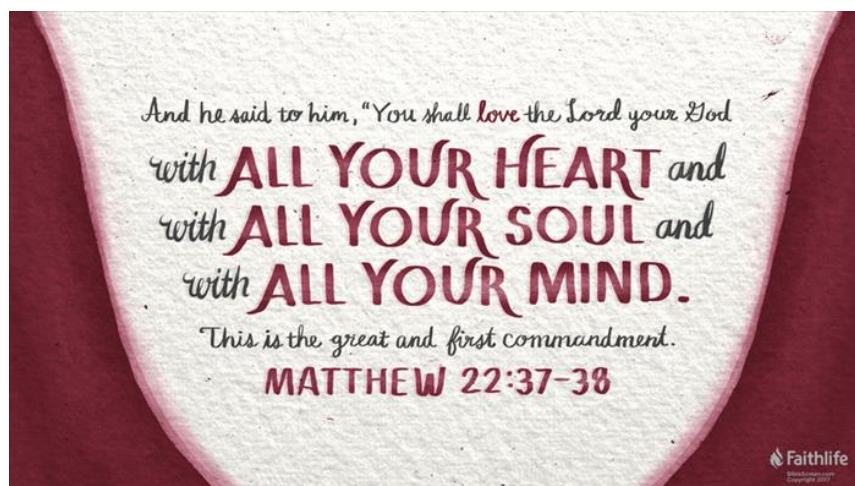
# **New Testament + Neuroscience =**

**God designed the human brain with a biological motivation mechanism that is automatically activated to force us to pursue food, water and sex. God designed this same motivation mechanism to be activated by what we choose, want and like! (Ronnie Crocker)**

God knows that choosing to “love the world or the things in the world” is harmful to the function of the brain:



God knows our brain works best when we chose to “love” Him with “all” of our “heart,” “soul” and “mind.”



The above passages (1 John 2:15,16 and Matthew 22:37) are neurospiritual passages because they deal with the want, like, reward, and motivation system of the human brain.

**The following neurospiritual Scripture describes how our reward/ motivation becomes hijacked:**

## James 1:14-16

But each one is tempted when he is drawn away by his own desires and enticed. <sup>15</sup> Then, when desire has conceived, it gives birth to sin; and sin, when it is full-grown, brings forth death. <sup>16</sup> Do not be deceived, my beloved brethren.



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## Neuroscience & Neurospirituality Made Simple

### Test & Answers

What does the Axon do?

The tips of the axon send out chemical messages.

What does the dendrite do?

The dendrites of nearby cells receive the messages.

Explain how Dr. Tiffany illustrated the way neurons communicate?

The tips of the axon send out chemical messages and the dendrites of nearby cells receive those messages. It's similar to how people communicate with each other. We use our mouths to speak and our ears to receive those messages. Our voices usually convey the message between one person's mouth and another person's ears. In the case of neurons, they use chemicals to talk between each other.

What is the main chemical in the reward pathway?

The reward pathway is considered a dopamine pathway, because dopamine is the primary chemical used to communicate between these cells.

What do scientists learn from the amount of dopamine that is released?

Scientists can measure how much dopamine is released to determine how motivating something might be.

What things in our environment can activate the dopamine pathway?

So, things in our environment that can activate this pathway, causing dopamine release, will likely be things that we like and likely be things that we are motivated to pursue.

What things are natural rewards because we don't have to learn to be motivated for them?

Things like food and sex are called natural rewards, because we don't have to learn to be motivated for them.



What is it about drugs that allows them to get in on the conversation between neurons directly?

Drugs of abuse have a particular advantage in activating the reward pathway. Remember that the neurons and the reward pathway are talking via chemicals. Drugs of abuse have chemical structures that allow them to get in on this conversation directly. Even more they can communicate with the pathway more directly than natural rewards.

Regarding the impact in your brain, explain the difference between eating a slice of pizza and consuming a drug?

For example, imagine that you've just eaten a slice of pizza, signals from your mouth have to be sent up to your brain to tell the brain that you've just eaten something tasty. However, when you consume a drug, it can reach the brain much more quickly, but not having to wait on these internal signals.

Why does God tell us “do not love the world or the things in the world?”

God knows that choosing to “love the world or the things in the world” is harmful to the function of the brain?” 1 John 2:15

Why does God tell us to “love the Lord thy God with all of your heart, with all of your soul, and with all of your mind?” Matthew 22:37

God knows our brain works best when we chose to “love” Him with “all” of our “heart,” “soul” and “mind.”

What phrases in James 1:14,15 imply how our reward/motivation becomes hijacked:

"Drawn away by his own desires and enticed"

"Desire has conceived"

"It gives birth to sin"

"When it is full-grown, brings forth death"