

The Biochemistry of Feeling Good

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Our brains are incredibly complex. But at the inner core of its processes and functions where we deal with our basic needs like: I'm hungry, I'm thirsty, I'm cold etc. are what we often refer to as our emotions. Anger, fear, anxiety, loneliness, grief, depression or on the positive side we speak of joy, hope, happiness, ecstasy, love. These functions all take place in specialized structures near the center of the brain. Compare these with what we sometimes in religious discussions refer to as the higher functions of the brain – reason, conscience, the will, the power of choice or decision – these are located in the frontal lobe of the brain.

But this emotional center of the brain is not really a “lower” part of the brain but rather a central part of the brain. A sense of well being or satisfaction or peace or happiness is really the heart of human existence – it is the evidence that all things are in order as the creator designed they should be. Although they can be deranged or perverted by sin yet the image of God has not wholly been defaced. God intended the emotions to play a central role in our lives as they do in His. When Jesus was facing the horror and shame of the cross we are told that it was a looking forward to the joy of seeing the redeemed saved by his sacrifice that led him to endure the cross. Strong emotions are at the center of most great accomplishments (and also most great acts of evil).

Brains are made of synapses

Emotions are the function of an organ of the body which like all other organs is made of cells. And we now are beginning to understand something of the structure and function of the cells which make up this part of the brain. Each specialized cell called a neuron has thousands of little branches and roots that extend in all directions to other neurons and every where they touch they form special connections that we call synapses. These synapses are where electrical impulses which travel over the surface of the neuron are transmitted to the next neuron. The type of action taking place at these synapses

determines in what manner the complex networks of neurons carries on thought processes in your brain. A mathematical calculation of the number of synapses in the brain and their possible combinations comes up with exponential numbers that exceed calculations of the number of atoms of matter in the universe. The human mind truly has immense potential.

A synapse is not a two-way connection it is a one-way connection. The two cells do not actually touch but they are separated by a small gap. The sending cell when it is activated releases microscopic little packages of neurotransmitters into this space. The receiving cell has receptors for these neurotransmitters and when enough transmitter molecules fit into the receptors the receiving cell is activated and now sends an electrical impulse along its surface to all of its sending units which release their little packages of transmitters into the next synapses in the complex network of thought being carried on.

Synapses are incredibly fast. As soon as the transmitters are released into the gap there are little recyclers that suck up all of the transmitters and the gap is cleared and free of transmitters and ready for the next impulse. This all takes about one millisecond. With some types of neurotransmitters instead of the recyclers there are enzymes that destroy the transmitters as soon as they are released to clear the gap for the next impulse.

Serotonin

Serotonin is one of the key neurotransmitters of feeling good. In the structures in the center of the brain serotonin is used to transmit feelings of peace, happiness, everything is OK. A deficiency of serotonin is the medical definition of depression. Today millions suffer from a serotonin deficiency with feelings of depression, a loss of purpose or meaning to life. Regardless of the facts of their life situation they feel hopeless, often tearful and incapacitated, it seems that nothing can make them happy, there is no point in living. Not a week passes but I see some patient in the ER where I work who has attempted to end their life by suicide. They are suffering from a deficiency of serotonin in certain places in the center of their brains.

Antidepressants

We cannot treat depression with a serotonin pill or injection as it does not cross the blood-brain barrier. Serotonin is used in other parts of the body for different purposes. It is the substance that causes platelets to activate. An IV infusion of serotonin would cause would cause every platelet in your blood to activate and go sticky causing system wide coagulation and instant death. The medications

prescribed today as antidepressants are SSRIs (Selective Serotonin Reuptake Inhibitors). These drugs (Prozac, Luvox, Zoloft, Paxil and many more) block the little serotonin recyclers present at the serotonin synapses in the center of the brain thus not as much serotonin is recycled so more is left in the gaps to trigger those neurons that signal peace and happiness. The only problem with these medications is that they don't just work here but they affect many other parts of the body as well causing numerous side effects as anyone who has taken them can verify.

God's antidepressants

Are there natural ways to elevate serotonin levels in the center of the brain? Yes, there are a number of things that can naturally help to elevate serotonin in the brain. Proper nutrition is one of them. Tryptophan is an amino acid found in many natural plant foods and it is the building material out of which serotonin is built. If you are deficient in tryptophan you will be deficient in serotonin. Baked potatoes in the skin, beans, lentils, soy beans, bananas and peanuts are a few of the foods that are very high in tryptophan. You can buy L-tryptophan and 5-hydroxy-tryptophan (the activated form of tryptophan) as supplements to boost tryptophan levels as well – but if you are on a whole plant food diet high in legumes you should not need supplements. Remember God designed this diet to provide everything we would need to be happy. But if your diet is high in refined products including white flour and sugar chances are you are missing out on adequate nutritional sources of this important amino acid.

Folate is a vitamin that is an essential tool used by the cell in the manufacture of serotonin out of tryptophan. Most Americans are deficient in folate because of the typical American diet and many doctors recommend folate supplements for those suffering from depression. In fact there is a prescription medication (Deplin) which is just a high dose of L-methylfolate which is the activated form of folate made in the body. Good amounts of folate will be found in the dark green leafy vegetables and should be a regular part of your diet. Legumes are also high in folate.

Sunlight produces serotonin in the center of the brain as we mentioned briefly in our last article. And exercise is also a very powerful antidepressant. Perhaps we can look at the physiology of these in more depth in a future article as well as some of the other neurotransmitters involved in feeling good like norepinephrine, endorphins, GABA and dopamine.

Beyond diet, exercise and sunlight we can look to Christ trusting that He will send His Spirit to actually regenerate and restore and bring peace and contentment to all who put their complete trust in His love and care for them as they do their part in following the simple instructions He has given.