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Neurotransmitters – The Nervous Systems Current

Your nervous system comprised of your brain and a network of nerves function like the most prestigious computer. Enormous amounts of information are communicated via this computer with its billions of nerve cells called neurons. In fact 100 million of them all of which are repaired and reproduced every single day.

Neurons are not connected, i.e. they don't touch one another. They are divided by a space called a synapse. Each synapse measures 20 – 40 nm (1/000,000,000 meter) and there are anywhere from 100 to 500 billion of them in the nervous system. These special connections enable the forming of networks between neurons and other cells, such as muscle and glands.

Neurons speak together via electrochemical signals, neurochemicals with the group name neurotransmitters, which travel from a neuron's axon to the next neuron's dendrite, and so forth. These electrochemical signals that create the body's "current", moving through a neuron at the speed of approx. 7 milliseconds creating life, giving energy and consciousness and when they disappear life is "turned off".

Each neuron is composed of:

- A body called a soma with a nucleus containing DNA – our genetic recipe or blue print
- Dendrites, the small branches that receive the sent message
- An axon, the carrier and transmitter of the message.

The nervous system can't increase its number of neurons, but it can and does increase the number of dendrites and thereby networks with other neurons. One neuron can have thousands of dendrites. Neural networks function just as any other network, the more you use them the stronger and more effective they are.

The phrase "use it or lose it" really applies here.

A dendrite receives an electrical signal (and a message) which starts a series of events ending with the release of a neurotransmitter into the synapse. This neurotransmitter locks on to a matching receptor on a neighboring dendrite, and delivers the electrical charge (and the message), and so forth.

Every neurotransmitter speaks its own language and can only lock on to a matching receptor. Fx. neurotransmitter Serotonin can only deliver its message via a Serotonin receptor, Dopamine via a Dopamine receptor, etc. Flow of these molecules is the key to physical and mental wellness, where excess or deficiency will show up in your character and health.

Neurotransmitters create a unique electrical pattern or wave and are produced in specific areas in the brain and body.

Fx. Dopamine is responsible for Beta waves, Acetylcholine for Alpha waves, GABA for Theta waves and Serotonin for Delta waves, all of which can be measured in an EEG – electroencephalogram. Every neurotransmitter is responsible for bringing information that releases a specific message and particular feeling. Some neurotransmitters are responsible for positive, happy feelings even euphoria – some for a relaxed, calm and quiet feeling – others for motivation, focus even intense concentration. How you perceive and feel is directly dictated by the levels of the different neurotransmitters.

The type and amount of neurotransmitter released is constantly changing, the purpose being to meet the needs of any particular circumstance. Fx at night to aid sleep the body needs more of the signals that bring calm and relaxation where the opposite is needed in the morning where the body sinks the level of relaxing signals and increases those connected with arousal. During training the body increases the amount of euphoric signals together with those that decrease pain.

Sugar craving is often connected with a neurotransmitter deficiency/imbalance. Fx if you feel sad the body's answer is more Serotonin, and eating something sugary indirectly increases Serotonin levels – check my e-book "The Sweet Life" for more information.

If you are in a hurry or are stressed then more of the excitatory neurotransmitters like noradrenaline will flow through the nervous system. The body will try to bring calm again by releasing GABA which job it is to block noradrenaline's messages.

Our physical expression can also drive our emotional response. Psychologist Dr. Israel Waynbaum discovered that when you frown you release stress hormones, but a smile increases the production of endorphins.

The production of all these molecules needs energy, in fact one third of our daily energy production goes to nerve transmission and this requires a stable delivery of sugar, oxygen and water. If the delivery is unstable then the production of neurotransmitters is likewise unstable. Yet another good reason for stable blood sugar levels.

The production of neurotransmitters is also affected by external molecules that have a similar chemical make-up and thereby can utilize a matching receptor. Fx heroin is identical to endorphins.

The nervous system cherishes order in its biochemistry and one of the conditions for a balanced neurochemistry is that all neurotransmitters are available in sufficient amounts. Therefore the nervous system has the power to regulate the number of receptors working at a given time and thereby the amount of a particular message/feeling being transmitted.

When neurons are bombarded with external molecules such as heroin, morphine, cocaine, etc., the receptors are down regulated and own production of the matching neurotransmitter reduced. This results in the need for more of the external molecule to produce the desired effect or feeling. And this is called addiction.

The opposite happens when there is a shortage of a neurotransmitter, the number of receptors at work is up regulated and neurotransmitter production increased. Imbalance in neurotransmitter biomechanics can be the cause of your bad mood, your anger, your physical and psychological pain, your fear, your insomnia and much more.

In children imbalances can be the main cause of their uncontrolled behavior and lack of ability to focus and concentrate. Extreme deficiencies can be the cause of violent actions.

The main causes of imbalance:

- Hereditary – a family history of abuse and addiction increases the risk of a reduction in the neurotransmitter levels and their matching receptors at birth.
- Stress – all stress increases the need for “feel calm and feel good” molecules. Neurotransmitter depots are emptied and transfer mechanisms affected, plus prolonged Cortisol production breaks down neurons responsible for the production of Serotonin.
- Diet – certain nutrients are essential for the production and transfer of neurotransmitters. The nutrient content of today’s produce and the quality of the foods many chose, does not supply enough nutrients. The result is that neurons are deficient in important nutrients such as amino acids, B vitamins, magnesium, omega 3, etc.
- Blood-Brain-Barrier (BBB) – separates the blood from the extracellular fluid of the nervous system. The blood is responsible for the delivery of necessary nutrients into the extracellular fluid. The very tightly knit cells in the walls of the capillaries

in the brain/nervous system are the barrier, which allows only small hydrophobic (water repellent/fatty) such as oxygen, carbon dioxide and certain hormones to pass through. Neurotransmitters are “manufactured” inside the neuron as they are too big to pass through the BBB. Which is the reason why pharmaceutical and supplement forms of neurotransmitters cannot pass through. Amino acids are the basic ingredient of neurotransmitters and together with vitamins and minerals necessary for conversion and enzyme activity are for the most part hydrophilic (water soluble) and thus must be actively transported through the membrane.

There is often talk about too little of a particular neurotransmitter, but deficiency of one neurotransmitter can be result of too much of another.

Regardless of too much or too little these imbalances play important role in your present physical, mental and emotional state, which is the foundation of your behavioral pattern also called your personality.

Test yourself and find your imbalances:

Dopamine

Dopamine is the nervous systems major stimulant and rewarder, our natural form of Amphetamines.

Dopamine is important for our physical and mental functions such as learning and storing information, movement control, mood and motivation, thought processing, control of metabolism, digestion and blood pressure and is the stuff that makes everything meaningful.

Symptoms of too little dopamine:

• feelings of sorrow or regret like having to give something or someone up

• misuse of stimulants, such as caffeine, nicotine, diet coke, etc. to promote the ”old you” (junk food orgy)

• depression (manio/bipolar)

• paranoia

• tired even apathetic

• extreme need for sleep, difficulties getting out of bed

• lack of determination - procrastinate/indecisive

• lack of enthusiasm and motivation

• lack of focus, concentration, A.D. H.D.

• slow thought process and/or learning new ideas

• foolish/irrational behavior

• clumsy

• shaking

• balance and movement difficulties

• poor sexual arousal even impotence

• poor sense of smell

• weight gain - obesity

• family history of drug abuse, alcoholism

• Ludomani

Symptoms of too much dopamine:

• feelings of greed

• exagerated enthusiasm and motivation - mani

• migraine

• nightmares

• skizophrenia

• fear

• aggression

Acetylcholine

Avetylcholine is the nervous systems coordinator and memory maker.

Acetylcholine's juices are the reason why our brain and mind is flexible, quick, creative and innovative. Acetylcholine is important for the preservation of learning, especially languages, and intuition. Together with dopamine, acetylcholine ignites the brain – together they permit the nervous system to work fast and furious.

Acetylcholine controls muscle contraction, too little and our muscles are limp, too much and we have cramps/spasticity. Some pesticides work by increasing the effects of acetylcholine. Acetylcholine is the neurotransmitter that drives the para-sypmpathetic nervous system, responsiblie for rest and digest.

Symptoms of too little acetycholine:

• feelings of guilt

• crave fatty foods, such as ice-cream, cream cheese, etc.

• crave coffee (caffeine)
• poor memory
• unable to feel happy or passionate about anyone or thing
• obsessed with ones shortcomings
• aggressive
• prefer to do things one's self
• lack of creativity and fantasy
• lost the desire to exercise
• former experiments with hallucinogens (LSD)
• long sighted
• Glaucoma
• Takykardia – racing heart beat
• high blood pressure
• dry mouth
• dry skin
• constipated
• decreased visits to the toilet
• inhibited short term memory – Alzheimers
• Myesthenia Gravis – cannot hold your physical grip on things

Symptoms of too much acetylcholine:

• feelings of arrogance, scorn or revenge
• rigidity– as seen in Parkinsons (low dopamine/high acetylcholine)
• oexagerarted saliva
• increased visits to the toilet (the runs)
• panic
• Bradykardia – slow heart rate
• low blood pressure - dizzy
• short sighted

• Asthma due to exagerated mucous (high acetylcholine/low noradrenaline)

• exagerated saliva

GABA

Gamma Amino Butyric Acid – the nervous systems natural peacemaker (Valium).

GABA is a kind of neurotransmitter policeman, responsible for keeping the other neurotransmitters in check by decreasing the ability to work. Too little GABA, then communication is out of control and we are over stimulated and unstable. We talk too quick, are awake several days in a row and develop wild, grand ideas. Prolonged GABA deficiency will affect your ability to administrate normal daily activities, not to mention your ability to tackle stress.

Symptoms of too little GABA:

• feelings of anger and hate

• an increased need for alcohol, nicotine or drugs to relax

• uncontrolled, unexplainable fear and panic

• unable to relax

• decreased need for sleep

• heart palpatations and high blood pressure

• low stress tolerance

• crampng and stiffness

• muscle tightness, especially neck and shoulders

• Mania/Bipolar

• attacks (Epilepsi)

• claustrophobic tendencies

• irritated

• tetanus and other spastic conditions

Symptoms of too much GABA:

• feelings of despair and apathy

• limp muscle tissue

• stutter

Serotonin

Serotonin is the nervous systems natural satisfier (happy stuff).

In general serotonin is responsible for signaling “I have enough”, ”I am satisfied” and is our primary defense against depression and fear.

Symptoms of too little serotonin:

• feelings of shame and humiliation

• depression, sad (the blues)

• suicide thoughts

• sleep problems (often wake up)

• OCD /thoughts and actions), such as anorexsi nervosa, compulsive shopping

• lack of sex drive

• easily angry and aggressive

• low tolerance threshold

• crave sugar and its family, especially starches and alcohol especially in the afternoon and evening

• alcoholism

• low blood pressure

• low body temperature

• winter depression (SAD)

• phobia - for heights, water, fear of snakes, etc.

• hyperacusis – sensitive for noise

• photofobi – sensitive for light

• heat intolerant

• jaw cramps

• chronic pain

• fibromyalgi

• constipation

Symptoms of too much serotonin:

• feelings of fear and anxiety

• pain

• migraine

• anorexia (not nervosa)

• hidden aggression

• shakes

• low self-esteem/worth

• high blood pressure

• high body temperature

• the runs

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https://sally-walker.com/index.php/en/know-how-tank/articles/neurotransmitters-the-nervous-systems-current