

Increasing Neurotransmitters may be helpful for:

- Food Cravings
- Appetite Control
- Smoking Cessation
- Insomnia
- Depression
- Anxiety
- Mood Swings
- PreMenstrual Syndrome
- Obsessive Compulsive Disorders
- Addictions
- Stress
- Type II Diabetes

Production Naturally

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Many factors have an impact on brain neurochemistry and endocrine balance such as age, genetics, circadian rhythms and various environmental factors including stress, diet, exercise and medications. Many people do not synthesize adequate serotonin including diabetics and those on SSRI's for a long period of time. Dieting is known to lower levels of tryptophan, an amino acid needed to make serotonin. Dieters, and others, often need help in controlling food cravings, mood swings and addictions. Cravings for cigarettes are known to be controlled by Dopamine receptors. Dopamine is another very important neurotransmitter often low in those who are prone to addictive or erratic behavior. Imagine what might be thrown off if one or more of these important neurotransmitters is deficient.

The perception of hunger is determined by many Physiologic factors:

1. Neurotransmitter balance of Serotonin, Dopamine, GABA, Glutamine, Acetylcholine and opioids. In general, any deficiency of these could trigger anxiety, hunger, depression, and cravings.
2. Genetic specificity of brain neurochemistry and hormonal balance.
3. Body fat stores. Adipose tissue produces various metabolic signals that affect the appetite: leptin helps to control hunger, inflammatory cytokines (TNF-alpha, IL-6, etc.) increase it.
4. The level of glycogen stores in the liver is communicated to the brain through the vagal nervous system, thus attempting to influence the appetite.
5. Blood glucose levels are perceived directly by the brain through glucoreceptors. Low blood glucose levels trigger carbohydrate cravings.
6. Adrenal hormones, cortisol and adrenaline, increase hunger and the production of sex hormones (estrogen, testosterone, progesterone). These all influence appetite.
7. Gut derived hormones are produced directly in response to the macronutrient composition and size of the meals: CCK (in response to protein, fat and the stretching of the stomach by food/drink volume), Galanin (in response to fat), Ghrelin (in response to an empty stomach), and they signal the brain directly. CCK and galanin reduce hunger while Ghrelin stimulates it.
8. Pancreatic hormones: high insulin levels signal the brain to reduce hunger if the tissues are insulin sensitive.

The amino acid L-Tryptophan (LT) converts into 5-Hydroxytryptophan (5-HTP) which converts into 5-Hydroxytryptamine (5-HT), also known as serotonin. 5-HTP readily enters the blood brain barrier and makes serotonin. Oral administration of 5-HTP has been shown to successfully raise serotonin levels. Serotonin is known to control sleep, depression, anxiety, aggression, appetite, temperature, sexual behavior and pain sensation.

- Other neurotransmitters and CNS chemicals, such as melatonin, dopamine, nor-epinephrine, and beta-endorphin have all been shown to increase following oral administration of 5-HTP.
- This ability to increase not only serotonin levels in the brain, but also dopamine and norepinephrine, allows 5-HTP to produce some significant and unique effects on brain chemistry and on serotonin-related conditions which other substances, including L-Tryptophan, cannot duplicate.
- L-Tryptophan may raise serotonin levels or may be shunted into the synthesis of niacin or the production of protein.

Research shows that Type II Diabetics have lower brain tryptophan levels and higher rates of depression. This may help explain their propensity towards sugar addiction beyond the typical fluctuating blood glucose levels. When twenty overweight, NIDDM patients were given 750 mg/day of 5-HTP or placebo for two weeks in a double-blind study, their daily energy intake decreased considerably as well as their carbohydrate and fat intake. Body weight also diminished along with appetite! (30)

MECHANISMS OF ACTION OF BRAIN NUTRIENTS

NUTRIENT	ACTION	REFERENCE
Vitamin C=100 mg	• Cofactor in adrenaline synthesis	1, 2
Vitamin B6=20 mg	• Cofactor in serotonin and dopamine synthesis	4, 5
Folic Acid=100 mcg	• Cofactor in serotonin and dopamine synthesis	3, 28
Vitamin B12=25 mcg	• Cofactor in serotonin and dopamine synthesis	3, 29
Niacinamide=20 mg	• Cofactor in brain energy production	7
L-Tyrosine=1,000 mg	• Precursor to dopamine and adrenaline • Antidepressant • Reduces cravings for tobacco	13, 14 15 16
5-Hydroxytryptophan=100 mg	• Precursor to serotonin and melatonin • Reduces carbohydrate cravings and appetite • Corrects age-related decline in serotonin	1, 29 22, 23 11
Taurine=50 mg	• Important regulator of calcium and neurotransmitters within the heart, muscles and brain • Helps calm the nervous system by regulating neurotransmitters • Strengthens and protects healthy cell membranes	1 8, 9, 10 12
Rhodiola Rosea=50 mg	• Improves levels and metabolism of: - beta endorphin - dopamine - serotonin • Adaptogen action, helping with stress	21 21

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