



## Neurotransmitters and Depression

**D**epression can affect every aspect of our life. Depression colors how we see ourselves, and what we believe about ourselves. Depression can markedly influence goals, aspirations, and desires. It is influenced by our environment, activity, what we eat, and our inherited genetics. To effectively manage depression, it is important to understand how a healthy brain has gone awry.

The field of neuro-biochemistry has shown that there are chemicals called neurotransmitters, that are needed for the brain and nerves to function efficiently. These neurotransmitters are the chemicals in the brain that need to be balanced, that allow transmission of impulses from one nerve to another. Over 40 different neurotransmitters in the brain have been identified, assisting different functions. For depression, the interaction of three main neurotransmitters greatly influences our energy, mood, and desires. These three main neurotransmitters of depression are:

1. **Serotonin**, the prominent calming and inhibiting neurotransmitter.
2. **Dopamine** regulates the sense of pleasure, satisfaction and reward.
3. **Norepinephrine** affects motivation, ability to focus and energy. Both dopamine and norepinephrine are known as the primary energizing neurotransmitter.

Though serotonin, dopamine and norepinephrine have different functions in the brain, the symptoms of neurotransmitter imbalance can mimic each other. With depression, these three neurotransmitters usually are imbalanced. It is important to know which, or even if, all of the neurotransmitters are at abnormal levels. For example, depression can result from too little serotonin or too little norepinephrine. Anxiety can result from both too little serotonin, but also with too much norepinephrine. Uncontrolled appetite, or binge eating, can result from insufficient serotonin, but also occurs due to low levels of dopamine. Knowing neurotransmitter levels can aid therapy intervention, and guide targeted nutritional intervention.

**Serotonin:** Enhances calm, joy, peace, and gratitude. When serotonin becomes low, people often feel anxious, angry, sad, nervous, or inadequate. There may be an uncontrolled appetite and headaches. Individuals with low serotonin may have excessive worry, obsessive thinking or compulsive repetitive actions.

**Dopamine:** Affects our perception of reward and desire, the learning and memory of pleasure, and physical movements. When dopamine is low, addictions and cravings emerge. When dopamine is low in the brain, disordered physical movements, as in Parkinson's disease, or muscle twitching, may also emerge. Dopamine is also important for proper gastro-intestinal function.

**Norepinephrine:** Important for emotional stability, energy and mental focus. When norepinephrine is low, fatigue, a low mood, sleep difficulties and an inability to have focused concentration occurs. Too much norepinephrine can present with anxiety, restlessness, hyperactivity, and even elevated blood pressure.

Intervention for depression can be connected to the specific neurotransmitter being affected. It is important to understand the differences of these neurotransmitters, and which neurotransmitters are being affected. Testing of urinary neurotransmitter levels, which correlate with emotional and physical symptoms, is now available. Some insurance companies pay for the evaluation of urinary neurotransmitters, in the evaluation of depression or other emotional struggles.

When specific abnormal levels of neurotransmitters are identified, and correlated with individual symptoms, then targeted nutritional intervention can be recommended for altering specific neurotransmitter imbalance. For example, for serotonin deficiency, adequate tryptophan and Vitamin B6 is needed. Foods high in tryptophan that could boost serotonin include soy protein, spinach, egg whites, halibut, and shrimp. For a deficiency in either dopamine or norepinephrine, the body needs adequate tyrosine precursors. Vitamin B6 is needed for the biochemical pathway for making dopamine, and Vitamin C is needed for making norepinephrine. Foods high in tyrosine, for making either dopamine or norepinephrine include eggs, soy, meats, dairy products, fish, wheat and oats.

Medical science is learning more about the causes of imbalance in the neuro-biochemistry of neurotransmitters. Abnormal neurotransmitters levels may accompany adrenal fatigue, or the presence of environmental toxins. Toxins that can influence neurotransmitter balance include environmental toxins and heavy metals. High antibody levels to fungus, such as yeast, has been noted when all three neurotransmitters are excessively low.

Always consult your health care provider before beginning any nutritional supplement. Antidepressant medications can be helpful for acute and immediate treatment of depression. Some nutritional supplements should not be taken with certain antidepressant medications without the guidance of an experienced health care provider.

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