

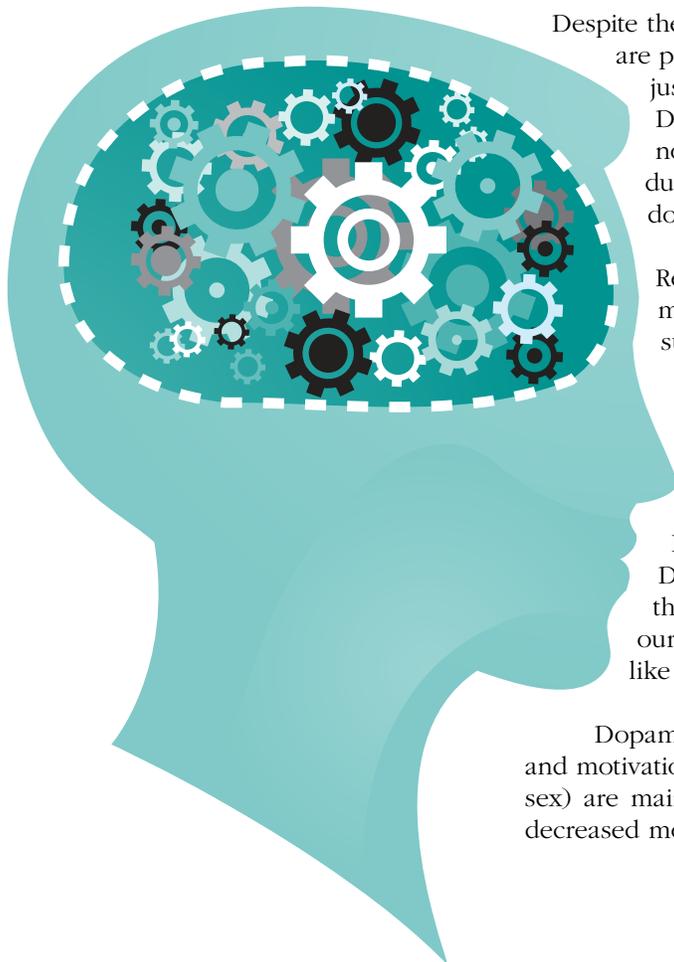
The Latest Dope On Dopamine

An Important Brain Neurotransmitter

Our brains require numerous biochemical messengers called neurotransmitters to allow us to think, move, remember, experience emotions, and anything else unique to humans. **Those of us with fibromyalgia have low levels of certain neurotransmitters that affect our mood, concentration, memory and other things that make us uniquely fibro.** Both serotonin and norepinephrine, two major neurotransmitters, are low in fibromyalgia.

Serotonin is the brightness switch in our brain TV. It is important in our brain's ability to control pain, maintain an upbeat mood or outlook and be motivated. A low serotonin level is equivalent to turning down the brightness switch. Norepinephrine is the contrast switch. It is important in improving our focusing, concentration and energy levels.

A third major neurotransmitter in our brain called dopamine is receiving more interest of playing an important role in fibromyalgia symptoms.² Dopamine is difficult to measure since it is concentrated in cerebral spinal fluid, and a lumbar puncture is necessary. Volunteering to have a long needle inserted into the lumbar spine is probably not appealing to those with fibromyalgia.



Despite the current lack of studies measuring dopamine in fibromyalgia, there are plenty of scientific clues that indicate dopamine is low in fibromyalgia just like its neurotransmitter siblings, serotonin and norepinephrine. Dopamine is a precursor (or building block) of norepinephrine, so if norepinephrine is low in fibromyalgia perhaps part of the reason is due to low dopamine levels. Evidence supports an inherited defect of dopamine receptors in people with fibromyalgia.³

Recent studies show improvement of fibromyalgia symptoms with medicines that increase dopamine levels in our brain. All these clues support a link between fibromyalgia and low dopamine levels.

What is the role of dopamine?

Dopamine has many diverse but important functions in the brain.

It controls the flow of information from different areas of the brain which is important for memory, attention and problem solving.

Low dopamine levels may contribute to attention deficit disorders.

Dopamine appears to help us notice objects and events and perceive their priority or level of desire. In fibromyalgia, low levels may disrupt our attention, memory, and decision making abilities (Does this sound like fibrofog?)

Dopamine is the key in our brains' reward systems. Feelings of enjoyment and motivation and naturally rewarding experiences (i.e. food, social interaction, sex) are mainly regulated by dopamine. Lack of dopamine, thus, can lead to decreased motivation, unhappiness, depression and social withdrawal.

Dopamine...

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Dopamine is also crucial in controlling our body movements through a specific part of our brain called the basal ganglia. Parkinson's disease is a result of destruction of dopamine neurons in the basal ganglion. A person with Parkinson's disease loses the ability to perform movements in a smooth, controlled manner.

Dopamine also appears to be involved in our autonomic nerve system and it may cause increased autonomic arousal in the brain's limbic system. This can contribute to typical fibromyalgia symptoms such as pain, fatigue, irritable bowel syndrome, irritable bladder, heart palpitations, abnormal sweating, cold hands/feet and anxiety. Further studies may clarify dopamine's role in the central pain processing abnormality in fibromyalgia, but for now it would appear that dopamine's multiple responsibilities in our brains' connections qualifies it to be the "channel switch" in our brain TV.

How does dopamine become abnormal in fibromyalgia?

There may be a quantity problem. It does not appear to be a result of any measurable destruction of dopamine producing nerves in the brain as occurs with Parkinson's disease. Brain dysfunctions in fibromyalgia have been measured with functional MRI studies,⁴ so a brain dysfunction could be causing low production of dopamine. Dopamine may be used up faster due to chronic overstimulation, so demand may exceed supply. Perhaps fibromyalgia dopamine does not have the structural "integrity" of normal dopamine or the dopamine receptors may be abnormal, causing a problem with the "quality" of available dopamine. Hopefully further research will clarify why decreased dopamine activity appears to be a problem in fibromyalgia.

How can Dopamine levels be increased?

Medicines called dopamine agonists work by activating dopamine receptors mimicking the effect of dopamine.

These medicines (e.g. pramipexole and ropinirole) have been approved by the FDA for the treatment of Parkinson's disease. Recent studies by Dr. Holman found that both pramipexole and ropinirole significantly decreased pain in nearly half the fibromyalgia patients tested as well as improving fatigue, sleep, restless leg syndrome, and function when compared with placebo.^{5,6}

Can dietary supplements increase Dopamine levels?

Dopamine is manufactured from the amino acid tyrosine. Tyrosine is converted to levodopa or L-Dopa by a specialized enzyme and from there, L-dopa is transformed in the brain to neurotransmitters dopamine and norepinephrine.

Low levels of tyrosine have been associated with **low blood pressure, cold hands and feet, fatigue, restless leg syndrome and underactive thyroid;** symptoms that overlap with fibromyalgia.

Tyrosine is a necessary building block, not just for dopamine and norepinephrine, but also for serotonin and enkephalins (substances that have pain relieving effects in the body). Our bodies manufacture tyrosine from phenylalanine which is found in many foods including chicken, turkey, fish, peanuts, milk, cheeses and soy products. Low levels of tyrosine have been associated with low blood pressure, cold hands and feet, fatigue, restless leg syndrome and underactive thyroid; symptoms that overlap with fibromyalgia. Different studies have looked at tyrosine supplements and

their potential benefits. The study of patients with schizophrenic show that tyrosine supplements improve cognitive functioning, suggesting a lack of tyrosine. Lack of tyrosine can interfere with dopamine mediated cognitive function.⁷ Another study evaluated the effects of tyrosine depletion in normal healthy volunteers has found that this group showed more apathy, was less content, and demonstrated less decision making abilities consistent with a hypothesis that dopaminergic factors are involved in clinical depression.⁸

Do people with fibromyalgia have a tyrosine deficiency leading to impaired dopamine function?

Hopefully additional research will clarify this question as the answer is not known at the present time. Some of the reported benefits of tyrosine supplements have included improved cognitive performance and mental alertness, improved mood, decreased stress and decreased fatigue. There is no clear cut research at the present that shows benefits of tyrosine supplementation in people who do not have a tyrosine deficiency.

The dosage of tyrosine supplements is anywhere from 750 mg a day to 1000 mg 3 x/day taken 30 minutes before meals. It has been reported that taking tyrosine with co-factors such as vitamin B6 and vitamin B9 (folic acid) can enhance its effectiveness in the body. There have been reports that tyrosine supplementation can interfere with treatment for cancer or interact with other medications so it is necessary to consult with a knowledgeable physician prior to considering taking tyrosine as a dietary supplement for fibromyalgia symptoms.

Our knowledge of dopamine in fibromyalgia will continue to grow over time, along with treatment and supplement options. Good brain food and hearty dopamine levels seem to be a healthy combination for any fibromyalgia patient.

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Dopamine...

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Editor Note: Serotonin can be boosted with a supplemental precursor. See 5-HTP: The Serotonin Solution by TyH Publications (M. Squires) for more information.

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