

Fibromyalgia & Pain: Is It Genetic?

How serotonin is involved and why 5-HTP may be one answer for pain relief

by Michael Smith PhD MDsc

The genetic revolution is upon us. A person can have portions of his or her genetic code diagnosed in a few days simply by visiting a clinic specializing in genetic testing. So it is not surprising that genetic testing has been recently performed on hundreds of fibromyalgia (FMS) sufferers and the results, when contrasted against the genetic code of “normal” people, are quite interesting.

In 2014, 116 families with members exhibiting FMS had their genetic profiles compiled in a study.¹ Within this group of participants, 342 were siblings. One finding was that the sibling of a FMS sufferer was 13 times more likely to also have FMS. This link suggests that there may be a genetic component to FMS, which was further explored by comparing similarities among the genetic codes of the participants.



One of the more interesting findings is that two genes (the serotonin transporter gene and the vanilloid channel 2 gene) have obvious differences in FMS sufferers from the normal population. These genetic differences are observed in high frequencies in FMS families and probably play large roles in initiating pain and loss of pain control.

Serotonin is a very important chemical messenger between neurons that your body synthesizes from the amino acid tryptophan or 5-hydroxytryptophan (5-HTP). Serotonin binds to nerve receptors and helps calm neurons. A genetically modified serotonin transporting protein in FMS sufferers may delete the tissues of serotonin *depriving sensing neurons of serotonin*. If this protein functions poorly, this may explain why the serotonin nutrient, 5-hydroxytryptophan, is useful as an aid for pain relief.

The second gene, vanilloid channel 2, codes for a protein that plays a role in sensing heat and the detection of chili peppers and topical ointments containing capsaicin. This is why chili peppers make you feel hot: the active ingredient capsaicin is chemically closely related to vanilla. Defects of this gene and sensing protein may be largely responsible for the constant pain felt in fibromyalgia.

But wait. Life as a human just isn't so simple. Another recent study of the DNA from about 4,000 people has found that mutations of the HTR2A gene are associated with chronic, widespread pain.² The HTR2A gene codes for a specific variety of serotonin receptor located on membranes of nerves throughout the body. It is another key to pain because these important nerves are responsible for communicating with

other nerves that release the neurotransmitter glutamate – a pain signal. Even a single mutation of the serotonin receptor could result in a person suffering a lifetime of continuous pain stimulus by allowing a continuous flood of painful glutamate. The mutation uncovered in this study has also previously been shown to be associated with depression and ME/chronic fatigue syndrome (SEID).³

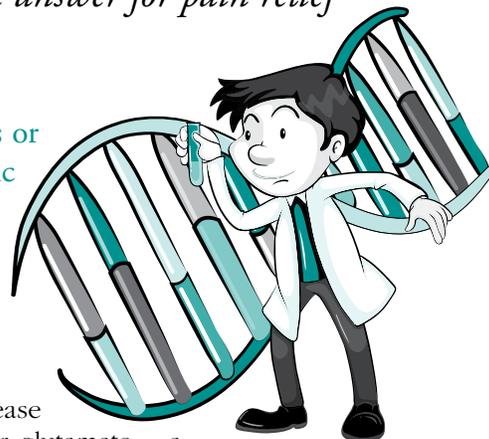
Another very large study was conducted with 496 patients diagnosed with FMS and 348 people without chronic pain (as controls). Three new genes were discovered to be strongly associated with FMS out of 350 genes examined.⁴ The first gene, RGS4, produces a protein important for the central nervous system and is involved with the opioid receptor and morphine analgesia (pain relief). The second gene influences neuron cannabinoid receptors that help control pain signals caused by tissue damage. It is also stimulated by the cannabinoids from marijuana and certain types of omega-6 fatty acids. The third gene with mutations in FMS sufferers is TAAR1. This is the genetic code for yet another protein associated with neural membranes and is a key regulator of specific neurotransmitters in the brain. Nerves, nerves, and more nerves!



What these recent genetic discoveries have in common is that the genes for many proteins responsible for neurotransmission may be mutated in FMS. In other words, there may be more than one root cause of FMS; but the basis for FMS being complicated is expected. Many human pathologies are complex, like cardiovascular disease and most cancers. What this all means for people with FMS is that practicing clinicians must now admit that FMS is a complicated pathology resulting from several genetic defects. Unfortunately, this also means that finding a cure for this difficult disease is also complicated.

In the meantime, we now know serious defects in neurotransmission are the root cause of FMS. This provides

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us with a scientific rationale to warn the FMS individual to always be careful to *avoid a diet high in glutamate*, a well-known neurotransmitter for pain – and consider a steady intake of nutrients like 5-HTP that are converted into the beneficial neurotransmitter serotonin.



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Mike Smith PhD, MDSc, has advanced studies in biochemistry, physiology and medicine. Dr. Smith has co-authored more than 30 scientific and medical articles in journals and lectured extensively. He has designed many new diagnostic tests for clinical use. Dr. Smith became interested in nutritional supplements after reading Linus Pauling and while doing research on oxygen and carbon monoxide toxicities.

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Note: An expounded (technical) version of this paper is available to health care professionals upon request to the editor@e-tyh.com.

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