

PFA Tips

Autism and Vitamin-D Deficiency

Vitamin-D deficiency is now recognized as a serious health abnormality. Studies of various populations have found vitamin-D levels are often very low. Additional research has shown that low vitamin-D levels are associated with many different types of health issues and chronic diseases. These include poor bone strength (rickets), muscle and joint pain, cognitive problems, poor immunity, cardiovascular disease, mood problems, hormone imbalance, and various cancers.

Vitamin-D Is Actually A Hormone

To fully appreciate the importance of vitamin-D, we must first understand what vitamin-D is. Vitamin-D was discovered in the 17th century when its absence in the diet was associated with the bone disease rickets. In 1923, Goldblatt and Soames discovered when the human skin was exposed to sunlight or ultraviolet light, a substance equivalent to vitamin-D was produced in the body. Hess and Weinstock confirmed the hypothesis that “light equals vitamin-D”. The structure of vitamin-D was determined in the 1930’s during the rapid rise of the science of nutrition and thus was classified as a vitamin. Today, through continued research, we now know vitamin-D is actually a steroid hormone. As a hormone, it is extremely important as a regulator of multiple functions in the body including.

- Immune system (helps fight infection)
- Muscle function
- Cardiovascular function (healthy heart and circulation)
- Respiratory system (healthy lungs and airways)
- Brain development
- Anti-cancer effect

In the past few years, research has indicated that vitamin-D may play a role in various health issues associated with autism. This association has become more closely reviewed as the science has shown more specifically how vitamin-D works in the body. We now know the more specific roles

of vitamin-D include anti-inflammatory, auto-immune, neurological, and antioxidant functions.

Anti-Inflammatory Functions

Vitamin-D has significant anti-inflammatory properties. A deficiency would thus allow inflammation to exist at sub-acute (also known as “silent inflammation”) and acute (typically associated with painful arthritis or injury) levels. Autism has been theorized to be a disease of neurological inflammation. Inflammation is also associated with abnormal signaling in autistic brains.

Auto-Immune Functions

Auto-immune diseases are diseases in which the body’s immune system attacks healthy cells by producing autoantibodies. Autism has been theorized to possibly be linked to auto-immunity because a number of autoantibodies to the brain have been identified in autistic children. The levels of autoantibodies have also been shown to be directly associated with the severity of the autism. The same research found that higher levels of a specific autoantibody were associated with significantly lower levels of vitamin-D. This research also found that low vitamin-D levels were associated with higher scores on an autism diagnostic assessment known as the Childhood Autism Rating Scale.

Neurological Functions

Neurotrophins are a family of proteins (see glossary for definition) that induce the survival, development, and function



of neurons. Neurons are nerve cells that specialize in transmitting nerve impulses. Vitamin-D plays an important role in increasing the number of receptors on the surface of target nerve and brain cells up to five fold for neurotrophins. This increase in receptors makes the brain and nerve cells more sensitive to hormones or another agents such as NGF (nerve growth factor) and GDNF (glial-derived neurotrophic factor), two neuropeptides (see glossary for definition) important to the regulation of growth, maintenance, proliferation, and survival of certain target neurons. With vitamin-D having this important of a role in nerve and brain cell growth and function, its benefit to autistic brains could be extremely important.

Antioxidant Functions

Antioxidants are substances (such as vitamin C or E) that remove potentially damaging oxidizing agents in a living organism. Vitamin-D has been shown to upregulate the antioxidant glutathione. Glutathione is involved in the brain detoxification process.

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Glutathione protects nerve cells and nerve conduction critical to mental processing. Vitamin-D is also linked to upregulating several other important antioxidants and detoxification agents. Low vitamin-D levels therefore can be associated with the potential for poor neurological detoxification and protection in those with autism.

How can you improve Vitamin-D levels?

The first step in addressing vitamin-D levels is to obtain a vitamin-D blood test which can be done in most standard blood test panels. This test will tell you exactly where the vitamin-D level is and how much you need to increase it. The three methods of improving vitamin-D levels are:

- 1) Get a healthy amount of sun exposure when possible.
- 2) Eat a diet with foods that contain vitamin-D. This includes fatty fish like tuna, mackerel, and salmon. Foods fortified with vitamin D include some dairy products, orange juice, cereals, beef liver, cheese, and egg yolks.

- 3) Take a vitamin-D dietary supplement. This is probably the most convenient and effective way to increase and ensure your vitamin-D level. Be sure to obtain a quality vitamin-D3 (the organic form of supplemental Vitamin-D) product that guarantees the accuracy and potency of the formula.

Other Dietary and Supplemental Considerations

In addition to lifestyle, diet, and supplementation that ensure an optimal level of vitamin-D, other considerations may be helpful nutritional strategies for autism. These include maximizing the consumption of anti-inflammatory foods which include fresh vegetables, fruits, and a healthy amount of lean protein. An anti-inflammatory diet will help regulate inflammation and provide nutrients (such as omega-3 fatty acids and magnesium) that are anti-inflammatory. In addition, supplementing with omega-3 fish oil and magnesium can help manage inflammation and promote healthy neurological function.

Always consult your health care provider for specific information regarding diet and supplementation to ensure the best possible results.

Glossary

Protein – large biomolecules, or macromolecules, consisting of one or more long chains of amino acid residues.

Neuropeptide – small protein-like molecules (peptides) used by neurons to communicate with each other.

Additional Resources

PFA Tip: Compounding Pharmacy
<http://pathfindersforautism.org/articles/healthcare/pfa-tips-compounding-pharmacy>

Compounding Pharmacy & Nutrition Center
<http://vitascriptrx.com/>

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