

Many parents of ASD children have heard about glutathione (GSH). Health professionals agree that anyone struggling with long term health issues will be low in glutathione. Studies have shown that the majority of children with ASD are low in glutathione. Dr. S. Jill James's research showed that around 80% of ASD children struggle with low glutathione levels. A very recent study has shown that low Natural Killer cell activity in children with ASD may be the result of low GSH (<http://www.ncbi.nlm.nih.gov/pubmed/18929414>). As with many physiological problems, low glutathione can have a profoundly negative ripple effect on health. To avoid this vicious circle, it is important to have some knowledge about how the body uses, creates, and saves glutathione.

Glutathione is a protein made up of three amino acids: cysteine, glutamic acid, and glycine. Glutathione is found in every cell in our body. Among the many purposes it serves, two of the most important are its detoxication and antioxidant abilities. Not surprisingly, the liver produces and has the most abundant stores of glutathione.

To help detoxify our bodies, glutathione conjugates with a toxin. That is, glutathione attaches itself to the toxin which is then escorted from the body. Glutathione is the most important conjugator for fat-soluble toxins, in other words, toxins that dissolve in and become part of the fat in our bodies. The body has a very hard time excreting toxins stored in a fat-soluble form—meaning that those toxins simply stay in the fat, causing damage of some kind, until the fat is used, at which point further damage is caused. By conjugating with these toxins—such as heavy metals, solvents, and pesticides—glutathione transforms them to water-soluble forms and they can be excreted via the kidneys.

Glutathione not only acts as an antioxidant in its own right, but it also recycles other antioxidants such as Vitamin C and Vitamin E. Children with ASD are known to have unhealthy levels of oxidative stress.

There are a number of relatively easy and very safe ways to increase GSH levels. One way to approach healthy GSH levels is through diet. There are a number of foods that when served raw (or lightly steamed) can improve glutathione levels: avocado, asparagus, walnut, tomato, spinach, carrot, grapefruit, and broccoli are some of the well-known ones. It is important to note that by serving organic foods you are sparing glutathione (that is, the body will require less of it). As well, Dr. Sidney Baker has noted that organic phytonutrients—that is, health-promoting compounds found in plant foods (that are not vitamins or minerals)—do more to boost (not just preserve) glutathione levels than ones raised using pesticides.

It is believed that cysteine, one of the amino acids which comprise GSH, is rate-limiting for the production of glutathione; therefore, some practitioners recommend food sources of cysteine: poultry, yogurt, egg yolk, garlic, onion, broccoli, oats, wheat germ, red pepper, and brussel sprouts are some. It should be noted that some children do not do well on “sulfury” foods like many of those mentioned.

There has been speculation that N-acetyl-cysteine (NAC) as a supplement can be helpful in the production of GSH. Michael T. Murray, ND, in his book Encyclopedia of Nutritional Supplements points to studies that show NAC is not very helpful in this, especially considering the cost versus Vitamin C, and, in fact, at higher doses NAC can actually increase oxidative damage.

Supplementing oral glutathione has not proved a feasible way of increasing GSH levels; however, by supplementing vitamin C at 500 mgs a day, study subjects raised their GSH levels by nearly 50%. Alpha lipoic acid is known to raise glutathione levels; however, ALA is also a chelator and there is risk involved if is used as simply a supplement for anyone who may be metal toxic. Vitamins B2, B6, and selenium are required for the manufacture of glutathione. Our soil is known to be selenium-poor and many people choose to supplement with selenium as a result.

Children with ASD who benefit from the supplementation of DMG (dimethylglycine) or TMG (trimethylglycine), or amino acid blends, may be seeing, in part, improved levels of glutathione from these supplements. Dr. S. Jill James research suggests that supplementation of TMG, folinic acid, methyl B12, B6, and zinc can promote more normalized glutathione levels. Some preliminary work by Dr. Jim Adams suggests that oral DMSA, a chelator, may also normalize glutathione levels.

There is research showing that other antioxidant supplements such as silymarin (milk thistle), melatonin, grape seed extract, and green tea can also boost glutathione levels (note that green tea can contain high levels of both fluoride and aluminum, two toxins that many parents are trying to avoid for their children). Glutamine, a supplement that has proven

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successful for gut healing, works in part by promoting glutathione production in the gut. It should be noted though that glutamine, an excitotoxin, must be used with caution as it can cause damage to the brain cells of some individuals. There is some research to support that sea or lake algae can also boost glutathione levels; however, there are some concerns about safe sources of algae and parents should be sure to order only from reliable companies.

Sparing glutathione is another way to avoid low glutathione levels. Avoiding toxins that require glutathione for their removal (solvents, pesticides, heavy metals, etc) is good sense on many levels. One of the substances known to reduce glutathione levels is acetaminophen. Using other antioxidants such as Vitamin C and Vitamin E (as well as other mentioned previously) will also spare glutathione, allowing it to fulfill other functions rather than working as an antioxidant.

Some parents have reported success using transdermal or liposomal (also called lipocetual) glutathione or even patches meant to promote glutathione production; however, there is not much research supporting these approaches to date. Costs of these approaches are much higher than many of those already mentioned.

The significance of glutathione to good health, the complexities of which are just barely hinted at in this article, cannot be overstated. Parents of ASD children can incorporate safe, inexpensive, and easy to maintain steps to help build and maintain healthy levels of this amazingly important peptide.

# Treating Autism