Understanding Glutathione

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Glutathione is making headlines again with the recent publication of a research study by Dr. S. Jill James showing that children with autism have impaired antioxidant defense due to low glutathione levels. Dr. James has published several studies and has connected autism, depression and Alzheimer's disease. (To learn more about her work see: www.ewg.org.)

James' latest investigation has additional new implications for those with autism spectrum disorders: a severe deficiency in glutathione means poor ability to detoxify environmental toxins, particularly mercury. At last we can explain why some youngsters are more susceptible to neurological damage from the mercury-containing preservative, thimerosal and other poisons.

Dr. James' research is being expanded clinically by Dr. Amy Yasko, a New York based researcher who is identifying genes that regulate specific areas of glutathione manufacturing and metabolism. By mapping gene weaknesses, health professionals can individually target nutrient intervention. In theory, parents would then be able to reduce the "trial and error" inherent in intervention programs. (See, "Genetic ByPass: Using Nutrition to Bypass Genetic Mutations," by Dr. Amy Yasko, Matrix Development Publishing, 2005.)

What is Glutathione?

Glutathione (GSH) is a peptide, composed of strings of amino acids, the basic building blocks of protein. Glutathione is made up of three amino acids: cysteine, glycine and glutamic acid.

GSH is in a class of molecules called antioxidants, whose primary job is to alleviate oxidative stress. Oxidative stress is a chemical phenomenon that occurs when cells are injured. Cells can be damaged physically, by viruses and bacteria, via toxic exposure and/or from normal aging. The result is atoms in the

cell lose electrons and need new ones. Antioxidants are electron donors.

The antioxidant part of GSH comes from the sulfur section of the L-cysteine. In chemistry, the electron donating sulfur group (-SH) is called a thiol. To detoxify mercury, arsenic, lead and cadmium, GSH provides a thiol group that binds to metals and other poisons. The body then excretes a metal-cysteine mixture.

If not enough glutathione (or another antioxidant) is available, heavy metals and toxins are stored in fat tissue. The brain, nervous system, breasts and prostate are mostly fat, and therefore become receptacles for environmental poisons. Thus, the increase in autism incidence may have an environmental connection to the increase in breast and prostate cancer.

Glutathione Delivery Options

Dr. James and others have speculated that increasing GSH levels would help brain development for those on the autistic spectrum. Raising GSH levels is not a simple matter of eating more food with GSH. Researchers have found that about half of the body's glutathione comes from the diet, mainly fruits and vegetables. The rest is made from the amino acid methionine, which is converted to cysteine, the most important component of GSH.

Giving GSH directly as a supplement by mouth does not consistently help raise glutathione levels because it is negatively affected by digestion. To overcome the digestive obstacles, creams have been marketed with uncertain results as it is difficult to gauge how much is actually being absorbed. Intravenous GSH is an effective delivery method but it is expensive and having children sit with a needle in the arm can be challenging.

The newest attempt to deliver GSH is a fat soluble form. Pharmacies are encasing GSH in tiny fat droplets called lipsomes. Preliminary studies suggest that liposomes optimize absorption by protecting the GSH from oxidation. One company sells lipoceutical glutathione in a bottle containing 12 teaspoons for around $50. Some children get cranky from taking glutathione. Ongoing feedback from parents using fat encased glutathione is available at www.wellnesshealth.com.

Building Glutathione from the Inside Out

Another way to increase glutathione is to provide the body with the raw materials and cofactors to make and maintain it. N-acetyl-cysteine (NAC) is the basic amino acid needed to create GSH. Using methionine is an option that requires more steps as well as other nutrients to convert methionine to NAC. The cofactors for incorporating cysteine into GSH are vitamin B-12, folinic acid (or folic acid) and TMG. Vitamin B-12 is best delivered in a methylated form by injection. The body can then produce more glutathione and absorb it better.

Once the body produces GSH, it only works as an antioxidant in its active form, confusingly referred to as reduced-L-glutathione (GSH). When GSH gives away its electron, it becomes inactive oxidized glutathione (GSSG). Vitamin C converts the inactive oxidized GSSG back to its active version. Therefore, NAC, vitamin B-12, folinic acid, TMG and vitamin C are all important nutrients for increasing and maintaining healthy glutathione levels, by giving the body the raw materials.

Precautions

Adding B-vitamins, vitamin C, NAC and/or a fat encased Glutathione can strengthen GSH status; they may also cause irritability. Because the nutrients are non-toxic, any agitation usually subsides quickly when they are discontinued. Glutathione has no known toxicity. Food supplements are generally safe but they should always be added one at a time while monitoring reactions. All of them are necessary to build and maintain GSH, but some youngsters need more of one than another.

Enhancing glutathione status is an exciting new way of improving detoxification. Increased language and relatedness appear to be positive results. Work with your health care practitioner to get the right delivery system for your child.

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