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Glutathione – Your Brain's Master Antioxidant Defense

By Priya Shah

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by: **Priya F Shah**

Free radicals and oxyradicals play an important role in the development and progression of many brain disorders such as brain injury, neurodegenerative disease, schizophrenia and Down syndrome.

Glutathione is the brain's master antioxidant and plays an important protective role in the brain.

According to Dr. Jimmy Gutman, "The brain is particularly susceptible to free radical attack because it generates more oxidative by–products per gram of tissue than any other organ."

Many neurological and psychiatric disease processes are characterized by... abnormalities in glutathione metabolism and antioxidant defenses."

Generation of reactive oxygen species (free radicals) and oxidative damage are an important cause of neuron (brain cell) death from brain injury.

Chemicals that cause toxicity to certain brain cells are known to decrease cerebral glutathione (GSH), making the cells more vulnerable to reactive oxygen species (ROS). (1)

On the other hand, over–expression of the glutathione peroxidase (GPX) enzyme potently decreases cell death from brain injury. (2)

Brain Injury and Glutathione – The Gender Difference

Researchers at Children's Hospital of Pittsburgh have found that males and females respond differently to brain injury. (3)

In animal models, levels of glutathione remain constant in females who have suffered a brain injury, but drop by as much as 80 percent in males with the same injury.

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When glutathione levels drop, brain cells die much more quickly. This suggests that boys with brain injuries may require different life-saving treatments than girls.

N-acetyl-cysteine (NAC), a precursor of glutathione, already approved for use by the U.S. Food and Drug Administration to treat people who have overdosed on acetaminophen, may be an effective treatment for brain injury in boys whose brains are deprived of oxygen.

Brain Disorders and Glutathione – A Genetic Cause?

Genetics researchers have found that the glutathione S-transferase gene controls the onset of Alzheimer's, Parkinson's disease and determines, not if we get these diseases, but when. (4)

The glutathione S-transferase gene has previously been linked to the risk for Parkinson's disease among people who used pesticides.

A previous article covered the importance of glutathione in Parkinson's Disease.

Alzheimer's Disease and Glutathione

Free radicals and oxidative damage in neurons is known to be a primary cause of degenerative diseases like Alzheimer's disease.

Amyloid- β peptide ($A\beta$) accumulation in senile plaques, a pathological hallmark of Alzheimer's disease (AD), has been implicated in neuronal degeneration.

Amyloid plaques encroaching on the brain increase the production of free radicals, or oxidative stress. Antioxidants, such as vitamin C and E "mop up" the damaging free radicals.

Glutathione (GSH) precursors can prevent death of brain cells induced by amyloid plaques in Alzheimer's disease, while substances that deplete GSH increase cell death. (5)

Evidence has been piling up over the link between the amount of an amino acid called homocysteine in the blood and the chance of developing Alzheimer's.

For people not genetically predisposed to developing Alzheimer's, cholesterol and homocysteine, largely caused by an unhealthy lifestyle, are the core causal factors.

Welsh GP, Andrew McCaddon, showed that the more homocysteine that patients with Alzheimer's had, the worse their mental performance, and the worse their "cognitive impairment," the less they had of the antioxidant glutathione. (6)

Glutathione and Mood Disorders

Studies have found that the mood stabilizing drug, valproate, used to treat epilepsy and bi-polar

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disorder, regulates expression of the genes that make glutathione-S-transferase (GST).

In addition, chronic treatment with lithium, another commonly prescribed mood stabilizer used in treating manic-depression, also increased levels of GST.

These findings led researchers to conclude that glutathione S-transferase may be a novel target for mood stabilizing drugs. (7)

Alcohol Consumption and Glutathione

Alcohol abuse is known to impair memory and other brain functions and increase brain cell death. A new study in rats has shown that alcohol consumption causes fewer new brain cells to form and results in greater cell death. (8)

But rats that were fed alcohol along with Ebselen – a glutathione peroxidase mimic that acts as a free radical scavenger – showed no similar reduction in brain-cell formation and no increase in cell death.

Substances that Boost Glutathione Levels and Protect Brain Cells

Taking glutathione itself as a supplement does not boost cellular glutathione levels, since it breaks down in the digestive tract before it reaches the cells.

However, intravenous glutathione therapy and glutathione precursors or dietary supplements are effective in boosting intracellular levels of glutathione.

Intravenous Glutathione Injections: Intravenous glutathione injections have been shown to produce amazing and rapid results, in patients with Parkinson's disease. Following even a single dosage of intravenous glutathione, many of the symptoms of Parkinson's disease rapidly improve, often in as little as 15 minutes.

Glutathione Precursors: In the Alzheimer's study conducted by Welsh GP, Andrew McCaddon, adding the glutathione precursor, N-acetyl-cysteine (NAC) to a protocol that lowered homocysteine levels by simple supplementation with B12 and folate, resulted in prompt, striking, and sustained clinical improvement in nearly all the patients. (9)

Cucurmin (turmeric): Studies have shown that the Indian curry spice, cucurmin, has neuroprotective effects because of its ability to induce the enzyme, hemeoxygenase-1 (HO-1), which protects neurons exposed to oxidant stress. Treatment of brain cells called astrocytes, with curcumin, increases expression of HO-1 protein as well as glutathione S-transferase. (10)

Ebselen: Ebselen is a glutathione peroxidase mimic and potent synthetic antioxidant that acts as a neuroprotective agent and an inhibitor of free-radical induced apoptosis (cell death). It can protect brain cells from the neuro-toxic effects of alcohol consumption. (8)

Undenatured Whey Protein: Undenatured whey protein provides glutathione precursors, has been

shown to raise intracellular glutathione levels in clinical trials, and has anecdotally been reported to improve the symptoms of Parkinson's disease.

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L–Glutathione, The Wonder Antioxidant

By Barrett Niehus

A naturally occurring compound, L–Glutathione (Tathion,) has demonstrated that it is effective in fighting cancer, environmental poisons, and even cataracts. Sound like snake oil? Well, that is what I thought until I started doing research. It turns out that L–Glutathione is one of the most effective antioxidants that our body produces. It works to protect our bodies from the thousands of daily hazards that we are exposed to such as pollution, second hand smoke, alcohol, and food chemicals and

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poisons. In fact, it is so effective that some researchers believe that it can actually slow down the aging process.

L–Glutathione is an antioxidant that our body produces from three basic amino acids that are found in our food. Our body makes it and uses it, along with the other vitamins that we ingest, as a hard line defense against all of the hazards that cause us to grow sick and old. This is important because research into this specific anti–oxidant has shown that it can actually cure disease, regenerate damaged tissue, minimize the side effects of chemotherapy, and treat cataracts.

It works by acting as a guardian to the toxic compounds that attack our cells. These compounds, typically called free radicals, are extremely aggressive and attack the molecules that make up the cells in our body. These free radicals change the chemical structure of the molecules in our cells and make them ineffective. This in turn either kills the cell, makes it ineffective, or turns it cancerous.

L–Glutathione and other antioxidants attack the free radicals and destroy them before they have a chance to attack the cells.

Because it protects our cells by attacking the external poisons, the levels of L–Glutathione in our blood have the potential to significantly impact our overall health. Studies have demonstrated that administration of L–Glutathione is extremely effective in treated diseases such as Hepatitis. It has also been shown to be a key player in the regeneration of the liver, and to combat cirrhosis. The compound is useful in treating jaundice and protects the brain and body tissues in the event of poisoning. In addition, the level of tissue damage from Carbon Monoxide, Hydrogen Sulfide, heavy metals, pesticides, and environmental poisoning has been demonstrated to be significantly lower with adequate L–Glutathione in the blood stream. Finally, the side effects of chemotherapy and the growth of cataracts have been demonstrated to be significantly reduced with the addition of L–Glutathione.

So what does all of this mean? Essentially, it is time to supplement your diet with L–Glutathione or the proteins that help your body make more of this essential nutrient. Although L–Glutathione is readily made by your body, supplementation with it and its precursors may increase your overall level of protection. Glutathione and its precursors, Cysteine, Glycine and L–Glutamic Acid, are all readily available as food supplements in your local health food store. In addition to eating a healthy and balanced diet, supplementation with Glutathione and its constituents can only help to increase your overall level of health, and may even slow down the process of growing old.

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