

# GLUTATHIONE

## Essential Health Aid

### Antioxidant - Immune Booster - Detoxifier

**Why your body needs a regular supply of this critical substance, and how it protects you from oxidative free radicals, disease and toxins.**

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### WHAT IS GLUTATHIONE?

- Glutathione (pronounced "gloota-*thigh*-own") also known as GSH is the body's essential health AID - Antioxidant, Immune booster and Detoxifier. This small protein, produced naturally in the body, maintains these three crucial protective functions. In fact, your life depends on glutathione. Without it, your cells would disintegrate from unrestrained oxidation, your body would have little resistance to bacteria, viruses and cancer, and your liver would shrivel up from the eventual accumulation of toxins.
- Glutathione is not yet a household word. Even doctors who have heard the term may have only a vague idea of it. However, everyone will soon be talking about this critical substance. There was a time when only scientists had heard of cholesterol and vitamins, but today everyone knows about them. Now it's glutathione's turn. In the last five years, over twenty-five thousand medical articles about this substance have been published, and this scientific understanding is gradually becoming common knowledge.
- Each and every cell in the body is responsible for its own supply of glutathione and must have the necessary raw materials to make it. Glutathione is always in great demand and is rapidly consumed when we experience any sort of pressure - illness, stress, fatigue and even exercise. Some well-known causes of glutathione depletion are shown in figure I. Glutathione levels also diminish as we age and many diseases normally associated with aging have been linked to glutathione deficiency.



### WHY GLUTATHIONE IS ESSENTIAL TO HEALTH

Glutathione's three major roles in the body are summarized by the letters **A-I-D** - Antioxidant, Immune booster, and Detoxifier - three critical processes driven by glutathione.

#### THE MASTER ANTIOXIDANT (AID)

Over the past thirty years researchers have explored the value of antioxidants in good health, as well as the treatment and prevention of diseases involving oxidative attack by free radicals. This has produced a whole new branch of medicine - Free Radical Biology. Free radicals have been implicated in all sorts of illness, including heart disease, cancer, diabetes and aging itself.

Well-known and widely used antioxidants such as vitamin C, vitamin E and selenium neutralize free radicals. These occur naturally in nature, but not in the body - they must be introduced as part of a balanced diet. Given the critical role of antioxidants in good health, it is not surprising that the body itself manufactures its own natural antioxidants. The most important of these is glutathione. Because all other antioxidants depend upon the presence of glutathione to function properly, scientists call it "the master antioxidant."

#### FOOD FOR THE IMMUNE SYSTEM (AID)

The immune system's function is to identify and attack germs and other invaders, including cancer cells. A body with plenty of glutathione fights off these threats more easily by denying most of them a foothold and by confronting the few that get through with an enhanced immune system. Elevated glutathione levels enable the body to produce more white blood cells - the most important front line defense of the immune system.

Glutathione plays a central role in the functions of these immune cells. Dr. Gustavo Bounous, a leading glutathione expert says, "The limiting factor in the proper activity of our lymphocytes (white blood cells) is the availability of glutathione." In other words, healthy growth and activity of immune cells depend upon glutathione's availability. Put simply, glutathione is 'food' for the immune system.

#### NATURAL DETOXIFICATION (AID)

Whether we know it or not, we are continually inhaling and ingesting natural and synthetic toxins. They are unavoidable in these modern times, both in our polluted cities and our engineered food supplies. When the body has its health and the nourishment it needs it works tirelessly to eliminate toxins and protect itself, but increasing levels of environmental pollution are depleting its stores of glutathione more and more rapidly. Our main organ of detoxification is the liver - the

body's most concentrated source of glutathione. Studies show that low glutathione levels lead to poor liver function, causing more and more toxins to circulate through the body and resulting in damage to individual cells and organs. Doctors routinely use glutathione promoting drugs to detoxify victims of certain types of drug overdose.

### GLUTATHIONE IN NATURAL MEDICINE

Practitioners of complementary medicine have long advocated the use of milk thistle for liver problems. It turns out that this herb works by modestly elevating glutathione levels. The mineral selenium also produces subtle elevations in glutathione by becoming integrated into the enzyme glutathione peroxidase.

### GLUTATHIONE IN TRADITIONAL MEDICINE

Emergency doctors, toxicologists and lung and liver specialists are well acquainted with glutathione's therapeutic uses. American physicians seeking ways to raise a patient's glutathione levels can open the standard Physician's Desk Reference (PDR) and find two options ~ the pharmaceutical drug NAC (n-acetyl-cysteine), sold under brand names Parlodex and Mucomyst, and the natural dietary supplement Immunocal (patented whey protein isolate).

### DRUGS THAT RAISE GLUTATHIONE LEVELS

Pharmaceutical drugs like those shown in figure 2 have been used to raise glutathione levels. However, they all produce side effects and are unsuitable for long-term use.

The drug NAC (n-acetyl-cysteine) is a potent glutathione precursor that has been available for many years, and is also found on the shelves of health supplement stores. This pharmaceutical chemical is used to break up mucus in lung diseases such as cystic fibrosis, chronic bronchitis and asthma. It remains the standard treatment for acetaminophen overdose. Most traditional glutathione studies on humans have been conducted with NAC.

<b>Figure 2 - Glutathione-promoting substances</b>		
<b>Drugs</b>	<b>Natural Products</b>	<b>Glutathione co-factors</b>
NAC	Oral Glutathione	Selenium
SAM	Cysteine	Vitamin B1
OTC	Methionine	Vitamin B2
OTZ	Melatonin	Vitamin B6
Procysteine	Glutamine	Vitamin B12
Glutathione monoesters	Lipoic Acid	Folate, Folic acid
Glutathione diesters	Silymarin (milk thistle)	Vitamin C
	Whey Proteins	Vitamin E
	Bioactive whey proteins (Immunocal)	Other Nutrients

### GLUTAMINE

Whether taken orally or intravenously, glutamine supplements raise glutathione concentrations, but completely healthy individuals shouldn't require supplemental glutamine and it can lead to side effects such as gastrointestinal upset. Older people as well as kidney and liver patients should be cautious. Any serious use of this supplement must be monitored by a health professional.

### LIPOIC ACID

Lipoic acid occurs naturally in the body but is also found on the shelves of health food stores. It is known that as glutathione molecules neutralize free radicals they gradually become oxidized, but lipoic acid can replenish its antioxidant powers by converting it back to a reduced form. It is still being investigated by scientists.

### SILYMARIN (MILK THISTLE)

The milk thistle plant, (*Silybum marianum*, silymarin) has a long history in the treatment of liver problems. It clearly prevents the oxidation of fats and maintains glutathione levels, but possible toxic reactions include gas, cramps and diarrhea. Liver disease should never be treated without the supervision of a health professional.

### WHEY PROTEINS

Whey, a large group of proteins, is a constituent of milk from humans and other mammals, and under ideal circumstances contains the building-blocks of glutathione.

Many whey products are marketed to health-conscious people but they vary greatly in their protein content, their concentration, the forms of proteins present, and other factors that affect the product's bioactivity (biological action).

Perhaps the most important criterion of all is the extent of the product's protein denaturation - a breakdown in the protein structure. This reduces its potential bioactivity in the body without affecting its food value. In addition, many nutritionists point out that the fat or lactose content of whey products may still be high enough to cause concern. Others have reservations about the milk industry and its liberal use of antibiotics and steroids to boost production. Also, we cannot ignore the very real issue of fat-soluble and water-soluble environmental toxins passing into the milk.

The whey content of truly fresh milk contains such potent glutathione building blocks as lactoferrin, beta-lactalbumin and serum albumin - all easily denatured by heat or mechanical agitation. Pasteurization and other industrial processes tend to denature milk products and by the time they reach your table their bioactivity is lost.

To maintain the bioactivity of glutathione precursors whey proteins must be extracted from milk with special means, and careful monitoring is essential. Whey products may contain anything from 20% to 90% protein. These proteins vary greatly in their make-up as well as the extent to which their glutathione precursors are denatured. So, although some whey proteins are bioactive, most are not.

### **BIOACTIVE WHEY PROTEIN**

Bioactive whey proteins contain high levels of non-denatured protein and this assures their glutathione-promoting activity. Much of our knowledge of the glutathione sustaining effect of dietary whey proteins is the result of research initiated at Montreal's McGill University in Canada during the early 1980's. Dr. Gustavo Bounous was studying protein supplementation in general when he discovered the bioactive potential of whey protein in particular. He investigated its effect on the immune system and published his ground-breaking results. They encouraged other scientific teams to study the effects of glutathione-enhancement in tests on a wide variety of diseases. Dr. Bounous and his team went on to develop Immunocal ~ a whey protein made under pharmacological conditions to maximize the protein's bioactivity. Undenatured whey protein is a natural extract of milk - a safe, dependable and effective way to sustain elevated glutathione levels.

### **GLUTATHIONE IN HEALTH AND DISEASE**

It is believed that glutathione has an important role to play in the treatment and prevention of hundreds of diseases, It may in the future be considered as important to health as a well-rounded diet, exercise and good lifestyle. Clinical tests show that raised glutathione levels may address some of the major health issues of our time - heart disease, stroke, diabetes, high cholesterol, asthma, cigarette smoking, hepatitis, AIDS and more. Glutathione provides the body with tools to fight off these threats naturally.

Healthy people also benefit from elevated glutathione levels through an enhanced ability to fight off toxins, infectious disease, pre-cancerous cells and the aging process itself. Diminished glutathione levels are a symptom of aging and are particularly evident in such ailments as Parkinson's disease and Alzheimer's disease.

Glutathione is also important to physically active people. Many world-class athletes are discovering that well-maintained glutathione levels give them the edge over their competitors, bringing greater strength and endurance, decreased recovery time from injury, less muscle pain and fatigue, and muscle-promoting activity.

### **PUTTING IT ALL TOGETHER**

- Medical science is still ascertaining all the critical roles played by glutathione in disease resistance and general good health. Clinical evidence links low glutathione levels to the most common illnesses of our time as well as newly emerging diseases.
- As an essential AID to health, glutathione works as the master Antioxidant in our body, optimizes the Immune system and Detoxifies a long list of pollutants and carcinogens. However, the body's glutathione levels are not raised by eating glutathione, since it is poorly absorbed through the digestive system. It must be manufactured within the cells of the body, Therefore, the best way to raise glutathione levels is by providing the building blocks used by the cells to make it themselves.
- Pharmaceutical medicine has created drugs that do this very effectively, and they have their uses in critical situations. But they also have side effects and repeated use is clearly inadvisable. Recently, scientists have developed a natural way to raise glutathione levels by safe, reliable dietary means. The emergence of bioactive whey proteins is an exciting step forward in nutritional supplementation.

**Figure 3 - Raising glutathione levels: some possible clinical applications**

<p><b>Aging</b></p> <ul style="list-style-type: none"> <li>• Parkinson's disease</li> <li>• Alzheimer's disease</li> <li>• Cataract formation</li> <li>• Macular degeneration</li> <li>• Cancers of aging</li> <li>• Prostate problems</li> <li>• Osteoarthritis</li> </ul> <p><b>Cardiovascular</b></p> <ul style="list-style-type: none"> <li>• Prevents heart disease</li> <li>• Prevents stroke</li> <li>• Prevents atherosclerosis</li> <li>• Reverses atherosclerosis</li> <li>• Prevents reperfusion injury</li> </ul> <p><b>Digestive system</b></p> <ul style="list-style-type: none"> <li>• Inflammatory bowel disease</li> <li>• Hepatitis</li> <li>• Malnutrition</li> <li>• Pancreatitis</li> <li>• Peptic ulcer</li> </ul> <p><b>Toxicology</b></p> <ul style="list-style-type: none"> <li>• Detoxifies certain drug overdoses</li> <li>• Detoxifies substances in cigarette smoke, auto exhaust</li> <li>• Detoxifies pollutants including heavy metals, pesticides</li> </ul>	<ul style="list-style-type: none"> <li>• Prevents hearing loss from noise pollution</li> <li>• Detoxifies many well-known carcinogens</li> </ul> <p><b>Infectious disease and immunology</b></p> <ul style="list-style-type: none"> <li>• Anti-viral (AIDS, hepatitis, herpes, common cold, etc)</li> <li>• Bacterial infection</li> <li>• Certain autoimmune dysfunction's</li> <li>• Chronic fatigue syndrome</li> <li>• Immuno-suppression</li> </ul> <p><b>Cancer</b></p> <ul style="list-style-type: none"> <li>• Cancer prevention</li> <li>• Suppresses tumor growth</li> <li>• Eliminates carcinogens, mutagens</li> <li>• Retards oxidative damage to DNA</li> <li>• Prevents wasting disease</li> <li>• Eases side effects of chemotherapy and radiotherapy</li> </ul> <p><b>Pulmonary</b></p> <ul style="list-style-type: none"> <li>• Breaks up mucus</li> <li>• Cystic fibrosis</li> <li>• Asthma</li> <li>• Chronic bronchitis</li> <li>• Emphysema</li> <li>• Pulmonary fibrosis</li> </ul> <p><b>Metabolic</b></p> <ul style="list-style-type: none"> <li>• Athletic enhancement</li> <li>• Decreases recovery time from physical stress</li> <li>• Decreases cholesterol LDL oxidation</li> <li>• Supports hemoglobin in kidney failure</li> <li>• Diabetes</li> </ul>
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## KIDNEY DISEASE

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## PREGNANCY, LACTATION AND CHILDBIRTH

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