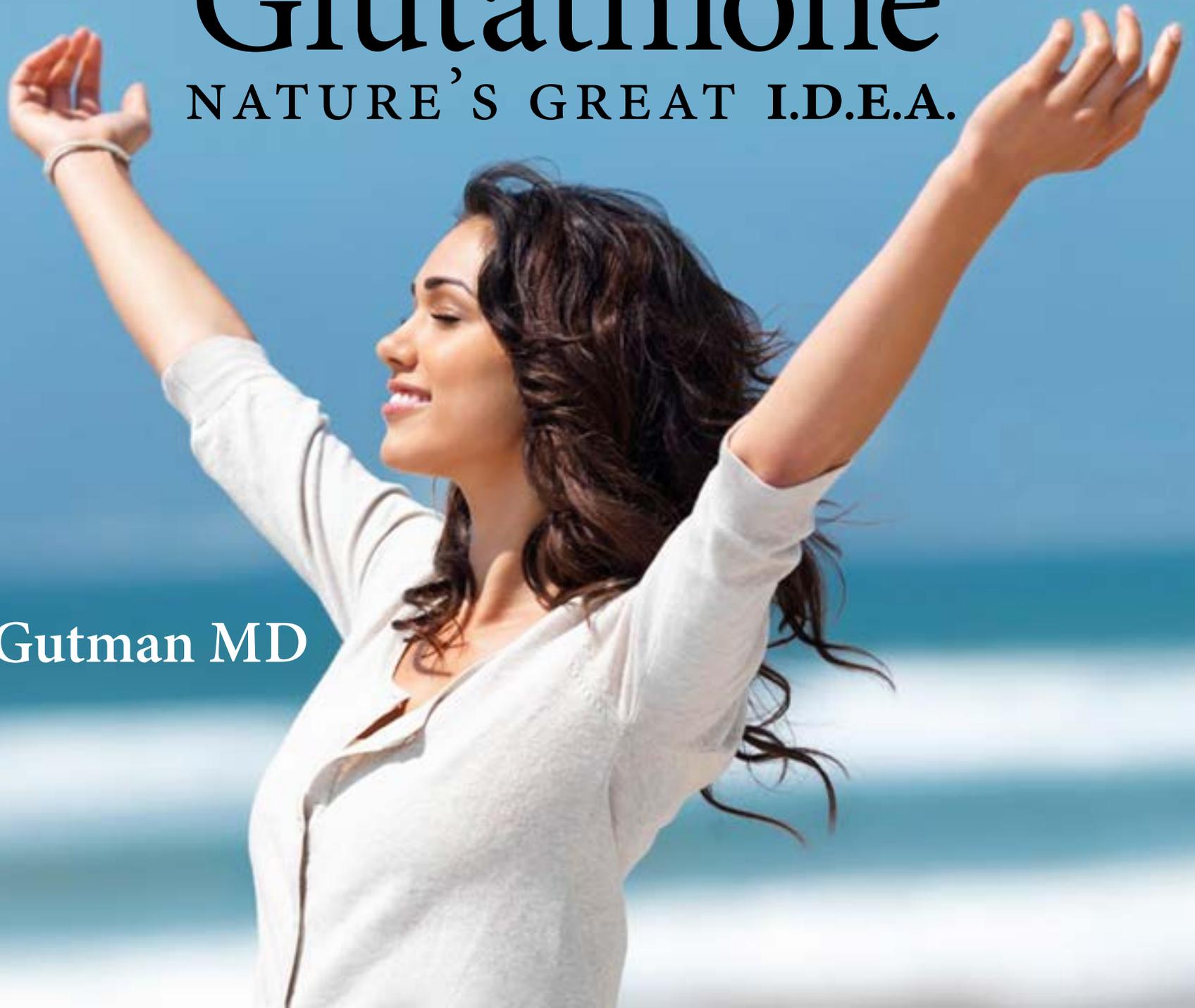


Glutathione

NATURE'S GREAT I.D.E.A.

Jimmy Gutman MD



Glutathione

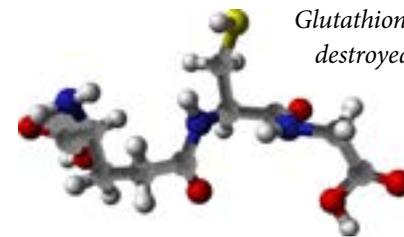
NATURE'S GREAT 'IDEA'

Your life depends on glutathione. This small protein is produced naturally in the body to maintain four protective functions. Without it, your cells would oxidize, your body would fall ill and your liver would be overwhelmed by toxins.

These four essential roles are recalled in the acronym IDEA:

I	Immune booster
D	Detoxifier
E	Energizer
A	Antioxidant

It's been known for over a century that glutathione is ubiquitous—it's found in almost every human cell. But even today most doctors have only a vague idea of how it works, and how important glutathione is to these four essential functions of life.



Glutathione: when eaten is rapidly destroyed by the digestive system

An overwhelming number¹ of medical articles have focused on glutathione. This eBook briefly reviews those findings and presents them in terms of sickness and health, to help explain the enormous importance of glutathione in human biology and to bring it to common knowledge.

NOTE: Because EATING GLUTATHIONE DOES NOT RAISE YOUR BODY'S GLUTATHIONE, you must supply each cell with the raw ingredients or 'precursors' to make its own glutathione. It's the availability of these precursors that determine your body's state of readiness.

¹ Over 130 thousand

HEALTH

Glutathione is essential

Glutathione is in constant demand and LEVELS CAN DROP QUICKLY. Illness, stress, fatigue and even exercise all place pressure on it. Some of the most well-known causes of glutathione depletion are shown TO THE RIGHT. Glutathione levels NATURALLY diminish as we age and many diseases normally associated with aging are linked to glutathione deficiency. Glutathione's **four essential roles** in the body are discussed on the next four pages.



(Right)

Low glutathione (GSH) levels lead to premature aging, disease and death. Supplements that raise glutathione (GSH) break the cycle.

(Adapted from Kidd & Huber, "Natural antioxidants—First line of defense," 1991)



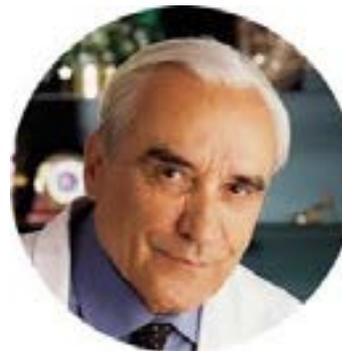
I Immune booster

Glutathione boosts the Immune System (IDEA)

The immune system identifies and attacks germs and other invaders including cancer cells. As long as it has a ready supply of glutathione, we are better equipped to fight off these threats. On the frontline of our defense is a formidable army of white blood cells (lymphocytes)—the immune system's foot soldiers. These immune cells depend on glutathione for their development and activity. In this sense, glutathione is considered 'food' for the immune system.



(left) Electron microscope image of human lymphocytes



“The limiting factor in the proper activity of our lymphocytes is the availability of glutathione.”

—DR. GUSTAVO BOUNOUS
Pioneering Glutathione Researcher

D Detoxifier

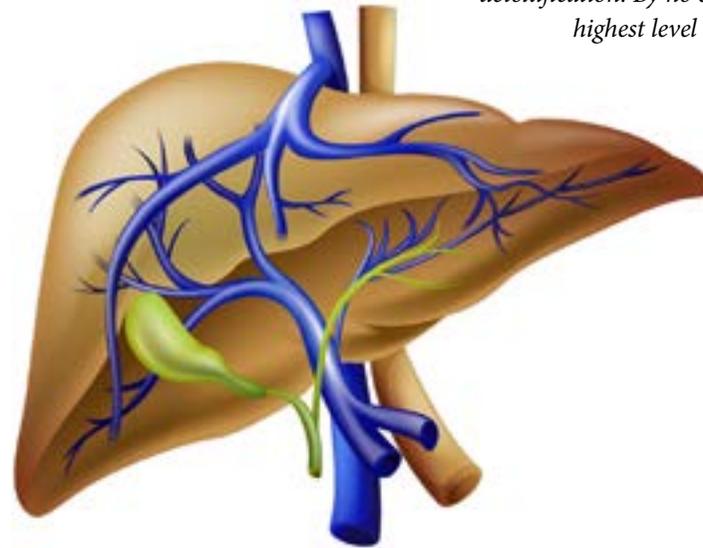
Glutathione Detoxifies The Natural Way (IDEA)

There's no avoiding it. We inhale, ingest and absorb natural and synthetic compounds every day. Some are more toxic than others. Some we don't even know about. This is especially true in polluted cities with food supplies that are biologically engineered and treated with pesticides.

The body isn't defenceless. The immune system is good at eliminating certain toxins and protecting itself, especially through the liver. The liver is the largest organ in the body, and also the main organ of detoxification.

So it's no surprise that the liver contains more glutathione than any other organ. Studies have shown that low glutathione levels result in poor liver function and this in turn allows toxins to circulate throughout the body, causing untold damage to individual cells and organs.

SUMMARY: We know that we absorb toxins on a daily basis, but not how much or how many. We're also not entirely sure of long-term effects as they accumulate in the body.



The liver is our most important organ of detoxification. By no coincidence, it also has the highest level of glutathione in the body.



E Energizer

Glutathione Provides Sustained Energy (IDEA)

Cells require a constant supply of energy to perform their many tasks. Energy production has a downside too—dangerous waste products that can interfere with further energy production. This is where glutathione comes in.



Mitochondria are tiny structures in the cell that act like 'generators' to provide cellular energy. When these generators 'heat up' from free radical accumulation, they can slow down or even burn out. Glutathione is essential to 'cool down' these structures

Glutathione is critically involved in energy at a) a molecular level, b) a cellular level and c) a whole-body level:

- a) **At the molecular level**, energy is released when nutrients are burned in the process of oxidation, producing unwanted by-products like free radicals. It's the job of glutathione to mop them up. If there isn't enough glutathione, the radicals roam freely, breaking up important chemical bonds and causing general havoc.
- b) **At the cellular level**, glutathione allows continuous energy production by the powerhouse of the cells, the mitochondria.
- c) **At a whole body level**, glutathione's role is evident in maintaining physical and mental performance.



A Antioxidant

Glutathione is the Body's Master Antioxidant (IDEA)

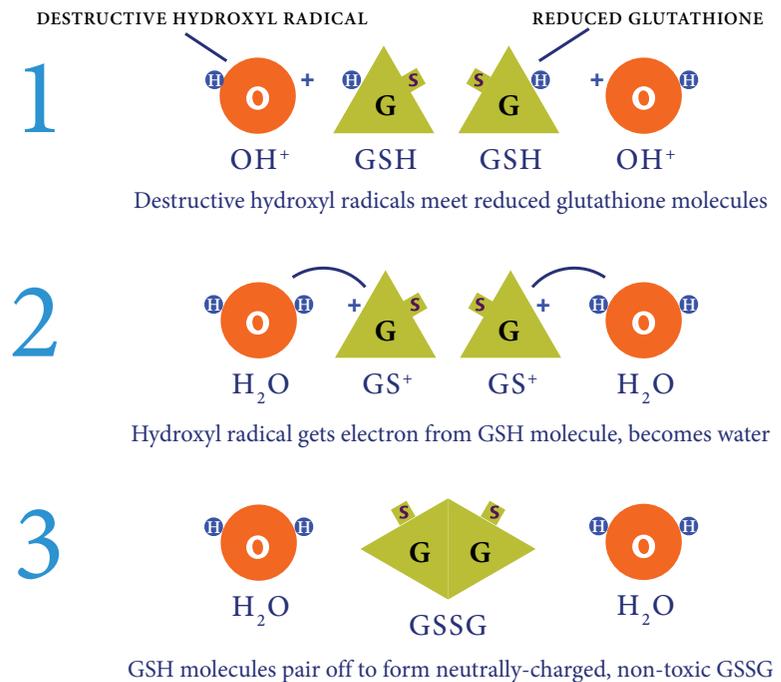
This is glutathione's best-known role. Since the mid-twentieth century researchers have recognized the strong association between hundreds of disease processes and oxidative stress.

A wide variety of antioxidant foods and other nutrients is absolutely essential for good health, and is increasingly used to prevent and treat many disease processes. This recent field of 'Free Radical Biology' has implicated oxidative stress in heart disease, cancer, diabetes and aging. Links to other health issues are still being discovered.

The body fights free radicals using well-known and widely-used antioxidants such as vitamin C, vitamin E and selenium. Unlike glutathione they are not produced in the body and their availability depends on dietary sources. What is less well-known is that they could not function properly without the presence of glutathione. Scientists therefore often refer to it as the 'Master Antioxidant.'

RIGHT

Glutathione is the only antioxidant that does not become a free radical itself after soaking one up. It does this by pairing up with another glutathione molecule to neutralize itself.



G = Glutathione backbone

O = Oxygen

+ = Missing electron

H = Hydrogen electron

S = Sulphydryl group

OH = Hydroxyl radical

H₂O = Water

GSSG = Paired GSH molecules



Glutathione in conventional medicine

The doctors with most hands-on knowledge of glutathione tend to be emergency physicians, toxicologists, lung specialists and liver specialists. Any of these browsing the *PHYSICIAN'S DESKTOP REFERENCE (PDR)* will find two options to raise glutathione—the pharmaceutical drug NAC (n-acetyl-cysteine) and a patented whey protein isolate.

NAC (n-acetyl-cysteine)

NAC is a potent glutathione precursor that's been available for years. Doctors use it to break up mucus in lung diseases such as cystic fibrosis, chronic bronchitis and asthma. It's also the standard treatment for acetaminophen overdose, and most glutathione studies on humans are conducted using NAC. However, it's unsuitable for long-term use.

One limitation is that NAC-induced glutathione levels reach a rapid peak and then decline, often to below normal levels. The drug is thus described as having a short 'half-life.' To maintaining constant levels, NAC must be swallowed or injected several times daily.

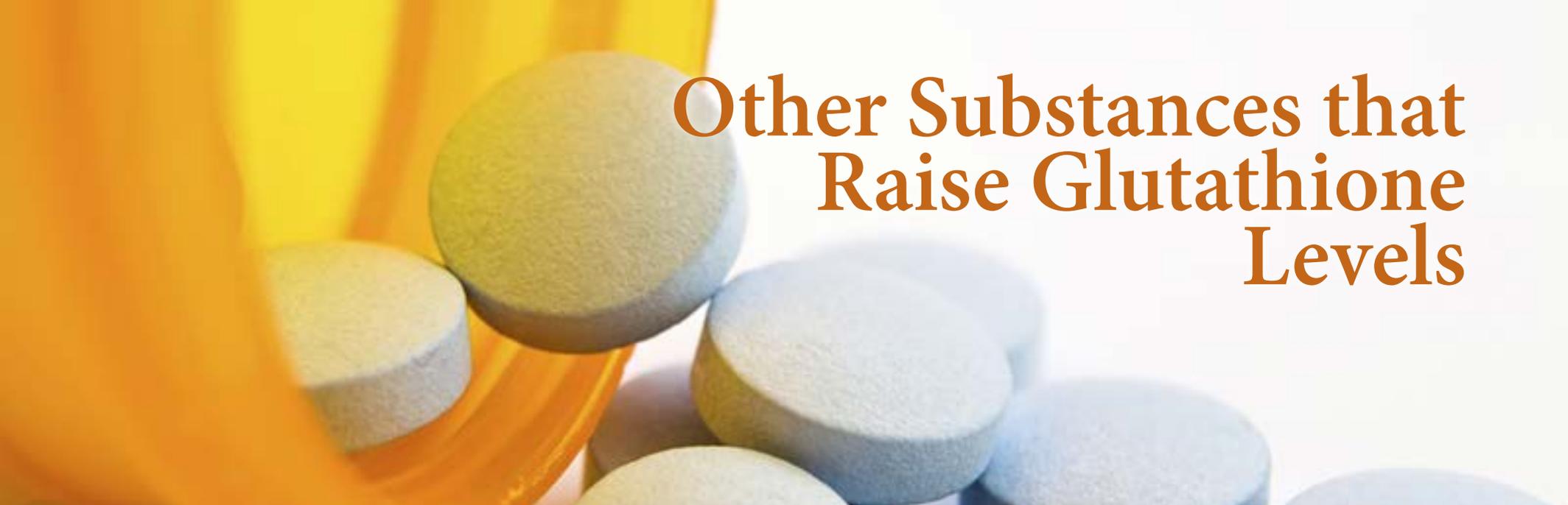


It's also a pharmaceutical drug that carries a certain toxicity itself. Unwanted symptoms include rash, wheezing, nausea, vomiting, cramps and diarrhea. In addition, patients find the smell and taste quite unpleasant. However, death is rarely reported with NAC and it's still the most commonly used clinical method to raise glutathione levels.

Whey Protein Isolate

Whey, a constituent of all mammals' milk, contains the crucial building blocks of glutathione and enables the body to manufacture its own supply. Unlike NAC, this method of supplementation is sustainable for years. However, the physical structure of whey protein is easily disrupted by pasteurization and handling, breaking up the building blocks and preventing absorption into the body. It must remain bioactive, and this requires carefully monitoring of the production process and careful handling thereafter.





Other Substances that Raise Glutathione Levels

Pharmaceuticals

Pharmaceutical drugs, such as those shown on the right, have been used to raise glutathione levels in the body. However, they are less effective than NAC and have side-effects that prevent long-term use.

Raw Glutathione

Glutathione is easily produced in pill form or powder but cannot be effectively absorbed into the body; most is lost in the digestive process.

Cysteine (L-cysteine)

Cysteine is available at pharmacies and health food stores and may raise intracellular glutathione slightly, but like raw glutathione it is oxidized in the digestive tract and becomes toxic.

Glutathione-promoting substances

Pharmaceuticals	Natural Products	Glutathione Co-factors
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 Protein	Vitamin E
	Bioactive Whey Protein	Nrf2 Activators

Methionine (L-methionine)

Methionine is an essential amino acid present in many foods, and a glutathione precursor. It is also a precursor of homocysteine, a high risk factor in the development of atherosclerosis (hardening of the arteries).



Other Substances that Raise Glutathione Levels (CONT.)

Glutamine, Glycine

Glutathione is made up of glutamine, glycine and cysteine. Of these, cysteine is the one in short supply. Healthy individuals don't need supplemental glutamine or glycine. Glutamine can provoke gastrointestinal upset. Older people and patients with impaired kidney and liver failure should be cautious.

Antioxidants in General

Antioxidants like alpha-Lipoic acid are important for recharging glutathione back from its oxidized to a reduced form. Antioxidants in general do not directly "raise" glutathione – they just take over some of its work so that glutathione is available for its other functions.

Food

Food is increasingly devoid of good glutathione building blocks. However, fresh, unheated, unblended and unpasteurized sources like raw milk, raw eggs and a pile of uncooked broccoli can provide some.

Silymarin (milk thistle)

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

NRF2 activators

The emerging field of epigenetics has greatly increased our understanding of how genes can be switched on or off. One epigenetic switch, called an "NRF2 activator", can stimulate better glutathione function.



Putting it all together

Glutathione in Health and Disease

Researchers have discovered that glutathione has an important role to play in of dozens of health challenges. It's as important to health as a well-rounded diet, exercise and good lifestyle. Clinical studies show that it is involved with some of the major health issues of our time, including heart disease, stroke, diabetes, high cholesterol, asthma, cigarette smoking, hepatitis, AIDS and more. Glutathione provides the body with tools to help fight these threats naturally.

Healthy people too should pay special attention to maintaining their levels of glutathione because it enhances their ability to fend off toxins, infectious disease, and the processes of aging. The diminished glutathione levels of aging are evident in ailments of age such as Parkinson's disease and Alzheimer's disease. Great attention is being paid to the action of glutathione in the aging brain.

Glutathione is essential to physically active people too. Many world-class athletes are discovering that maintaining glutathione levels gives them an edge over the competition. They have greater strength and endurance, faster recovery time from injury and less muscle pain and fatigue. They also benefit from the natural muscle-promoting activities of glutathione.

Summary

- Medical science continues to discover the critical roles played by glutathione in good health and disease resistance. Clinical evidence links glutathione to the most common illnesses of our time as well as to newly emerging ones.
- As an essential IDEA for better health, glutathione works towards Immune system support, Detoxifies a long list of pollutants and carcinogens, contributes Energy at multiple levels, and is the body's master Antioxidant.
- You cannot raise glutathione levels by eating glutathione as it is broken down in the digestive system; it must be manufactured within the cells of the body. Therefore, the way to raise glutathione levels is to obtain the building blocks used by the cells to make it themselves.
- Pharmaceutical drugs do this effectively, and so are used routinely in critical situations. But their side effects make repeated use unadvisable. Recently, scientists have developed a natural way to raise glutathione levels by safe, reliable dietary means. At the time of writing, these 'bioactive' whey proteins are the way to go.

FOLLOW DR. GUTMAN ON FACEBOOK FOR ONGOING RESEARCH INTO GLUTATHIONE

www.facebook.com/drjimmygutman

DR. JIMMY GUTMAN is the world's leading authority on the role of glutathione in health and wellness. He lives and works near Montreal, Canada.

His Facebook page (above) updates the public on research and resources that explain the increasing importance given to this vital molecule.

"I cannot give medical advice or answer health questions about any specific product.

However, I Welcome all your questions about glutathione.

