

# 27 Benefits of Glutathione + Supplements & Foods to Boost It

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Glutathione, often referred to as “the mother of all antioxidants,” is one of the most talked-about supplements in the healthcare industry...and for good reason. **Glutathione is produced and used by every single cell in the human body** and, therefore, has a very **wide range of scientifically-proven health effects**.

In this article we will explore the science surrounding the biological benefits of glutathione supplementation, and the best measures you can take to ensure your glutathione levels are optimally balanced.

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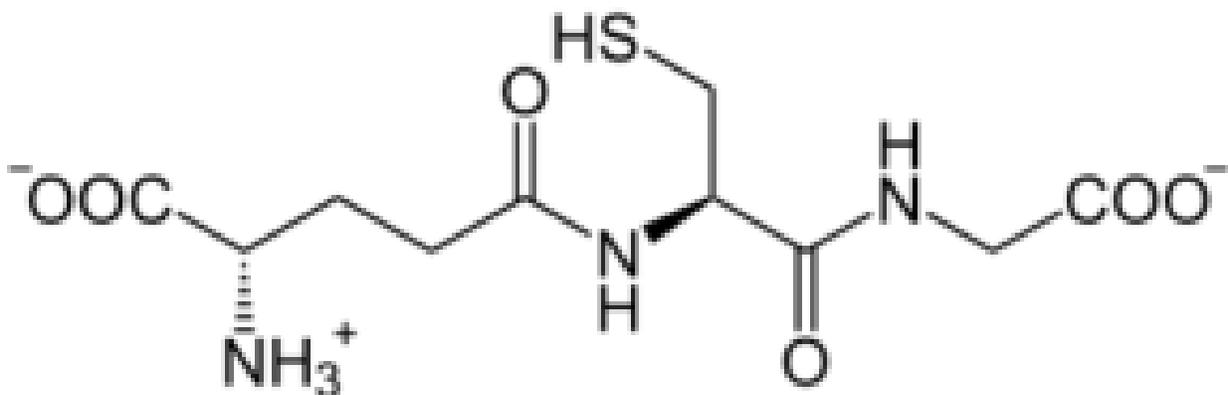
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## What Is Glutathione?

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Glutathione is a peptide containing 3 important amino acids that have several important roles in the human body [R].

Demonstrating glutathione's importance for humans, researchers have suggested that **cellular glutathione levels are a great predictor of life expectancy** [R, R].

Like [vitamin C](#) & [E](#), glutathione is an **important antioxidant in the body**. What's special about glutathione is that it is positioned within the cell, making it perfectly placed to carry out its job.

**Glutathione is an important antioxidant in animals, plants (especially avocados), fungi, and some bacteria, where it prevents damage to important cellular components caused by reactive oxygen species [R].**

By removing oxygen radicals from the body, glutathione protects many different body systems from disease and deterioration [R].

Glutathione is a **defensive agent against the action of toxic xenobiotics** (drugs, pollutants, carcinogens) [R].

Because of its wide range of uses in the body, **it is essential to prevent glutathione levels from becoming low.**

Glutathione deficiency manifests in increased susceptibility to oxidative stress, the resulting damage of which is thought to be involved in a plethora of diseases, such as cancer, Parkinson's, and Alzheimer's disease [R].

Therefore, **regulation of glutathione metabolism is a critical part of strategies to ensure optimal health** [R, R].

## The Glutathione That I Take

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### Glutathione Snapshot

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- *Longevity*9.5/10
- *Inflammation*9.0/10
- *Mood*9.0/10
- *Cognition*9.5/10
- *Energy*9.5/10

#### Pros

- Better bioavailability
- The ultimate detoxifier
- Positive effects for prevention of glaucoma and cataracts
- Anti-aging
- Improves liver function
- May prevent addiction
- Improves acne
- Many people find they feel all around better and in a much better mood with glutathione
- Essential for maintaining health, and addressing toxic related illness
- May treat autism

#### Cons

If health is very poor, must start slow and work to a higher dose

## Health Benefits of Glutathione

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### 1) Glutathione Fights Oxidative Stress in the Body

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**Glutathione reduces the amount of reactive oxygen species (ROS) and oxidative stress in the body, which would otherwise cause damage to cells and DNA [R, R, R].**

Glutathione protects against chronic oxidative stress that can cause cancer, neurodegeneration, and a range of other diseases that we will discuss below [R].

As well as neutralizing reactive oxygen species (ROS), glutathione is important for the regeneration of other antioxidants, such as vitamins C and E [R].

## 2) Glutathione May Control Inflammation

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Glutathione inhibits the production of most inflammatory cytokines [R].

**Glutathione deficiency caused inflammation in the airways of mice.** This inflammation was reduced when the mice were given glutathione [R].

**Also, glutathione inhibits NF-κ**, a transcription factor that increases the transcription of various inflammatory genes [R].

A number of pulmonary diseases are caused by excessive inflammation. In many of these diseases, **restoring glutathione to a healthy level is protective**, indirectly supporting the idea that glutathione is anti-inflammatory [R].

## 3) Glutathione Is Anti-Aging

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With less glutathione, free radicals can harm the body and cause aging [R].

Replenishing glutathione levels can **slow the aging process** [R].

Imbalances in glutathione levels affect immune system function and are thought to play a role in the aging process [R].

Multiple studies have demonstrated that **the body makes less glutathione as it ages** [R].

**Glutathione drops off during menopause**, which may be part of the reason for the dramatic aging that occurs during this time in a woman's life.

By maintaining glutathione levels, aging individuals may **prevent age-related cognitive decline** [R].

Decreased levels of glutathione in aging subjects caused oxidative stress, which can cause bone breaking and osteoporosis [R].

Myricitrin, a drug used in preventing age-related osteoporosis, may work by increasing levels of glutathione [R].

## 4) Glutathione May Prevent Depression and Stress

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Studies show low glutathione levels **in patients with depression** [R, R].

Also, glutathione is able to **prevent shock-induced behavioral depression** in animals [R].

A study on mice showed that alprazolam, a drug used to relieve stress, increased levels of glutathione in the mice [R].

## 5) Glutathione May Limit Neurodegeneration

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The cells of the human brain consume about 20% of the oxygen utilized by the body but make up only 2% of the body's weight. **Reactive oxygen species** are continuously generated during oxidative metabolism. Therefore, the detoxification of reactive oxygen species is an essential task within the brain. Glutathione plays a key role in this process [R].

## Alzheimer's Disease

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**Alzheimer's disease** is in part caused by the oxidative stress that antioxidants neutralize, as demonstrated by clinical studies showing that oral vitamin E (powerful antioxidant) intake slowed the progression of Alzheimer's [R].

To make matters worse, Alzheimer's is characterized by accumulation of TDP-43 (a DNA binding protein) in the nervous system, which further lowers glutathione levels [R].

In mice, a protein that increases glutathione levels in the body was found to **increase memory in subjects with Alzheimer's** [R].

## Parkinson's Disease

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**Parkinson's disease** is caused, in part, by oxidative stress in the nervous system. Glutathione combats this oxidative stress.

Parkinson's disease involves the loss of dopaminergic neurons in the substantia nigra part of the brain. Studies have noted that **people in pre-clinical stages of Parkinson's have low glutathione** levels in the substantia nigra [R].

A study showed that a drug, named 3,4-dihydroxybenzalacetone, helped prevent Parkinson's disease by increasing levels of glutathione [R].

## Huntington's Disease

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**Huntington's disease** is caused by oxidative stress and mitochondrial dysfunction [R].

Studies have shown that a **special form of curcumin successfully helped improve mitochondrial health by increasing glutathione levels** [R].

## 6) Glutathione May Help with Infections

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Viral Infections cause abnormal amounts of oxidative stress in cells due to inflammation and a reduction of glutathione levels [R, R].

In many diseases (e.g., AIDS, COPD, cystic fibrosis, influenza, and alcoholism), **lowered immunity and increased risk of infections correlate to low glutathione levels** [R].

Patients with tuberculosis have been shown to have low glutathione levels [R].

Glutathione depletion lowers the anti-infection activity of macrophages, while NAC (glutathione precursor) increased intracellular killing of mycobacteria [R].

Another study showed that the maintenance of **cysteine levels, and thus glutathione levels, is important for enhancing mycobacterial killing activity** [R].

## 7) Glutathione May Heal the Gut

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**Patients with IBS have decreased activity of enzymes involved in glutathione synthesis**, as well as lower levels of glutathione's precursor, cysteine [R].

Glutathione peroxidase is an important enzyme for the normal renewal of the gut wall [R].

**Glutathione protects the intestinal mucosa.** Administration of glutathione may protect the gut wall which, when weakened, can lead to leaky gut [R].

## 8) Glutathione May Treat Autism

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Children diagnosed with autism have lower levels (20 to 40% lower) of reduced **glutathione** than considered normal levels [R, R].

Other abnormalities have been found in the transsulfuration pathway (the pathway where glutathione is produced) in children diagnosed with autism [R].

This includes lower levels of cysteine, the rate limiting substrate for glutathione production [R].

Oral and transdermal glutathione are currently being used to normalize glutathione levels in autistic children. Early studies indicate that this may improve some of the transsulfuration

metabolites often low in autistic children [R].

## 9) Glutathione and Cancer

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Glutathione is a major factor in the regulation of life, proliferation, and death of cancer cells [R].

Glutathione deficiency, or a decrease in the glutathione/glutathione disulphide (GSSG) ratio, leads to increased damage from oxidative stress involved in the progression of cancer [R].

There is significant correlation between increased glutathione intake and decreased risk of oral and throatcancer [R].

Furthermore, glutathione plays a key role in repairing damage done by cancer drugs on cells in chemotherapy patients [R].

**Glutathione is crucial in the removal and detoxification of carcinogens** However, it should be noted that, by conferring resistance to a number of chemotherapeutic drugs, **elevated levels of glutathione can actually protect tumor cells**. Perfect balance is imperative [R, R].

## 10) Glutathione May Treat Psychiatric Disorders

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**Schizophrenics have low levels of glutathione.** NAC, which increases glutathione levels in the brain, was shown to improve the symptoms of schizophrenia in human subjects [R].

**Patients with OCD have low levels of glutathione in certain parts of their brain** (e.g., lower posterior cingulate cortex) [R].

**High levels of free radicals were found in the blood of patients with OCD.** Reducing these levels by introducing glutathione may help reduce the severity of OCD symptoms [R].

Furthermore, glutathione may help to reduce stress, which is a major symptom, and possibly contributing factor, of OCD [R].

Multiple drugs used to treat bipolar disorder work by increasing glutathione levels [R].

## 11) Increasing Glutathione Levels May Help ADHD

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Subjects with ADHD have been shown to have low glutathione and high levels of oxidative stress [R, R].

Pycnogenol, a glutathione booster, was found to **normalize antioxidant levels in children with ADHD** [R].

## 12) Glutathione May Help in Preventing Heart Disease

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Low activity of glutathione peroxidase, as well as low levels of systemic and cardiac glutathione, is linked with an increased risk of heart attack [R, R, R].

**Cardiovascular disease is largely caused by oxidative stress in heart tissues.** Perhaps this is why insulin resistance, impaired glucose tolerance, and diabetes (3 conditions that cause oxidative stress), are linked to heart attacks [R, R].

Glutathione can help in reducing these reactive species and, in turn, **limit the risk of stroke or heart attack** [R].

### 13) Glutathione May Treat Diabetic Complications

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Diabetes II and high blood sugar cause the reduction of glutathione in the body [R].

Free radical accumulation causes many of the complications associated with diabetes type 2, such as cardiovascular problems and neurodegeneration [R].

Studies show introducing extra glutathione into the body prevents or limits these complications [R].

### 14) Glutathione May Prevent Kidney Disease

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Oxidative stress in the kidneys can cause kidney failure [R].

Studies in rats have shown that the precursor of glutathione, NAC, **can prevent kidney disease due to aspartame** [R].

A study, which investigated 20 patients suffering from chronic renal failure and undergoing hemodialysis, found that **supplemental glutathione resulted in a marked improvement in kidney function** (as measured by red blood cells, plasma reduced glutathione, hematocrit, and hemoglobin) [R].

## 15) Glutathione Protects Against Liver Damage

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Liver disease is caused by oxidative stress. Glutathione keeps the liver healthy by helping in reducing this oxidative stress in the liver [R].

Glutathione plays an important role in the liver in detoxification reactions and in controlling the thiol-disulfide status of the cell [R, R].

The liver upregulates glutathione synthesis to combat the effects of a high-fat diet.

Oral administration of reduced glutathione (300mg/day) is **effective at preventing non-alcoholic fatty liver disease**, which can eventually lead to cirrhosis and liver cancer [R].

## 16) Glutathione May Help Prevent Addiction

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Consumption of cocaine, methamphetamines, and alcohol lead to an increased production of reactive oxygen species (ROS).

These species can alter proteins involved in neuronal and behavioral pathways, causing the subject to become addicted. By reducing the presence of these reactive species, glutathione may decrease the development of addictive behaviors [R, R].

This may also be applicable to overeating disorders [R].

## 17) Glutathione May Reduce Consequences of Drugs or Alcohol

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Chronic alcohol use causes oxidative stress and reduces liver levels of glutathione [R].

Glutathione can reduce the effects of chronic use by decreasing the presence of reactive oxygen species (ROS) [R].

Glutathione improved liver function of alcoholics, but only when they abstained from alcohol use.

**Chronic alcohol ingestion** causes oxidative stress in the lungs which can often lead to respiratory infections such as pneumonia. Glutathione can protect the lungs by reducing oxidative stress [R].

## 18) Glutathione Controls Cell Death

Glutathione depletion is a key signalling event that **controls the activation of cell death pathways**. For example, S-glutathiolation is important for protein modulation and apoptotic (cell death) initiation [R, R].

Cells depleted of glutathione are susceptible to damage, especially from arachidonic acid. Studies show that **low glutathione levels cause a series of events, which ultimately result in cell death** [R].

## 19) Glutathione Can Help with Respiratory Issues

### Lung diseases associated with glutathione deficiency

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Acute lung injury/acute respiratory distress syndrome

Chronic bronchitis

Chronic obstructive pulmonary disease

Cystic fibrosis

Idiopathic pulmonary fibrosis

Various bacterial and viral infections (including AIDS)

Toxicity of various foreign compound (smoke, pollutants, drugs ...)

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<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3048347/>

One study showed that **low levels of glutathione increased inflammation and caused asthma** in the airway [R].

The same study showed that increasing levels of **glutathione decreased inflammation and reduced asthma** in the airway [R].

Chronic Obstructive Pulmonary Disease (COPD) is a lung disease caused by long-term oxidative damage to lung tissue, the damage of which results in inflammation of the lung tissue, causing shortness of breath and coughing [R].

Glutathione supplements can decrease this oxidative damage and tissue damage within the lungs, thereby reducing the risk of developing COPD [R].

## 20) Glutathione Can Treat Sleep Apnea

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**Patients with sleep apnea have very high levels of oxidative stress and, consequently, depleted glutathione levels [R, R].**

A study showed that glutathione levels were low in subjects who were diagnosed with sleep apnea, and that **increasing those levels of glutathione to normal improved sleep quality** in these patients [R].

## 21) Glutathione May Treat Acne

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High levels of oxidative stress lead to **low levels of glutathione in acne patients** [R, R].

A decline in antioxidative activity, especially a decrease in glutathione quantity, may play a key role in the development of acne [R].

Increasing glutathione levels may help **reduce acne by decreasing oxidative stress levels.**

## 22) Glutathione May Help Treat Rheumatoid Arthritis

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Studies have shown that **antioxidant mechanisms can be impaired in subjects with rheumatoid arthritis**. Glutathione levels were shown to be significantly lower in these patients [R].

**Patients with rheumatoid arthritis have increased levels of glutathione peroxidase as a response to high levels of oxidative stress.** It makes sense to supplement glutathione to ensure that these individuals can match this high demand for glutathione [R].

## 23) Glutathione Helps Prevent Glaucoma and Cataracts

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Glaucoma and cataracts can gradually cause loss of vision. Both of these conditions are in part caused by oxidative stress to the ocular nerve, which glutathione may reduce [R].

## 24) Glutathione Encourages a Healthy Pregnancy

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In pregnant women, low glutathione levels caused by depression may lead to impaired brain development in the unborn child [R].

Increased amounts of reactive oxygen species in a fetus have been linked to preterm labor. Thus, by reducing these oxygen species, **glutathione can delay the onset of labor to a biologically healthier time** [R].

## 25) Glutathione May Treat AIDS

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A study showed that older **AIDS patients produced lower levels of glutathione in their mitochondria** [R].

NAC (glutathione's precursor) blocks the stimulatory effect of TNF on HIV replication [R].

AIDS sufferers with glutathione deficiencies have decreased insulin sensitivity, and muscle strength. Introducing adequate glutathione effectively treats these issues [R].

**Glutathione deficiency weakens the immune systems of AIDS patients with already weak bodies.** Studies have shown that giving these individuals additional glutathione can rebalance their immune systems [R].

Introducing glutathione into the body decreases the chances of AIDS sufferers developing tuberculosis [R].

## 26) Glutathione May Treat Cystic Fibrosis

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People with cystic fibrosis have low glutathione levels [R].

Cystic fibrosis causes the release of oxidative reactants in to inflammatory cells. Making matters worse, cystic fibrosis reduces levels of glutathione able to scavenge these reactants [R].

Studies show that **patients treated with inhaled glutathione have increased lung capacity and function** [R, R].

Glutathione inhalers can **restore oxidant-antioxidant balance and reduce inflammation** in those with cystic fibrosis [R].

More broadly, certain forms of buffered glutathione have been found to lower the symptoms of cystic fibrosis [R].

## 27) Glutathione Is a Skin Lightening Agent

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Studies have shown that **glutathione can increase lightness of the skin in healthy women** [R, R].

This is because glutathione causes the production of a different type of melanin in skin cells [R].

## Glutathione Metabolism and Administration

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Glutathione is made in the body from 3 amino acids: glutamate, cysteine, and glycine (making it a “**tripeptide**”). The glutathione produced in the body is broken down by an enzyme, **GGT**, on the surface of the cells before it can be transported to the inside of the cell [R]

However, when we ingest glutathione as a supplement, it has to pass the liver before it reaches the bloodstream. **The liver can contain high amounts of GGT, which can break down** glutathione. This means that most oral forms of glutathione may not achieve the desired effects [R].

**There are several ways to bypass this limitation, such as** [R]:

- Liposomal glutathione [R]
- Sublingual glutathione (absorbed directly into the bloodstream) [R]
- Slow-release tablets dissolved in the mouth (orobuccal) or lozenges [R, R]
- Inhaled glutathione [R]
- Methyl glutathione, where another compound (the methyl group) is attached to glutathione, so GGT cannot degrade it [R]
- Coated glutathione tablets [R]
- IV glutathione is also available, but the safety has not been established [R]

New formulations of glutathione are being researched every day in the hopes of maximizing its concentration in the body.

Taking glutathione with **vitamin C** may also increase its absorption [R].

## Safety

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**People with asthma should not inhale glutathione.**

Taking glutathione supplements **during pregnancy or breastfeeding is not recommended.**

Thirty-eight participants aged 21 to 62 were given oral glutathione (1,000mg a day) for 4 weeks. Side effects were limited, but included: **Increased flatulence and loose stools (5 patients), flushing (2 patients), and weight gain (1 patient)** [R].

Another study that gave glutathione to patients with cystic fibrosis found the following side effects: Chest tightness, diarrhea and fever. Of course, **these results may not apply to the general population** [R].

Also, these studies are relative exceptions; to date, **glutathione supplements are known as safe**. More research is undoubtedly needed on high-dose and long-term glutathione supplementation.

## Glutathione Side Effects (If You Have Chronic Inflammation)

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Glutathione promotes immune system function. It enhances T cell growth and activates mTOR [R].

When studies deplete glutathione, it reduces the inflammatory response, because it reduces the immune system response [R].

However, under inflammatory conditions, it often becomes more important to reduce the damage with an antioxidant like glutathione.

So glutathione can both be good and bad if someone has chronic inflammation. If you get negative side effects, it could be that it's stimulating your immune system too much.

## Glutathione in Food

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The picture above shows a number of foods that contain glutathione precursors. These are great additions to your diet, but **I usually recommend supplementation to get a therapeutic and reliable dose.**

**Garlic, asparagus, and cruciferous vegetables** such as **broccoli and kale** boost glutathione levels as a result of their sulfur components.

Animal foods, which are higher in **cysteine and methionine**, can also help increase glutathione levels.

## Increasing Glutathione with Supplements

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### Cysteine

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Out of three amino acids that glutathione is made from, cysteine is the most important; the amount of cysteine governs the speed and quantity of glutathione that can be made inside the cell. Here are some options for increasing cysteine:

NAC – dose usually 500 to 1,000mg/day

### Selenium

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Selenium is important for maintaining healthy glutathione levels as it becomes a component of glutathione peroxidase in the body – the enzyme that helps neutralize free radicals.

## Alpha Lipoic Acid (ALA)

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R-Lipoic acid is one of the main boosters of glutathione levels in cells [R].

## Methionine

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S-adenosyl-methionine is a supplement that contains methionine and can help boost glutathione levels.

## Buying Glutathione

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Liposomal Glutathione

## Are You Struggling With Chronic Health Issues?

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If you are struggling with chronic health issues – the way I used to – you probably have piles of lab tests that can potentially tell you a lot about your health. However, doctors never had enough time to explain it properly. They will only notice it if the lab flags your test results as outside of normal. But what if all your results are coming back normal, yet you know you are feeling nowhere near healthy? They may even tell you there is nothing wrong with you, and that it's all in your head – I've been there.

**Lab Test Analyzer** is the tool I wish I had when I was dealing with all my health issues. Instead of normal, it will tell you the **optimal** values for lab tests. And if you are outside the optimal range, it will give you actionable tips and recommendations that will help you get there.

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