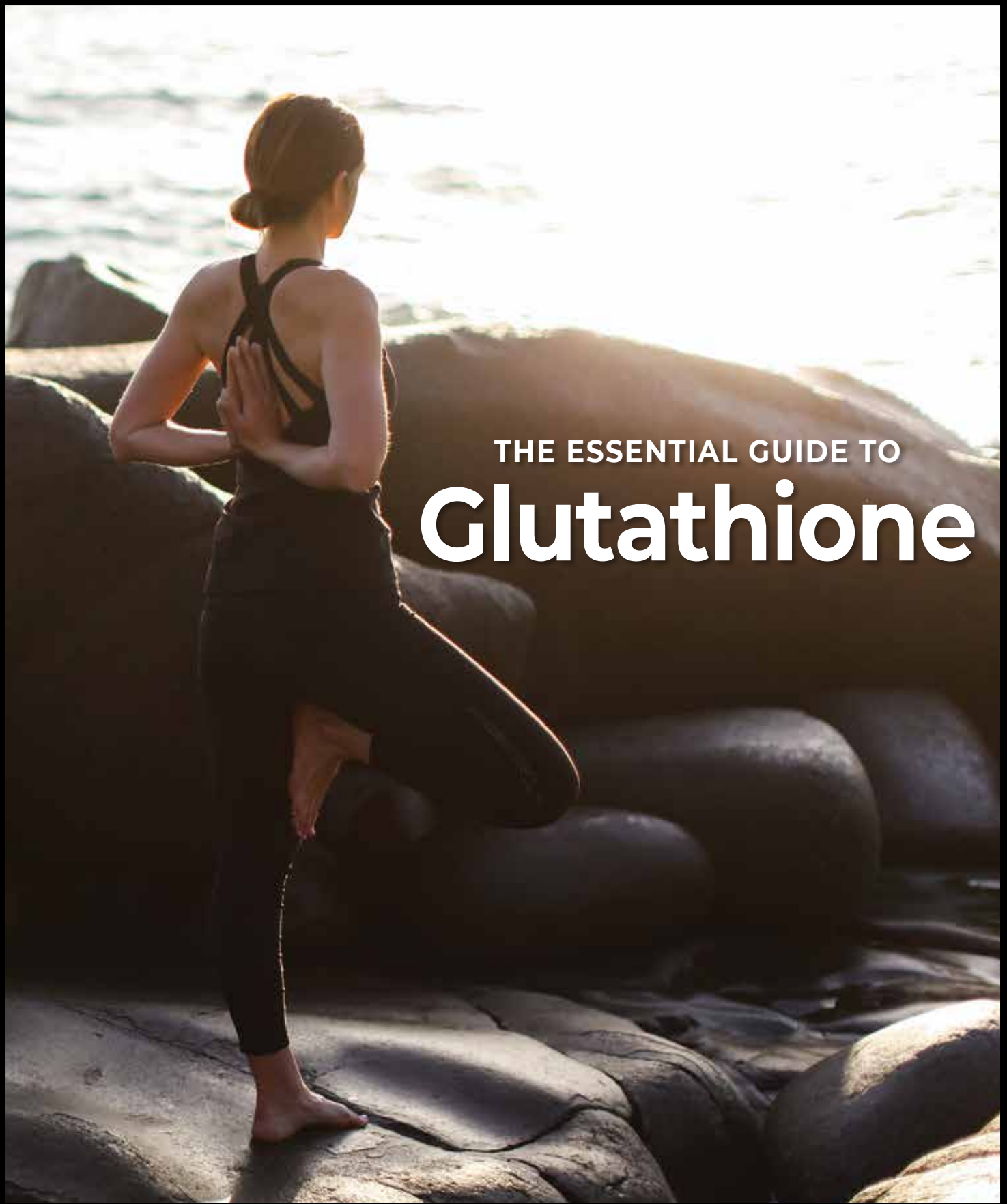

THE ESSENTIAL GUIDE TO

Glutathione

Setria®

IN PARTNERSHIP WITH tasteforlife®

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These statements have not been evaluated by the FDA. These products are not intended to diagnose, treat, cure, or prevent any disease.

Meet Kyowa Hakko

MANUFACTURER OF SETRIA® GLUTATHIONE

Improving Lives with Health Science

Kyowa Hakko USA, Inc., is the North and South American office for Kyowa Hakko Bio Co., Ltd., an international health ingredients manufacturer and world leader in the development, manufacturing, and marketing of high-quality branded ingredients for use in dietary supplements.

Based in Japan, the company is a pioneer in the development and application of fermentation technology, and this is reflected in its name—the word "hakko" in Japanese translates to "fermentation."

In 1956, Kyowa Hakko became the first company in the world to succeed in the industrial production of amino acids using fermentation methods. Since then, the company has released a wide range of amino acids and has been a global leader in the field.

Setria® *Is* Glutathione

Glutathione, a powerful tripeptide, is often called the mother of all antioxidants for reasons detailed in this e-book. Nearly 160,000 studies in the medical database PubMed mention the importance of glutathione in preclinical and clinical research. About 80,000 published studies show that glutathione protects cells against free radical damage, oxidative stress, and toxins; fortifies the immune system; and plays a central role in overall good health.*

Kyowa Hakko employs its innovative fermentation process to make Setria® Glutathione.

What's In a Name?

Setria = Set (Balance) + Tria (tripeptide), is a clinically studied and patented form of l-glutathione, also known as reduced glutathione (GSH), an active form of glutathione able to neutralize free radicals in the body. Setria® Glutathione has been clinically shown to raise and replenish the body's blood glutathione levels when taken orally. Scientists have also linked Setria® with helping the body fight oxidative stress and boosting the body's natural defense system.

Setria® Glutathione has achieved self-affirmed GRAS and is made according to good manufacturing practice (GMP) standards. Its fermentation manufacturing process yields high-quality, high-purity, vegetarian, and allergen-free ingredients while eliminating any risk of Transmissible Spongiform Encephalopathy (TSE) contamination.

Its uses span immune support, skin health, fitness, and healthier aging. Key market areas include:

- Antioxidant Protection
- Detoxification Support
- Liver Health Support
- Immune System Support
- Respiratory Health Support
- Skin Health
- Sports Nutrition
- Healthy Aging

Consumer Confidence

Recent consumer surveys reveal that supplement users prefer and have more confidence in branded ingredients as opposed to generic ones. Branded ingredients offer research, quality, and dependability. When deciding which antioxidant supplements to purchase, over 80% of glutathione users reported that seeing Setria® Glutathione on an ingredients label significantly influences their purchasing decisions.

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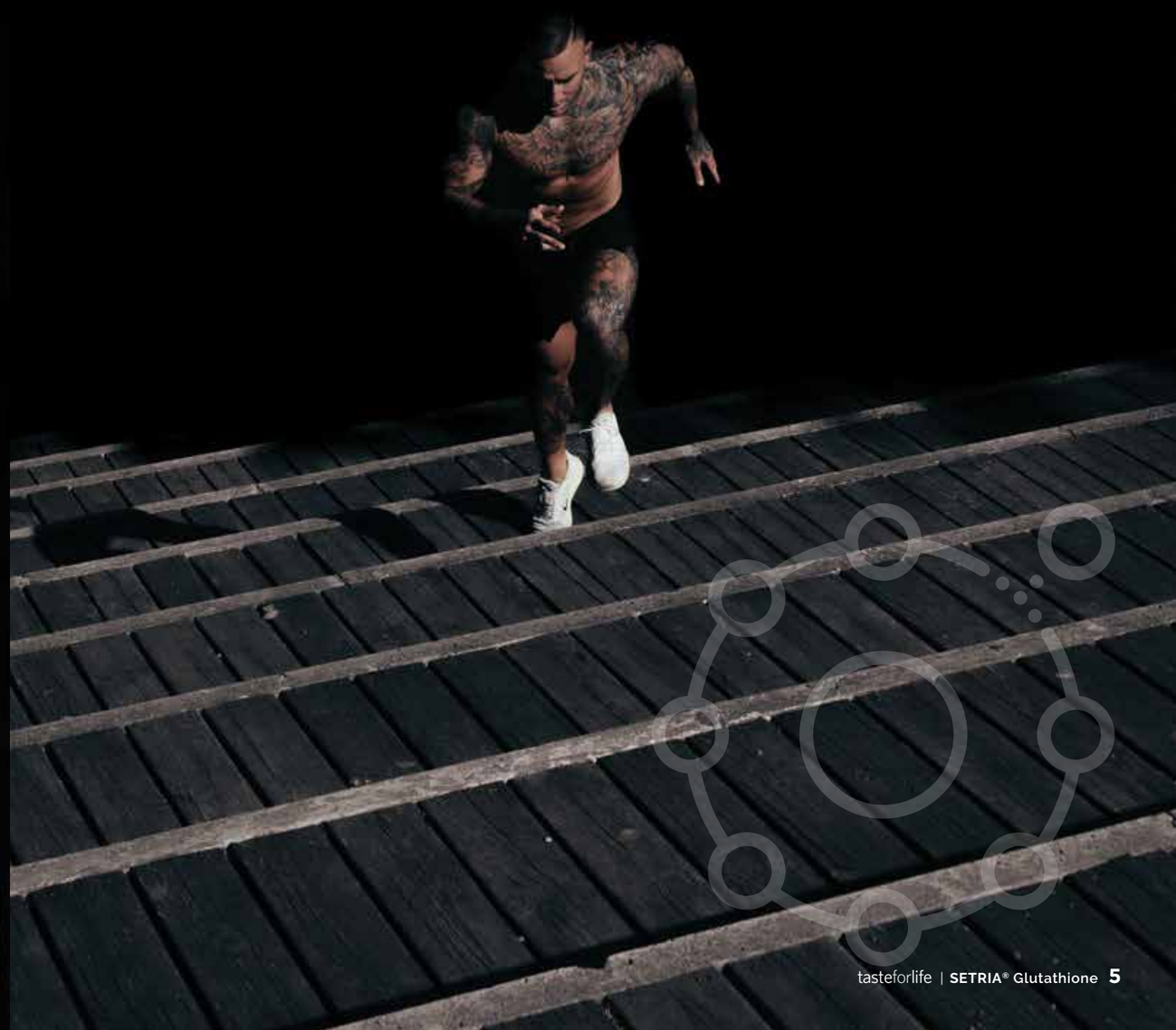
The ABCs of Antioxidants

The human body is under constant threat of attack from external forces including bacteria, viruses, and pollutants. There's also a menace from within, in the form of free radicals.

"The body generates free radicals as the inevitable byproducts of turning food into energy," according to Harvard's T.H. Chan School of Public Health. "Free radicals are also formed after exercising or exposure to cigarette smoke, air pollution, and sunlight." A buildup of free radicals in the body leads to oxidative stress, which in turn causes damage at the cellular level.

Cue the Antioxidants

Nutrients with antioxidant properties include vitamins C and E, the minerals manganese and selenium, and carotenoids such as beta carotene, along with a host



of other substances: Glutathione and coenzyme Q10 (CoQ10) are among the best known.

While the body manufactures some of the antioxidants it needs, others come from foods, notably vegetables, fruits, and whole grains. Dietary supplements provide some antioxidants including vitamins C and E.

Why the Body Needs Them

The word "antioxidant" describes the main function of a substance, not the substance itself. Among its other jobs, an antioxidant gives up an electron to convert a dangerous free radical to a harmless molecule.

"There are thought to be hundreds and possibly thousands of substances that can act as antioxidants," according to registered dietitian nutritionist Megan Ware, RDN, LD. "Each has its own role and can interact with others to help the body work effectively. Each antioxidant serves a different function and is not interchangeable with another. This is why it is important to have a varied diet."

Glutathione: An Antioxidant's Antioxidant

Sometimes called "the mother of all antioxidants," glutathione is considered by some experts to be the master detoxifier of the immune system.

Made up of the amino acids cysteine, glutamine, and glycine, glutathione is a tripeptide compound that packs a punch in terms of its ability to remove free radicals and toxins from the body. Toxins stick to glutathione, which carries them into the bile and out of the body.

REFERENCES S.D. Sondergard et al., Applied Physiology, Nutrition, and Metabolism, 9/21, http://cdnsciencepub.com • M. Mari et al., *Biochimica et Biophysica Acta,* 5/13

The Mother of All Antioxidants

THE IMPORTANT ROLES OF GLUTATHIONE

Modern life bombards us with toxins and stressors that can damage cells, accelerate aging, and lead to health issues. Poor diet, inadequate sleep, and lifestyle habits like smoking and drinking are all sources of free radicals, as is aging itself. Ideally, the body is able to regulate and neutralize free radicals before they cause oxidative stress. Maintaining that precarious balance is the work of antioxidants.

Plenty of substances act as antioxidants, including vitamins C and E and the minerals selenium and manganese, but there's one that stands apart from the rest. Considered the body's "mother of all antioxidants," glutathione (pronounced gloo-tuh-thai-own) protects cells from oxidative stress while supporting the immune system, liver, respiratory health, skin health, and more. Studies even show it can provide a competitive edge in the gym.

"Glutathione is the body's most important antioxidant," said Lise Alschuler, ND, FABNO, associate director of the fellowship in integrative medicine at the Andrew Weil Center for Integrative Medicine at the University of Arizona. "All of our cells make glutathione."

Glutathione's most important roles include

- Helping immune cells eliminate inhaled invaders
- Preventing toxic chemicals from being absorbed after ingestion
- Protecting the antioxidant-oxidant balance of cell proteins
- Removing heavy metals.

Despite its versatility and MVP status, this antioxidant isn't well known, so too many people miss out on its well-researched benefits and inadvertently "overdraft" their body's natural stash.

What Is Glutathione?

Think of glutathione as the body's live-in housekeeper, removing unwanted toxins from cells to maintain a tidy and orderly "home." Made of the amino acids cysteine, glycine, and glutamic acid, glutathione is as abundant as glucose in cells.

Compared with its antioxidant peers, "glutathione is a little bit different because A, our bodies make it, but B, it can actually even recycle other antioxidants," explained Heather Moday, MD, a board-certified allergist, immunologist and functional medicine physician. "So that's why they often call it the 'mother of all.'"

Dr. Moday tells her patients that glutathione stores are "like your own personal supply of one of the most powerful antioxidants that we know." If, for example, a vitamin C molecule wants to give up its electrons to stabilize a free radical, "glutathione will be like, 'no, no, here, let me do that for you,' because glutathione can then go with another glutathione molecule and then create more," she said.

"One of the places that we make the bulk of it is within our liver," added Dr. Moday, citing its role in detoxification. Glutathione is also concentrated in the mucosal linings of the lungs and gastrointestinal tract, and in the kidneys, other key detoxification sites.

Science-Backed Benefits of Glutathione

Reduces oxidative stress

Glutathione earned its status among antioxidants for its ability to shield cells from damage. It benefits almost every organ, tissue, and system in the body by minimizing the impact of free radicals. Glutathione also helps manage oxidative stress caused by health conditions, including diabetes, said Dr. Alschuler.

"The circulating sugar interacts with proteins in cells and it creates an inflammatory reaction referred to as glycation," she explained. "That's a highly oxidative event. There's a lot of oxidative stress in diabetes, so when people who have diabetes take glutathione over time, they might see changes in their glycation, their hemoglobin A1C as an example."

Immune support

Glutathione is "definitely useful for immune support, because white blood cells are heavily glutathione-dependent in terms of their activity," explained Dr. Alschuler. It helps in two ways: by boosting the number of white blood cells that serve as the first responders to immune threats, and by encouraging production and activity of natural killer (NK) cells.

Support for respiratory health

There's a "large amount of glutathione in our respiratory tract, especially in the lung sacs, the alveoli," said Dr. Moday. Low levels of glutathione in the lung lining have been linked to abnormalities and respiratory issues.

Detoxification

The liver, kidneys, and digestive system are important for the body's natural detox processes. Glutathione supports their work both by helping remove substances that have been ingested or absorbed, and neutralizing them before they can cause harm.

"It's definitely a very important component in detoxification," said Dr. Alschuler, adding that glutathione can help neutralize toxic compounds.

Skin health

Aging impacts skin, leading to wrinkles and less elasticity, among other changes. However, glutathione has been shown to reduce melanin production and support elasticity.

Support for athletes

For all its benefits, exercise also creates free radicals. During intense training cycles, the body needs additional time to recover and repair tissue. When combined with the nonessential amino acid L-citrulline, glutathione may support nitric oxide production after a workout, to potentially reduce fatigue and recovery time.

REFERENCES W. Aoi et al., *Journal of the International Society of Sports Nutrition*, 2/6/15 • P. Hwang et al., *Journal of the International Society of Sports Nutrition*, 6/27/18 • S. McKinley-Barnard et al., *Journal of the International Society of Sports Nutrition*, 12/27/15 • P.E. Morris et al., *The American Journal of the Medical Sciences*, 1994• J. Pizzorno, *Integrative Medicine: A Clinician's Journal*, 2/13/14 • J.P. Richie et al., *European Journal of Nutrition*, 5/5/14 • R. Sinha et al., *European Journal of Clinical Nutrition*, 8/30/17• S. Weschawalit et al., *Clinical, Cosmetic and Investigational Dermatology*, 4/27/17

Glutathione Supplementation

WHAT TO KNOW

The body produces glutathione naturally, but the very things this antioxidant protects against are also what erodes, and potentially depletes, the body's built-in supply.

"If you're burning the candle at both ends, not getting enough sleep, maybe not getting good nutrition, you can become overburdened with inflammation," said functional medicine physician Heather Moday, MD. This can eventually lead to decreased glutathione production. Even healthy pursuits like training for a marathon can be depleting.

Glutathione is a use-it-or-lose-it substance, and the body's reserves turn over daily. How much is needed is highly individualized. While foods can assist with glutathione production, diet is not the primary source, so it's not considered an essential nutrient. Fresh fruits and vegetables, as well as freshly prepared meats, provide the most meaningful amounts of the nutrients the body needs to form glutathione.

Habits That Help or Harm Natural Glutathione Production

Free radical damage draws from the body's glutathione supplies. Demand increases during times of stress or illness, in the presence of toxins, and due to weight gain and aging. Increased exposure to ultraviolet radiation, medications, and substances such as tobacco and alcohol deplete glutathione, as does living or working in a polluted or urban area.

Time of day makes a notable difference in glutathione levels, even in healthy adults, said Lise Alschuler, ND, FABNO, who is board certified in naturopathic oncology.

"People are most glutathione deficient first thing in the morning," she said, making that an ideal time to supplement. "There's a lot of cell clean-up that occurs as we sleep. That clean-up process can deplete the antioxidative potential of cells resulting in a relative insufficiency of glutathione. We use a lot of glutathione as we're sleeping."

A single night of sleep deprivation can significantly reduce glutathione levels and interfere with the body's overnight checklist.

Supplies also naturally start to dwindle in middle age. "Past the age of 45, most of us are not making glutathione as efficiently as we did when we were younger," explained Dr. Alschuler.

The good news is that all the usual healthy habits—including stress management, avoiding alcohol and tobacco, a nutrient-dense diet and adequate sleep—help offset the demand for diminishing natural supplies.

As for fitness, "aerobic exercise temporarily decreases, but then eventually increases glutathione production," said Dr. Alschuler, and gentle exercise like yoga also increases glutathione production.

How to Choose a Glutathione Supplement

The best way to maintain adequate supplies of glutathione is by taking a supplement. "When you take oral glutathione, you do elevate your cell tissue levels of glutathione," Dr. Alschuler said.

Recommended doses usually range from 250 milligrams (mg) to 500 mg, she said. Many publications on glutathione have provided evidence to show its safety.

In choosing a supplement, look for "reduced" glutathione or L-Glutathione, such as Setria® Glutathione. This form is vegetarian and produced via fermentation.

"They've done the studies to show that after they give Setria they've shown elevations in blood glutathione levels, which is really what you want to see," said Dr. Moday, founder of the Moday Center in Virginia, where she offers personalized medicine that targets unique root causes and helps people age better.

REFERENCES J.P. Richie et al., *European Journal of Nutrition,* 5/5/14 • M.S. Trivedi et al., *PLoS One*, 7/24/17

Glutathione

HOW TO CHOOSE

When it comes to your L-Glutathione supplement, purity matters.

Emerald Labs L-Glutathione (Setria®) Is a pure, well-studied form of Reduced L-Glutathione. Gluten free. Additive free.*

Healthy Origins® L-Glutathione Reduced (Setria®) is a naturally derived, biologically active sulfur amino acid tripeptide compound containing three amino acids: L-cysteine, L-glutamic acid, and glycine.*

Code Age Liposomal Glutathione offers a modern antioxidant, immune, and healthy skin support with 500 milligrams (mg) of Setria® L-Glutathione, a clinically studied and patented form of glutathione.*

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