

ARE YOU GETTING ENOUGH SULFUR

SULFUR – THE FORGOTTEN NUTRIENT

Sulfur is an inorganic element and forms part of several molecules in the body, including amino acids, proteins, enzymes, vitamins, and more. Following calcium and phosphorus, sulfur is the third most abundant mineral in the human body and this fact alone denotes its importance of sulfur to the human body.

Dietary sulfur comes from protein where 2 of the 20 amino acids, methionine and cysteine, contain sulfur (the sulfur-containing amino acids; SAAs). The amount of SAAs in protein varies according to the food source, e.g., dairy is 4% SAAs and egg whites is the highest containing around 8% SAAs. Additionally, glutathione (a natural intracellular antioxidant) provides a source of dietary sulfur and is found in fruits and vegetables.

THE ROLE OF SULFUR IN THE BODY

Sulfur has a long history of use for dermatological conditions (e.g., acne and overall skin appearance), wound healing and acute exposure to radioactive material.

Two of the most important roles sulfur play in the body lie in the connective tissue (e.g., skin, tendons and ligaments) and the liver. Disulfide bonds link skin proteins, like collagen and elastin, and are critical for skin's strong, yet flexible characteristic. Additionally, as an integral part of the antioxidant and detoxification processes, sulfur is necessary to protect and maintain proper skin growth.

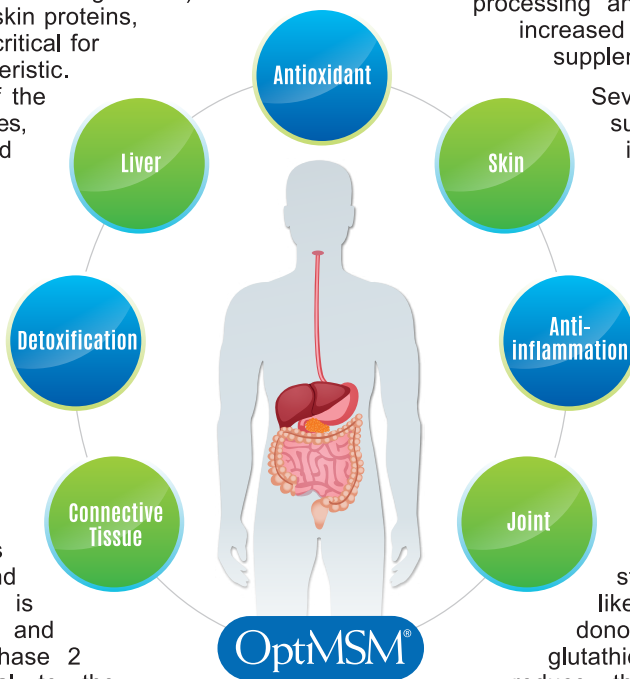
Similarly, tendons and ligaments that support the joint movement rely on sulfur for proper cross-linking (disulfide bonds) in addition to extracellular matrix proteins like glycosaminoglycans (GAGs) and hyaluronic acids (HA), which are highly sulfonated, and provide strength and cushion.

In the liver, sulfur plays two critical roles. As a major component of glutathione, the most prevalent antioxidant in the body, sulfur helps the body react to oxidative stress and maintain homeostasis, which is particularly relevant to exercise and aging. And as component of Phase 2 detoxification, sulfur is essential to the metabolism and excretion of harmful toxins.

OPTIMSM® AS A SOURCE OF SULFUR

Methylsulfonylmethane often abbreviated as MSM, is composed of sulfur (roughly 34%), oxygen, and methyl groups. MSM is found naturally in trace amounts in milk, fruits, tomatoes, corn, coffee, and tea. Because the amount found in foods can also significantly decrease during food processing and manufacturing, there has been increased interest in the usefulness of supplementing the diet with MSM.

Several studies have demonstrated that sulfur from MSM can be incorporated into SAAs, proteins, and various tissues. Dosages of MSM ranging between 1.5g and 6g/day taken over several weeks to months have been used in human clinical studies with no significant adverse events reported. Furthermore, MSM has been shown to benefit joint health, alone or in combination with glucosamine (joint pain, swelling, and improved mobility), improve skin quality (elasticity, firmness, and reduced wrinkles), suppress seasonal allergic rhinitis, and reduce exercise-induced oxidative stress and muscle damage. This is likely a result of MSM acting as a sulfur donor in addition to stimulating glutathione and other relevant molecules to reduce the impact of inflammation and oxidative stress.



OptiMSM®, the only branded and U.S. manufactured form of MSM, is produced by Bergstrom Nutrition and is utilized in the majority of research on MSM and its benefits. **OptiMSM®** provides the body an easily accessible pool of sulfur which spares the essential sulfur-containing amino acids (SAAs) methionine and cysteine from being metabolized for their sulfur. The decrease in inflammation and oxidative stress protects joints, helps the body recover from strenuous activity, boosts immunity and helps the consumers stay active, live and age well.

References: (1) Hewlings S. and Douglas Kalman D. "Sulfur in Human Health". *EC Nutrition* 14.9 (2019): 785-791. (2) Butawan M., et al. "Methylsulfonylmethane: Application and Safety of a Novel Dietary Supplement". *Nutrients* 9.3 (2017).

OptiMSM® is a registered trademark of Bergstrom Nutrition, Inc., USA.

This article is brought to you by Winwa Medical Sdn. Bhd. For further information, please contact us: Tel: 04-5079784 Email: info@winwamedical.com

Disclaimer: The information provided in this article is for educational or reference purposes only and should not be construed as medical advice. Use as directed. Always read the label. People on prescription medicine should consult a healthcare professional first.