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The Spark of Life: Sulfur

Strike a match, and you see the tip of the match quickly ignite in a burst of energy. Blow the match out and you quickly recognize a very distinct and familiar odor. That specific odor comes from the element sulfur, that is responsible for the ability of matches to ignite. But did you know that the same element is also vital for many of the biochemical processes in the human body? Without sulfur, the "spark of life" would not be possible. It is the sixth most abundant macromineral found in breast milk, and as a percentage of body weight it is the third most abundant mineral found in adults.[1]

Our bodies need sulfur in forms that are different from the sulfur on a match head. Sulfur gets chemically incorporated into larger molecules and amino acids that can be found in certain foods, hard water, and supplements. These are the forms that your body recognizes and knows how to incorporate into its complex biochemical processes. Some of the most common dietary forms of sulfur include methionine, methylsulfonylmethane (MSM), L-taurine, sulforaphane, N-acetyl-L-cysteine, thiamine (Vitamin B1), and biotin.[1,2]

Where do we get sulfur in our diets?

Rich dietary sources of sulfur include healthy vegetables that we sometimes associate with sulfur-like odors such as cabbage, garlic, cauliflower, broccoli, leeks, Brussels sprouts, asparagus, nuts, beans, kale, radishes, and spinach.[1,3,4] Broccoli is actually one of the most potent sources of sulforaphane that has been widely studied and shown to have potent health benefits.[5–7] Foods high in protein contain sulfur, but amounts vary based on the types of amino acids that compose the proteins. Shellfish like lobster, crab, and scallops are excellent sources of sulfur. Eggs are also a good source of sulfur, however many people eat fewer eggs due to concerns about cholesterol.

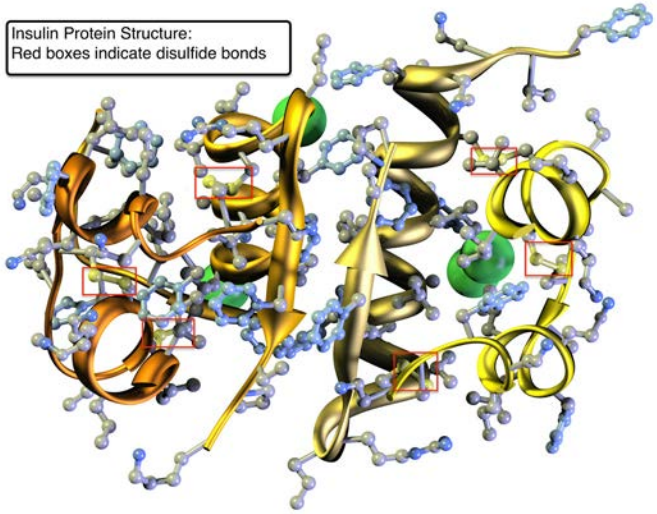
People may not be getting adequate sulfur from their normal diets and this may contribute to the development of some diseases.[3] Sulfur is typically better absorbed and utilized when it comes from animal protein sources as compared to vegetables however there are exceptions.[1] Many crops are now grown in soil that has been depleted of sulfur over time so the content found in our food is lower than in the past.[8,9] Trans-

porting, processing, cooking, and washing food can reduce the levels of sulfur compounds found in food, causing them to become nutritionally deficient.[8,9]

Why does the body need sulfur?

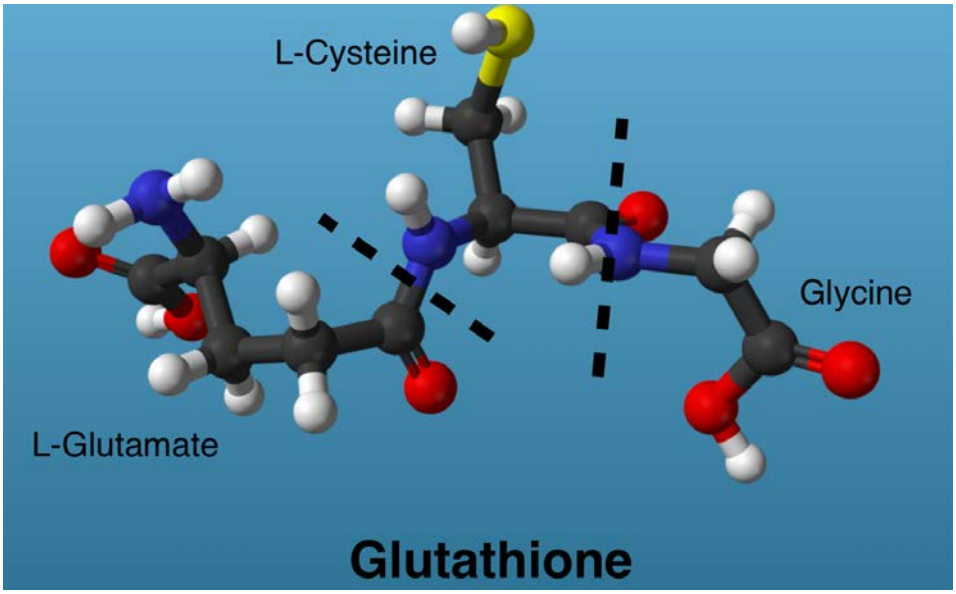
Sulfur is required for production of DNA, insulin, hormones, enzymes, antibodies, neurotransmitters, amino acids (building blocks of proteins), collagen, connective tissues, and much more. It is also essential for the production of detoxifying compounds and antioxidants like glutathione, making it an essential component for the metabolism of many medications, hormones, metabolic waste products, free radicals, and dietary/environmental toxins.[1] N-acetyl-L-cysteine is used universally in hospitals around the world to protect the liver following poisonings and overdoses from things like acetaminophen (active ingredient in Tylenol®).[10,11]

The sulfur-containing amino acid cysteine is also an essential component of many proteins and polypeptides because of its ability



to form "disulfide bonds." These very strong bonds help determine a protein's shape and function while providing biochemical stability.[12] Interestingly, disulfide bonds are more common in extracellular proteins (extracellular = outside of the cell) such as insulin and albumin, while they are generally not found in intercellular proteins (intracellular = inside of the cell) such as hemoglobin and myoglobin.[12]

N-acetyl-L-cysteine, L-taurine, sulforaphane, and MSM have all been shown to have a variety of additional health benefits including antimicrobial activity, immune support, antihistamine, anti-cancer, and anti-inflammatory properties.[13–17] They play a role in providing cell membranes with the fluidity they need for proper signaling, dividing, and many more functions.[18] The sulfur in N-acetyl-L-cysteine is even known to help break up mucous secretions in lungs, and is sometimes used in treating conditions like cystic fibrosis.[10,11,19]



Small Molecule Technologies Nutritional Supplements provide natural sources of sulfur

The Small Molecule Technologies nutritional supplements were designed to provide your body with the sulfur sources that it needs to function properly. In fact, N-acetyl-L-cysteine, L-taurine and MSM are combined with hydroxytyrosol from olives plus B vitamins to create the patented Olivamine10® MAX found in all Small Molecule Technologies supplements. Sulforaphane is included in ImmuneBoost™, Brain Health, and Joint Health while methionine, biotin, and thiamine are provided by Small Molecule Technologies MultiVitamin.

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