



Biological Sulphur

MSM (MethylSulfonylMethane) serves as an important source of bioavailable dietary sulfur. This is a non-metallic sulfur compound, which occurs widely in nature and is stored in every cell of the body.

Because it is found in every cell, MSM helps with: Allergies; Arthritis; Asthma; Back pain; Candida; Constipation; Detoxification; Digestive disorders; Heartburn; Inflammation; Muscle cramps; Parasites; Stress; Ulcers; Wound healing (including surgery). It increases energy, alertness, mental calmness and the ability to concentrate. It is also a free radical scavenger and helps the liver to produce *choline*.

Although sulfur is an essential mineral and plays many roles, it has three major responsibilities in the body: 1) Sulfur is needed to maintain cell membrane permeability, ensuring that nutrients and water can enter the cell and allowing toxins and wastes to exit (major detoxifier); 2) Sulfur is a component of insulin, the critical hormone that regulates the uptake of glucose by cells for use as energy as well as normal carbohydrate metabolism; and 3) Sulfur is a required element found in the proteins of most body tissues (skin, blood vessels, organs, hair and nails) making up the flexible S-S (disulfide) bonds within proteins which provide elasticity and flexibility for movement.

MSM is naturally present in body fluids and tissues and is found in raw milk, raw meat and a variety of fruits, vegetables and grains in small amounts. It is one of the most common substances found in the body, playing an essential role in human nutrition, a commonly overlooked fact. However, because of its volatility, it is readily lost when fresh food is processed and/or stored. Unless the diet consists largely of raw, freshly harvested, unprocessed foods, it is unlikely that sufficient MSM will be ingested to contribute to the daily nutritional sulfur requirements.

A white, odorless crystalline material resembling sugar, MSM is 34% sulfur by weight making it one of nature's richest sources of sulfur. It has a slightly bitter taste and mixes easily into water or juice due to its high solubility and the fact that we use no fillers or excipients. Our MSM is the highest quality, more than 99.5% pure pharmaceutical grade, from plant-based sources and comes in vegetarian capsules.

MSM/TMG

THE WAY NATURE MADE IT

“MSM ~ while present naturally in fresh food—can be driven out of any food by even moderate processing. People will be sulfur-deficient unless they eat their fish and meat raw and their vegetables unwashed and uncooked.”

TMG (TriMethylGlycine) is a natural compound found in most vegetables, small fish and shrimp and is critical for effective metabolism of *homocysteine* (a toxic amino acid).

Homocysteine metabolism is important as it is extremely toxic in blood and is related to elevated risk of heart and cardiovascular disease. However, diseases other than those found in the cardiovascular system can result because of sluggish homocysteine metabolism. These include: Alcoholism; Alzheimer's; Birth defects; Cancer; Cognitive decline; Coronary artery disease; Deep vein thrombosis, Depression; Diabetic retinopathy; Impotence; Intermittent claudication; Multiple sclerosis; Heart attack; Type II diabetes; Osteoporosis; Parkinson's disease; Placental abruption; Renal failure; Rheumatoid arthritis; Mental disorder; Aneurism; and Liver disorders. These conditions only touch the surface, as methylation and *transsulfuration* are global. Since aging is related to methylation of DNA and other functions modified by methylation, almost any disease may be related to sluggish homocysteine metabolism.

During normal metabolism, *methionine* (a beneficial amino acid) is partially converted to homocysteine through a process called *methylation*. In the presence of an adequate methylation system, homocysteine is quickly converted back to methionine or used as a starting point for the synthesis of a large number of compounds needed for a healthy cell—kind of like a fantastic recycling center converting the dangerous homocysteine to many essential nutrients.

Methylation can be affected by many different external factors (in addition to aging) including: high fat diet; cigarette smoking; birth control pills; diets low in grains and vegetables; genetic predisposition; being male. Research suggests that a combination of TMG, folic acid and vitamins B-6 & B-12 works best to lower homocysteine levels.

Our TMG is a highly purified form of anhydrous trimethylglycine obtained from sugar beets. More than 99.9% pure, it is unsurpassed for use as a nutritional supplement and, of course, contains no fillers or additives.

Sulfur's Role—Stored in every cell of the body, the highest concentrations of sulfur are found in the joints, hair, skin and nails. Sulfur also occurs in the blood and in the other organs as well. In mammals, the concentration of MSM decreases with age, possibly as a result of changing diet or body metabolism. The body uses MSM (along with vitamins and amino acids) to continually create new healthy cells. Without proper nutrition (including MSM), the body will produce weak, dysfunctional cells.

Transsulfuration—A metabolic process whereby sulfur is moved from the toxic amino acid homocysteine to the non-toxic sulfur amino acids cystathionine, cysteine and taurine. It is called transsulfuration because this pathway is important in moving sulfur from the amino acid methionine (through homocysteine) to other substances within the cell.

TMG (TriMethylGlycine)—A chemical compound and the best known dietary source of methyl groups. TMG is a natural compound found in most vegetables (especially broccoli and beets), small fish and shrimp

DNA (Deoxyribonucleic acid)—our genetic blueprint, encodes for eye color, hair color, enzyme activity, etc. and is the starting point for the building of each and every cell in our body.

Methionine—A non-toxic amino acid that is found in most proteins and in the natural anti-depressant and methylating agent known as SAM

Methyl Groups—a molecule consisting of one carbon atom and three hydrogen atoms. In the presence of appropriate enzymes, methyl groups are best known for their role in converting homocysteine to methionine, required for the production of proteins and natural antidepressants.

SAM or SAmE—

S-adenosylmethionine. A natural antidepressant and supplier of methyl groups to DNA and other molecules in the body.

Methylation—a naturally-occurring chemical process in the body by which methyl groups (CH₃) attach to different substances in the body to either protect them or transform them. For instance, when properly attached to DNA, methyl groups can act in a protective capacity, keeping inappropriate genes (i.e. Genes that manifest as disease or disorder) from being expressed. The process works against cancer, heart disease, neurological disease, liver disease, and nearly every age-related disorder. As we age, methyl groups are lost from DNA and the ability to replace them is decreased.

Homocysteine—A toxic amino acid shown to be a significant risk factor for cardiovascular disease, neural tube defects and more.



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