The MSM Miracle

WHAT IS METHYL-SULPHONYL-METHANE?

Methyl-Sulphonyl-Methane is an abbreviation of methylsulfonylmethane, an organic form of sulfur. The chemical formula of MSM® is $CH_3SO_2CH_3$. It is the form in which sulfur appears in nature in all living organisms, and in which it is biologically active. Methyl-Sulphonyl-Methane is an odorless, white, crystalline powder that is highly soluble in hot water and in a wide range of organic solvents[1]. Biologically active sulfur has unbelievable preventive and therapeutic properties. The medicinal activities of biological sulfur are so all-encompassing, and are based on such obvious principles, that its discovery is generally considered one of the biggest advances in orthomolecular medicine in the second half of this century.

THE DISCOVERY OF METHYL-SULPHONYL-METHANE

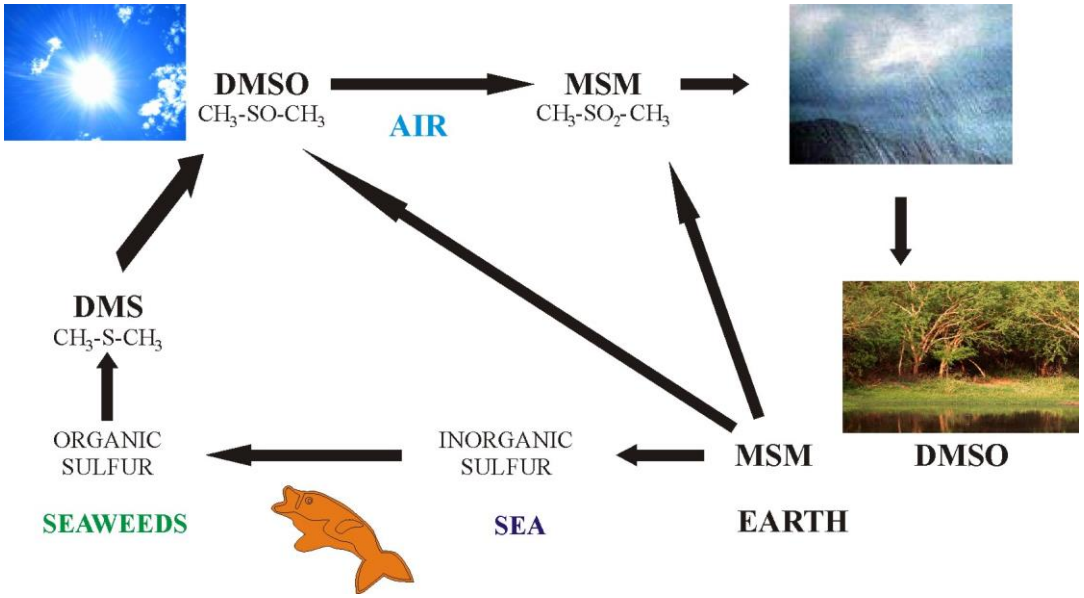
About forty years ago, Dr. Stanley Jacob and *Dr. Robert Herschler*, chemists with the pulp and paper plant Crown Zellerbach Corporation, were asked to find a use for lignin, one of the primary waste products of the plant. Oxidation of lignin in a reactor was shown to result in the formation of DMSO (*Dimethylsulfoxide*), a natural, organic form of sulfur. This water soluble compound has a strong and bitter taste, and is absorbed rapidly through the skin. Workers coming in contact with the DMSO-containing wastewater, noticed their perspiration began smelling like DMSO, and they tasted its bitterness in their mouths. Moreover, the water appeared to have special medicinal qualities. Many stories about miraculous recoveries and benefits still go around, but they can not be authenticated. Certain is, however, that cuts, scrapes, burns and sprains recovered more quickly when dipped in this water. Several workers also noticed that conditions caused by arthritis and asthma improved when they came in contact with the DMSO-containing water (*George Bergstrom*, personal information).

Following its original discovery, several thousand articles and publications have appeared in the United States discussing the medicinal properties of DMSO. Because of its bitter taste and penetrating odor, DMSO never became very popular with the general public. Another problem with DMSO was that it sometimes caused skin irritation when applied topically. For these reasons researchers began looking for a more user-friendly derivative of DMSO. Oxidation of DMSO was found to produce Methyl-Sulphonyl-Methane, a much more stable, organic sulfur compound with medicinal properties at least equal to DMSO, but without the odor and skin irritation complications[4,8,9].

NATURAL SOURCES OF METHYL-SULPHONYL-METHANE

Methyl-Sulphonyl-Methane is the natural form in which sulfur is found in the earth's sulfur cycle[3]. Algae and several forms of plankton in oceans are capable of absorbing massive amounts of inorganic sulfur from seawater, and to convert this into a simple, organically-bound form. When these algae and planktonic organisms die, enzymatic processes result in the breakdown of the organic molecules into DMS, or Dimethylsulfide. This compound is volatile and poorly soluble in water. It collects in the stratosphere, where it is oxidized under the influence of ultraviolet light into DMSO (*Dimethylsulfoxide*), and further converted into MSM (*Methylsulfonylmethane*). DMSO and Methyl-Sulphonyl-Methane are highly soluble in water, and therefore concentrate easily in atmospheric water vapor, returning to earth in the form of rain. Plant roots rapidly collect and concentrate these sulfur sources. Laboratory research has shown, that a one ppm mixture of

radioactive labeled DMSO and Methyl-Sulphonyl-Methane, can concentrate hundred fold in plant roots within hours[4].
Rainwater in particular therefore contains a lot of Methyl-Sulphonyl-Methane. It is also abundantly found in fresh fruit and vegetables in amounts generally ranging from 1 to 4 mg/kg[3]. Raw milk from cows which graze in pastures contains 2 to 5 mg/kg Methyl-Sulphonyl-Methane. Due to the volatile nature of Methyl-Sulphonyl-Methane, it is rapidly lost due to heating during the preparation of food. It is also lost when vegetables and fruit are left for a period of time, heated or not. Pasturized milk therefore contains less than 0.25 mg/kg Methyl-Sulphonyl-Methane, roughly the same amount as found in milk from cows fed dried, artificial food[3]. Due to our present day's dietary patterns, it is unavoidable that modern man suffers from a chronic shortage of Methyl-Sulphonyl-Methane.



METHYL-SULPHONYL-METHANE AND HUMAN HEALTH

The natural level of Methyl-Sulphonyl-Methane in the circulatory system of an adult human male is about 0.2 mg/kg. Normal adults excrete 4 to 11 mg Methyl-Sulphonyl-Methane per day in their urine. Several studies suggest, that the systemic concentration of Methyl-Sulphonyl-Methane drops in mammals with increasing age, possibly as a result of changing diet or body metabolism. Some research suggests, that there is a minimum concentration of Methyl-Sulphonyl-Methane that must be maintained in the body to preserve the normal function and structure[8,9]. Low concentrations of Methyl-Sulphonyl-Methane in our bodies have been linked with unspecified complaints of fatigue, depression, high sensitivity to physical and psychological stress, and with a large number of degenerative diseases[5,6]. Methyl-Sulphonyl-Methane is an important source of sulfur, but also has unique properties related to its chemical structure and biological activities. To understand the preventive and therapeutic properties of Methyl-Sulphonyl-Methane, a distinction needs to be made between "*why humans need sulfur*" vs. "*why humans need Methyl-Sulphonyl-Methane*".

WHY DOES THE HUMAN BODY NEED SULFUR?

Following calcium and phosphorus, sulfur is the third most abundant mineral in the body. A grown person contains approximately 140 grams of sulfur[6]. Nearly half of all sulfur is contained in muscular tissue, skin and bones[5].

Protein Structure

When plants absorb Methyl-Sulphonyl-Methane from rain water, they convert it into the sulfur containing amino acids methionine and cysteine. Taurine and cystine, the other two known sulfur

amino acids, are synthesized from cysteine. The body manufactures about 80% of the amino acids it needs, and these are classified as nonessential. The remaining 20%, called essential amino acids, must be obtained from food. Methionine and cysteine are considered two of them. There are approximately 28 known amino acids. Each type of protein is made up of a unique collection of amino acids in a specific combination. Two molecules cysteine can oxidize and bond together through sulfur (-S-S-) bonds[5]. These sulfur bonds are the key factors that hold proteins in shape, and determine the form properties and biological activity of proteins.

Connective Tissue

Nails and hair primary consist of a tough protein with a high sulfur content, called keratin. Flexible tissues like connective tissue and cartilage, contain proteins with flexible sulfur bonds. Collagen is the most abundant protein in the body, and a major component of all connective tissue. In skin, collagen works with fibers of another protein called elastin, to give skin its elasticity. In cartilage, the sulfur containing proteoglycans glucosamine and chondroitin form with collagen a fibrous protein substance that give cartilage its structure and flexibility[5,6].

The importance of the connective tissue for the body goes beyond simply keeping cells together. The first biophysical regulatory model was developed by *Prof. Dr. Pischinger* which he termed the "*Vegetative Building Structure*". This theory was further developed by *Prof. Dr. Heine* who described proteoglycans and glycosamines, and by Dr. Popp, a biophysicist, who showed the importance of electromagnetic fields in bio-information. Their research has demonstrated that the soft, connective tissue, the extracellular matrix which surrounds cells, serves more purposes that structural and connective. It also is important in the transport of nutrients, electrolytes, signal compounds and atomic and subatomic particles. Thus, the soft connective tissue forms an essential communication network within the body through the transfer of fine matter bio-information[13-16].

As many people notice later in life, the flexible tissues lose their elastic properties. A shortage of sulfur is the likely cause of this problem. The consequences are stiffening of muscles and joints, rippling of the skin, and decreased elasticity of lung tissues and arterial blood vessels. Without a doubt, the transfer of bio-information through soft connective tissue deceases also, and the occurrences of diseases at advanced age may well be caused by a decrease in communication between cells and body tissues.

Cell Membrane Permeability

All cells (and all organelles within cells) are surrounded by membranes. A membrane consists of two layers of molecules situated opposite of one another and consisting of an essential fatty acid on one end, and a sulfur containing amino acid on the other end. The amino acids are interconnected in such a manner that they form a surface into which the proteins and other membrane constituents are inserted and secured. These proteins are necessary for the transport through the cell membrane of many types of nutrients and waste materials.

Sulfur bridges form flexible connections between the cells and the surrounding connective tissues. This allows the cells to retain their elasticity. When sulfur is in short supply, the cell wall hardens, and the cells lose their elasticity. The transport proteins of the membrane become locked, and the membranes become less permeable. This results in a reduced transport of oxygen and nutrients into, and excretion of waste products from the cells. This causes a shortage of oxygen and nutrients, and an accumulation of toxic metabolic waste products inside the cells. Reduced vitality and eventually degenerative diseases are the result.

Recent insight in free radical pathology has shown that the thiol (-SH) groups of sulfur containing amino acids can protect cell membrane protein chains from oxidation. But that is not all. Studies by *Dr. Johanna Budwig* have demonstrated that sulfur containing amino acids in cell membranes resonate with the double connections of the fatty acids, resulting in the release of electrons. Electron clouds are formed, which can move along the fatty acid chains. In this manner, electrical currents evolve which form the basis of all electrical energy in the body. This energy can be measured in

heartbeat, nerve stimulations, muscle contractions, in short, in all chemical and electrical reactions which make life possible.

Metabolism

Enzymes are proteins which control all-important life functions. For example, they regulated all metabolic processes in our bodies. Sulfur bridges are responsible for the spatial structure of enzymes. Without sulfur bridges, enzymes would lack biological activity due to deviations in their spatial structure. Shortages in sulfur cause reduced production of biologically active enzymes, which result in a reduction of many metabolic processes. Sulfur is important for the cellular energy production in which glucose is metabolized under the release of energy.

Most important, sulfur plays a role in the electron transport system, as part of iron/sulfur proteins in mitochondria, the energy factories of the cell. Furthermore, sulfur participates in the vitamin-B Thiamine (B_1) en Biotin. These vitamins are essential for converting carbohydrates into energy, by burning glucose. Insulin is a hormone excreted by the pancreas which mainly functions to regulate the blood sugar level. Insulin therefore plays an important role in the carbohydrate metabolism. Each insulin molecule consists of two amino acid chains, connected to one another by sulfur bridges. These sulfur bridges are very important for the proper functioning of insulin. Without these bridges, the hormone loses its biological activity.

WHY DOES THE HUMAN BODY NEED METHYL-SULPHONYL-METHANE?

Preferred Dietary Source of Sulfur

It is generally believed that in humans, the sulfur-containing amino acids methionine and cysteine are the most important sources of sulfur. However, since the discovery of the earth's sulfur cycle, this theory is increasingly brought into question[3]. Several hundred million years ago, algae in the oceans started producing simple organic sulfur compounds, which led to the formation of Methyl-Sulphonyl-Methane. This biologically active sulfur was probably the most important source of sulfur for all subsequently developing life forms. This gives food for thought that the higher forms of life most likely are genetically preprogrammed to use Methyl-Sulphonyl-Methane as source of sulfur. This theory is further enhanced by the discovery that Methyl-Sulphonyl-Methane can be ingested by all organisms investigated so far in almost unlimited quantities without causing any toxic effects. The same cannot be said about the sulfur containing amino acids methionine en cysteine, which can be consumed in small quantities, but at larger doses cause undesired toxic symptoms[3].

Experiments using Methyl-Sulphonyl-Methane containing radiolabeled sulfur (^{35}S) have shown, that following ingestion, Methyl-Sulphonyl-Methane releases its sulfur to form collagen and keratin, basic ingredients of hair and nails, as well as the essential amino acids methionine and cysteine, and serum proteins[8,11]. It appears abundantly clear that the importance of Methyl-Sulphonyl-Methane as source of sulfur has been grossly underestimated. The reason for this underestimation is most easily explained by the way food is processed in our western society, which causes the loss of the majority of the naturally present Methyl-Sulphonyl-Methane. It is therefore for good reason that Methyl-Sulphonyl-Methane is referred to as “The Forgotten Nutrient”[6].

Protection of the Mucosa

Additional experiments with Methyl-Sulphonyl-Methane containing radiolabeled sulfur demonstrated that after ingestion, Methyl-Sulphonyl-Methane is bound to the mucosa. Apparently, Methyl-Sulphonyl-Methane is binding to receptor sites at the mucous membrane surface in the intestinal and urogenital tracts and the respiratory system. By doing so, it presents a blocking interface between host and environment[4]. There are many health-benefitting implications to such natural interactions. Allergens and parasites cannot bind to the mucosa, toxins are oxidized and free radicals are eliminated.

WHAT CAN METHYL-SULPHONYL-METHANE DO FOR YOU?

Deficiencies in biological sulfur can result in less optimal functioning of each cell, tissue and organ in the body. Inorganic sulfur is poorly assimilated. Organic, biologically active sulfur is therefore extremely important for the health of every living organism. Methyl-Sulphonyl-Methane is the natural source of biological sulfur. Use of Methyl-Sulphonyl-Methane has the following benefits:

Chronic Pain

Perhaps the most remarkable discovery regarding Methyl-Sulphonyl-Methane is, that Methyl-Sulphonyl-Methane is an effective pain killer which works with many types of chronic pain. In March 1999 a remarkable book was published: "*The Miracle of Methyl-Sulphonyl-Methane: The Natural Solution for Pain*". This book is based on the experience of two medical doctors who have worked with Methyl-Sulphonyl-Methane. The authors are: *Stanley W. Jacob, M.D.*, Head of the DMSO Pain Clinic in Portland, OR, and Professor at the *Oregon Health Sciences University*; and *Ronald M. Lawrence*, M.D., Ph.D., Founder of the *International Association for the Study of Pain*, and the *American Association for the Study of Headaches*. Both doctors discuss their extensive experience with Methyl-Sulphonyl-Methane in this book. Combined, they have over 20 years of experience with fighting pain with Methyl-Sulphonyl-Methane. They conclude that of more than 18,000 patients that suffer from chronic pain, about 70% have experienced benefits from the use of Methyl-Sulphonyl-Methane, i.e., the pain either diminished or disappeared altogether.
The types of pain which has been treated successfully with Methyl-Sulphonyl-Methane include:

- Personal injury due to accidents, burns, etc.
- Osteoarthritis and rheumatoid arthritis
- Fibromyalgia
- Lower back pains
- Headaches, migraines
- Muscle aches
- Bursitis
- Tennis elbows and other local sprots injuries
- Carpal Syndrome
- Sclerosis;
- Whiplash
- RSI (Repititive Strain Injury);
- Scars due to burns, operations, accidents, etc.

The way Methyl-Sulphonyl-Methane impacts pain is currently explained by the following mechanisms:

- Methyl-Sulphonyl-Methane is a natural analgetic: it blocks the transfer of pain impulses through nerve fibers (C-fibers).
- Methyl-Sulphonyl-Methane blocks inflammations and inflammatory processes. Methyl-Sulphonyl-Methane enhances the activity of cortisol, a natural anti-inflammatory hormone produced by the body.
- Methyl-Sulphonyl-Methane improves the permeability of cell membranes. This improves the uptake of nutrients and many vitamins and the elimination of waste products and excess cellular fluids.
- Methyl-Sulphonyl-Methane dilates bloood vessels, enhancing the blood circulation. This, too, helps to eliminate waste products from the body, which speeds up healing.
- Methyl-Sulphonyl-Methane is a muscle relaxant. This is an important and often overlooked benefit of Methyl-Sulphonyl-Methane. Many chronic pains are aggrevated by chronic muscle tension in the body.

- Methyl-Sulphonyl-Methane aids the natural defense mechanisms in the body by regulating the prostaglandin metabolism, and regulates the formation of anitbodies and immune complexes.
  Methyl-Sulphonyl-Methane slows down and restores crosslinking in collagen. Crosslinking in collagen is a natural process in scar formation, causing hard and often painful scar tissues. Particularly in the case of burn scars, in which large surface areas may be affected, this may lead to chronic pain. Methyl-Sulphonyl-Methane heals scar tissue which makes the skin more flexible. Dramatic examples are known of people who have treated burn scars with a Methyl-Sulphonyl-Methane ointment and have seen their scars almost disappear and have eliminated associated pains.

Synergetic Effect

Methyl-Sulphonyl-Methane is considered a potentiator of most vitamins and other nutrients, such as vitamin C, Coenzyme Q10, all B- vitamins, vitamin A, D en E, amino acids, selenium, calcium, magnesium en many others. Methyl-Sulphonyl-Methane improves the cellular uptake of these nutrients, and prolongs their lives[5,6,8]. The body can better utilize the nutrients, and taking dietary supplements is more efficient. Additionally, fewer dietary supplements need to be taken.

Antioxidant

Methyl-Sulphonyl-Methane is a strong antioxidant, capable of binding and inactivating free radicals. Free radicals are unstable molecules and atoms with unpaired electrons, which, by force of nature, attract electrons from their surrounding environment. Free radicals are not all harmful. Actually, life without free radicals is impossible. They are needed for te cellular energy production. The liver produces free radicals during the breakdown of harmful substances. And the body's immune system uses free radicals to kill viruses and bacteria. The body houses antioxidants which bind and deactivate free radicals. The normal productions of free radicals in a healthy human therefore are harmless. However, the overproduction of free radicals can be very harmful. They can begin a chain reaction which eventually can cause great harm to cell membranes and chromosomes. Overproduction of free radicals is caused by physical and mental stress, malnutrition, air pollution, heavy metals and organic contaminants in drinking water and food, radiation and cigarette smoke. In such cases the body needs extra antioxidants from our food. Methyl-Sulphonyl-Methane is such an antioxidant.

As a major sulfur donor, Methyl-Sulphonyl-Methane is essential for the proper functioning of the body's anti oxidation system. When neutralizing free radicals, the body uses a variety of antioxidant enzymes that contain sulfur amino acids, and derive their structure and biological activity from sulfur bonds (S-S). Besides, Methyl-Sulphonyl-Methane provides the sulfur for the amino sulfur acids methionine, cysteine and taurine, that are considered powerful antioxidants. When split off, the thiol (-SH) groups of these amino acids are capable of neutralizing free radicals[17]. Sulfur is also necessary for the formation of what is considered the most powerful nutritional antioxidant, glutathion[5]. And as stated before, Methyl-Sulphonyl-Methane potentiates the effect of well known nutritional antioxidants as the vitamins C and E, coenzyme Q10, selenium etc.[5, 7]. Methyl-Sulphonyl-Methane itself also appears to act as an antioxidant[7]. The mucosa contains a carbon-sulfur bond cleaving enzyme, termed C-S lyase. Studies suggest that when bound to the mucosa, cleavage of Methyl-Sulphonyl-Methane provides an electron deficient group CH_3SO_2which can neutralize free radicals[4].

Detoxification

Methyl-Sulphonyl-Methane is known to dissolve in many organic and inorganic compounds[1]. Bound to the mucosa and split into an electron deficient group $CH_3SO_2^{\cdot}$, Methyl-Sulphonyl-Methane reacts with toxins, affects inactivation and speeds excretion[4]. Furthermore, Methyl-Sulphonyl-Methane enhances the permeability of cell membranes, making it easier for nutrients to

be taken up by the cells, and waste products to be eliminated. Practically speaking, Methyl-Sulphonyl-Methane drastically increases the ability of cells to excrete toxic waste products. Many health practitioners working with Methyl-Sulphonyl-Methane will state, that it is the most powerful detoxifying nutraceutical or pharmaceutical agent they have ever worked with.
A recent example shows the dramatic detoxification action of Methyl-Sulphonyl-Methane. A young artist sought help in a psychiatric institution for severe mental complaints. Anti-depressives worsened his complaints to such degree that he decided to look for alternative care. Microscopic examination of his blood using the Life Blood / HLB test showed undeniably that the man suffered from several heavy metal and solvent poisoning caused by the paints which he used in his art work. This person subsequently sought the help of various traditional and alternative medical professionals who prescribed various pharmaceutical drugs, homeopathic and orthomolecular detoxifier as well as bioresonance therapy. After one and one half years of detoxification the blood picture had somewhat improved, but he still exhibited severe toxicity symptoms (***Figure a***). One and one half years later, his blood had improved somewhat but his basic complaints had remained unchanged. On the advice of the author, this man stopped taking the medications received so far, and was put on high dosages of Methyl-Sulphonyl-Methane (15 grams/day), supported by weekly Ayurvedic sweat baths to stimulated waste discharge. Two months later his a microscopic examination showed that his blood had returned to normal (***Figure b***), and he indicated that, for the first time since seeking treatment, he had noticed a significant improvement in his condition.

Figure a Figure b

Neurological Diseases

The brain is extremely sensitive to the effects of toxic materials such as heavy metals and organic compounds. Many of these compounds tend to accumulate in nerve cells where they can cause severe oxidative damage. Neurological disturbances such as Alzheimer's and Parkinson's disease, may be the result. Methyl-Sulphonyl-Methane is one of the few antioxidants which can easily pass the blood-brain barrier. It prevents and repairs oxidative damage and restores cell membrane elasticity and permeability. This allows the nerve cells to start excreting waste products.
The powerful action of Methyl-Sulphonyl-Methane is illustrated in the following example. An older woman suffered from poisoning caused by exposure to aluminum. This heavy metal had accumulated in her brains and caused severe neurological damage. The woman had been confined to her bed for six years, unable to communicate with her surroundings. All this time she had not spoken a word. Medical doctors could no longer help her and had given up on her. She was completely dependent on her husband who took complete care of her needs. A natural health care practitioner advised two teaspoons of Methyl-Sulphonyl-Methane (about 15 grams) daily. The Methyl-Sulphonyl-Methane passed the blood brain barrier, and restored the permeability of the brain cell membranes, following which her brain cells were allowed to purge the heavy metal poisons. Two weeks later, the orthomolecular physician prescribed a warm bath to her in which special substances had been added to help her eliminate the released poisons through the skin. After twenty minutes in this bath, the woman suddenly smiled and said "*Gee, I feel much better now*". These were the first words she had spoken in years. Several months later, the woman was capable of leading a normal life again[7].

Allergies

Methyl-Sulphonyl-Methane alleviates the symptoms of a large number of allergies including food allergies, contact allergies, inhalation allergies, etc. The major anti-allergic property of Methyl-Sulphonyl-Methane is probably caused by its ability to bind to the mucosa and present a natural blocking interface between hosts and allergens. Besides, Methyl-Sulphonyl-Methane alleviates allergies through detoxification and elimination of free radicals, and improvement of cell permeability. A direct correlation between concentration of Methyl-Sulphonyl-Methane used and resistance to allergens has been established. Several authors have noted that Methyl-Sulphonyl-Methane works as a histamine inhibitor at least as well as the traditional antihistamines, without the negative side effects[5, 6, 7].

Autoimmune Diseases

Methyl-Sulphonyl-Methane very effectively fights inflammations resulting from autoimmune reactions (in which the body's immune system turns onto itself). For example, people who suffer from arthritis often benefit greatly from Methyl-Sulphonyl-Methane. Several studies have shown, that supplementation of Methyl-Sulphonyl-Methane, significantly reduced joint degeneration and inflammation. In one study, 24 people with symptomatic osteoarthritis were treated with either a regular (NSAID) drug, or with 3 grams of Methyl-Sulphonyl-Methane daily. After one month, both groups noted equal improvements in pain and stiffness[6]. In another experiment, a special strain of mice was studied that is prone to the spontaneous development of rheumatoid arthritis-like joint lesions.

Researchers have found that two-month old mice who were given water containing a 3% solution of Methyl-Sulphonyl-Methane for a period of three months suffered no degeneration of articular cartilage. In the control group of mice receiving only tap water, 50% of the animals were found to have focal degeneration of articular cartilage. Nearly all (95%) control animals had inflammatory reaction in the synovial tissues, compared to less severe inflammatory reaction in 50% of the Methyl-Sulphonyl-Methane group[8,10]. The beneficial effect of Methyl-Sulphonyl-Methane is due in part to its ability to improve cell permeability, allowing harmful substances (lactic acid, toxins) to flow out while permitting nutrients to flow in, thereby preventing a pressure buildup in cells that causes inflammation in the joints[5].

Mice prone to the development of Autoimmune Lymphoproliferative Disease (ALD) were fed a diet that included a 3% solution of Methyl-Sulphonyl-Methane as drinking water from the age of one month. The mean life span of the control group was 5.5 months, whereas the mean life span of the Methyl-Sulphonyl-Methane group was extended to more than 10 months of age. The Methyl-Sulphonyl-Methane group showed decreased anti-nuclear antibody responses and significant diminution of lymphadenopathy, splenomegaly and anemia development, thus suggesting that Methyl-Sulphonyl-Methane provided significant protection against the development of the autoimmune disease ALD[12]. Other experiments were conducted on mice bred for their propensity to acquire the autoimmune disease Systemic Lupus Erythematosus (SLE).

These experiments showed Methyl-Sulphonyl-Methane to have a protective effect both before and after the onset of the disease. Mice which are maintained on a diet including 3% Methyl-Sulphonyl-Methane in their drinking water from age one month, suffered lower death rates and liver damage than control groups drinking only tap water. After seven months 30% of the control group had died, while all the Methyl-Sulphonyl-Methane mice were still alive. Also, when mice seven months old and already showing signs of advanced lupus were fed the Methyl-Sulphonyl-Methane diet, 62% of the animals were still alive after nine months compared to 14% for the control group that received only tap water[8].

Cancer

Several experiments have shown, that oral administration of Methyl-Sulphonyl-Methane can protect rats against the onset of cancer. In one study, rats specially bred to be susceptible to breast cancer

when given certain carcinogenic compounds, were fed a diet containing Methyl-Sulphonyl-Methane for a period of eight days. The control group did not receive Methyl-Sulphonyl-Methane. Following this preliminary period, all rats were given oral doses of cancer-causing agents. There was no statistical difference in the number of tumors developing in the two groups. However, the Methyl-Sulphonyl-Methane diet rats developed their first tumors some 100 days later than the control rats, and these tumors became cancerous some 130 days later than those in the control group. Considering a two-year average life expectancy of rats, 100 days are the equivalent of about ten years in human life[8].

In another research, rats received Methyl-Sulphonyl-Methane as 1% solution in their drinking water throughout the time of the experiment. The control group received only tap water. One week after the start of the dietary regimen, all rats were injected with dimethylhydrazine, a chemical that induces colon cancer. Over the nine months that the experiment was conducted, the number of bowel tumors occurring in the rats was statistically the same for the two groups. However, the time of appearance of the first bowel tumors was considerably longer in the Methyl-Sulphonyl-Methane treated rats. The researchers concluded, that Methyl-Sulphonyl-Methane significantly lengthens the time of tumor onset compared to the controls[8].

Parasites

One of the most amazing discoveries on Methyl-Sulphonyl-Methane is its anti-parasitic action against Giardia, Trichomonas, roundworms, nematodes, Enterobius and other intestinal worms[5]. Animal studies include laboratory mice, determined to have pin worms (*Enterobius*) by fecal cast examination. They were given commercial food and drinking water, both containing 2% Methyl-Sulphonyl-Methane by weight. After 17 days, fecal examination indicated the feces were free of worms and eggs. The blood level of Methyl-Sulphonyl-Methane in one animal examined exceeded 30 ppm or mg/kg[3]. Human studies include a man with confirmed *Giardia lamblia*, apparently contacted from contaminated water in a primitive area. He was given 500 mg Methyl-Sulphonyl-Methane three times a day for 14 days. By the eighth day he was free of symptoms, and two stool specimens collected one week later were free of the organism[3]. In another study, *Trichomonas vaginalis* was successfully treated by oral dosage of 1 gram Methyl-Sulphonyl-Methane a day, and a daily topical application of 5% aqueous Methyl-Sulphonyl-Methane for one week[3].

The major antiparasitic property of Methyl-Sulphonyl-Methane is probably caused by its ability to bind to the mucosa and present a natural blocking interface between hosts and parasites. It's as though Methyl-Sulphonyl-Methane puts down a coating on the mucosa, which parasites find impenetrable and can't cling to. Unable to stick, the parasites are simply flushed out of the body[5,9].

In vitro research has shown the antiparasitic, antifungal and antibacterial action of Methyl-Sulphonyl-Methane concentrations. Methyl-Sulphonyl-Methane concentrations of 1 mg/mL and less demonstrated no significant inhibition of *Giardia lamblia*. However, at 20 mg/mL concentrations it was strongly inhibitory, and concentrations above 40 mg/mL promptly killed the organism. According to Dr. Herschler, one can safely administer up to 1-2 gram Methyl-Sulphonyl-Methane per kg body weight on a daily basis. One therefore builds a safely tolerated blood level up to 4000 ppm (mg/kg), which level is highly toxic to many infective organisms yet is harmless to the host[3].

A growing number of natural physicians are expressing concerns about parasites. It is becoming increasingly clear that they can be a continuous source of poisoning which can spread throughout the body and affect the immune system. It is an intriguing thought that Methyl-Sulphonyl-Methane maybe nature's original means of protecting us against parasites.

Diabetes

The sulfur-containing B vitamin biotin is a critical part of glucokinase, the enzyme involved in the utilization of the sugar glucose. Sulfur is also a component of insulin, the protein hormone secreted by the pancreas that is essential to carbohydrate metabolism. Lack of nutritional sulfur in the diet

can result in low production of biological active insulin. Studies indicate, that Methyl-Sulphonyl-Methane improves cellular glucose uptake by improving cell permeability, thus balancing blood sugar level and returning the pancreas to normal functioning[5].

Muscle Soreness and Cramps

Especially in combination with vitamin C, Methyl-Sulphonyl-Methane has demonstrated remarkable ability to reduce or eliminate the incidence of muscle soreness, leg and back cramps. Methyl-Sulphonyl-Methane is particularly successful with geriatric patients who have such cramps during the night or after long periods of inactivity. Many people with stiff muscles and joints have reported a marked improvement after using Methyl-Sulphonyl-Methane for some time. Several cases have been reported of people who suffer from carpal tunnel syndrome, who have been cured by using Methyl-Sulphonyl-Methane. An elderly woman was slated to have an operation performed on both wrists. On the advice of the author she started using Methyl-Sulphonyl-Methane. A month later her symptoms had all but disappeared, and the operation was no longer necessary.

Athletes who compete vigorously can learn from trainers of million-dollar racehorses. For many years and with great success, trainers administer Methyl-Sulphonyl-Methane to their prize horses before a race to prevent muscle soreness, and afterwards to lessen the risk of cramping and improve physical recovery[4]. The physical fatigue syndrome following intense athletic activity in competitive sports, which usually persist for 8-10 days in athletes, was gone in 2-3 days in individuals who had ingested 1-2 gram Methyl-Sulphonyl-Methane per day for the preceding six months[3].

Constipation and Stomach Acidity

One study reveals, that at least 75% of individuals taking one or more antacids or H_2 histamine receptor antagonists against stomach acidity, were able to sharply reduce or eliminate such medication within a week of initiating Methyl-Sulphonyl-Methane as a dietary supplement. In another study, twenty-one subjects with a history of constipation were given 500 mg daily doses of Methyl-Sulphonyl-Methane together with 1 gram of ascorbic acid. All subjects with abnormal colon function returned to normal and remained normal while Methyl-Sulphonyl-Methane was part of their diet[5]. These studies point out, that Methyl-Sulphonyl-Methane often gives more relief from stomach acidity and constipation, than commonly prescribed medication. Many people have experienced, that one of the most exciting and rewarding benefits for those who begin taking Methyl-Sulphonyl-Methane, has been the prompt and continuing relief from stomach acidity and constipation problems[7].

Lung Dysfunction

Methyl-Sulphonyl-Methane allows the body to more effectively take up oxygen. In the first place, it improves the elasticity of the lung cells and the permeability of long cell membranes, allowing more air to be breathed and oxygen to pass through the membranes into the blood stream. Secondly, Methyl-Sulphonyl-Methane prevents and corrects the clotting of red blood cells, allowing the blood to absorb more oxygen. Moreover, by improving the cell membrane permeability, cells throughout the body can take up more oxygen from the blood, and hence produce more energy. People suffering from lung dysfunctions may benefit greatly from treatment with Methyl-Sulphonyl-Methane. In one study, seven human subjects with respiratory deficiency were given Methyl-Sulphonyl-Methane in amounts ranging from 250 - 1.500 mg/day. Five had emphysema, and two had lung tumors with additional function impairment due to pleural fluid accumulation. Both were on radiation chemotherapy prior to including Methyl-Sulphonyl-Methane in their diet, but without apparent benefit. Before and during the test period, the five subjects with emphysema were required to walk a measured distance compatible with their physical capabilities. Within four weeks of beginning the ingestion of Methyl-Sulphonyl-Methane, all emphysema sufferers had at least doubled their "*comfortable*" walking distance. The two subjects with lung tumors were assessed by

attending physicians and nurses as more alert and with a better attitude than before the test. Most strikingly however, the lung fluid had disappeared during the first months of the test period [3].

Stress

Many people using Methyl-Sulphonyl-Methane have reported to feel better and stronger, with increased endurance. During a test with 14 persons using Methyl-Sulphonyl-Methane for periods from seven months to over one year, none of them became ill[3]. One stress study involved two groups of 25 goldfish, which were removed from a large aquarium and placed in two identical, small aquariums. One group was fed ordinary goldfish food, and the other group received the same food with 2% by weight of Methyl-Sulphonyl-Methane added. Movement confinement, temperature changes and marginal oxygenation stressed the fish in both aquariums equally. After five days, only one fish of the Methyl-Sulphonyl-Methane group had died, against 11 (almost 50%) of the control group[3].

It is common practice in intensive cattle breeding to add antibiotics to animal feed to promote growth and prevent the outbreak of stress-related diseases. Animal products such as meat, milk and eggs contain residues of antibiotics, which are readily consumed. The abundant usage of antibiotics is largely responsible for the creation of resistent bacteria strains. Well known examples are the "*hospital bacterium*" MRSA (meticillin resistant *Staphylococcus aureus*), and the VRE's (vancomycin-resistant enterococci). Today, increasing resistance of bacteria is considered one of the major threats of human health. It is an intriguing thought that adding Methyl-Sulphonyl-Methane to animal feed might reduce stress and improve animal health to a level where the usage of antibiotics can be strongly reduced.

Skin

Sulfur is called nature's "*beauty mineral*," because it keeps the skin smooth and youthful, and the hair glossy. Sulfur is necessary for production of collagen and keratin, protein necessary for health and maintenance of skin, nails and hair[6]. Several experiments have shown, that all kinds of dermatological disorders which are often allergy-related, respond favorably to a diet supplemented by Methyl-Sulphonyl-Methane. Oral dosages of Methyl-Sulphonyl-Methane have shown to be effective against acne, Rosaceae and dry, scaly or itching skin[3]. When used topically in the form of an ointment or lotion, Methyl-Sulphonyl-Methane is helpful in treating skin disorders including acne, psoriasis, eczema, dermatitis, dandruff, scabies, diaper rash and certain fungal infections[1,6]. Scars resulting from operations and from burns also respond well to topical application. New scars can heal so perfectly, that they are almost invisible. Old scars, too, can improve markedly.

FOR WHOM IS METHYL-SULPHONYL-METHANE INTENDED?

Methyl-Sulphonyl-Methane is intended for everyone who appreciates good health and intends to keep this as long as possible. Sport enthusiasts and athletes can use it to improve their performance and sped up recovery. People with degenerative diseases can use it to drastically improve their health.

Methyl-Sulphonyl-Methane is no cure-all solving each and every health problem. It is a food supplement which people in ancient times probably received in sufficient degree. In our present time, this is demonstrably not the case. Methyl-Sulphonyl-Methane assists the body to better cure itself and maintain its vitality. Methyl-Sulphonyl-Methane cannot do this by itself. The basis for good health is maintaining healthy living conditions, in which one feels happy and takes good care of one's health. Such living conditions include:

- Healthy food which, at a minimum, includes Methyl-Sulphonyl-Methane, vitamin C and trace minerals and elements, as these are food ingredients which nearly everyone obtains insufficiently;
- Loving relationships;

- Sufficient sleep;
- Sufficient sunlight and fresh air;
- Periodic meditation or prayer;
- Attainable life goals which fit one's essence;

DOSAGES AND USAGE

The optimal dosage depends on the nature and intensity of the complaints. In most cases, it is sufficient to take an initial dose of three 1-gram tablets twice daily (children ten and under take a tablet twice daily, older than ten, take two tablets twice daily). After several months this dosage can be reduced to two tablets twice daily. People with serious ailments have been shown to benefit from higher dosages, up to four 1-gram tablets three times daily. Such a high dosage may be advised to fight parasital infections. Case studies have been reported in which patients did not show noticeable improvement until they received a daily dosage of 30 grams[6]. Such extreme dosage is not generally recommended for most people, although no negative effects were reported[3,6].
It is recommended to gradually increase the dosage from two tablets twice daily, and not to increase the dose as long as detoxification symptoms persist. Although uncommon, these symptoms may include nausea and headaches (see below). Methyl-Sulphonyl-Methane is best taken with a glass of water one half hour prior to taking a meal. As it tends to stimulate one's energy level, it is generally advisable not to take it prior to retiring for the night.

HOW SAFE IS METHYL-SULPHONYL-METHANE?

Methyl-Sulphonyl-Methane is considered to be one of the least toxic substances in biology, similar in toxicity to water. When Methyl-Sulphonyl-Methane was administered to human volunteers, no toxic effects were observed at intake levels of 1 gram per kg of body weight per day for 30 days. Intravenous injections of 0.5 grams per kg body weight daily for five days a week produced no measurable toxicity in human subjects. The lethal dose (LD50) of Methyl-Sulphonyl-Methane for mice is more than 20 g/kg body weight. Methyl-Sulphonyl-Methane has been widely tested as a food ingredient without any reports of allergic reactions. An unpublished Oregon Health Sciences University study of the long-term toxicity of Methyl-Sulphonyl-Methane over a period of six months, showed no toxic effects. More than 12,000 patients were treated with Methyl-Sulphonyl-Methane at levels above two grams daily, without toxicity[8].

DETOXIFICATION SYMPTOMS

In practice, most people who use Methyl-Sulphonyl-Methane notice very little at the onset, or may experience slight detoxification symptoms. These symptoms may include mild forms of diarrhea, skin rash, headache and fatigue. After one week, these symptoms usually disappear. Fewer than 20% of users of Methyl-Sulphonyl-Methane may feel moderately sick in the first few days of using Methyl-Sulphonyl-Methane. It may be small consolation to know, that the stronger the symptoms are, the more toxicants had been stored in the body and the more Methyl-Sulphonyl-Methane was needed for its purification. If more moderate symptoms of detoxification are experienced, it may be advisable to reduce the dosage of Methyl-Sulphonyl-Methane, and to gradually rebuild it once the symptoms disappear.

ABOUT THE AUTHOR

Ir. *Paul Klein Breteler* is a Health Care Practitioner in The Hague, Netherlands, who's private practice specializes in homeopathic and orthomolecular medicine and healing methods involving aura's and chakra's. He has published widely in scientific and popular magazines, and is Director of the Methyl-Sulphonyl-Methane Medical Information Foundation, located in the Netherlands.

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