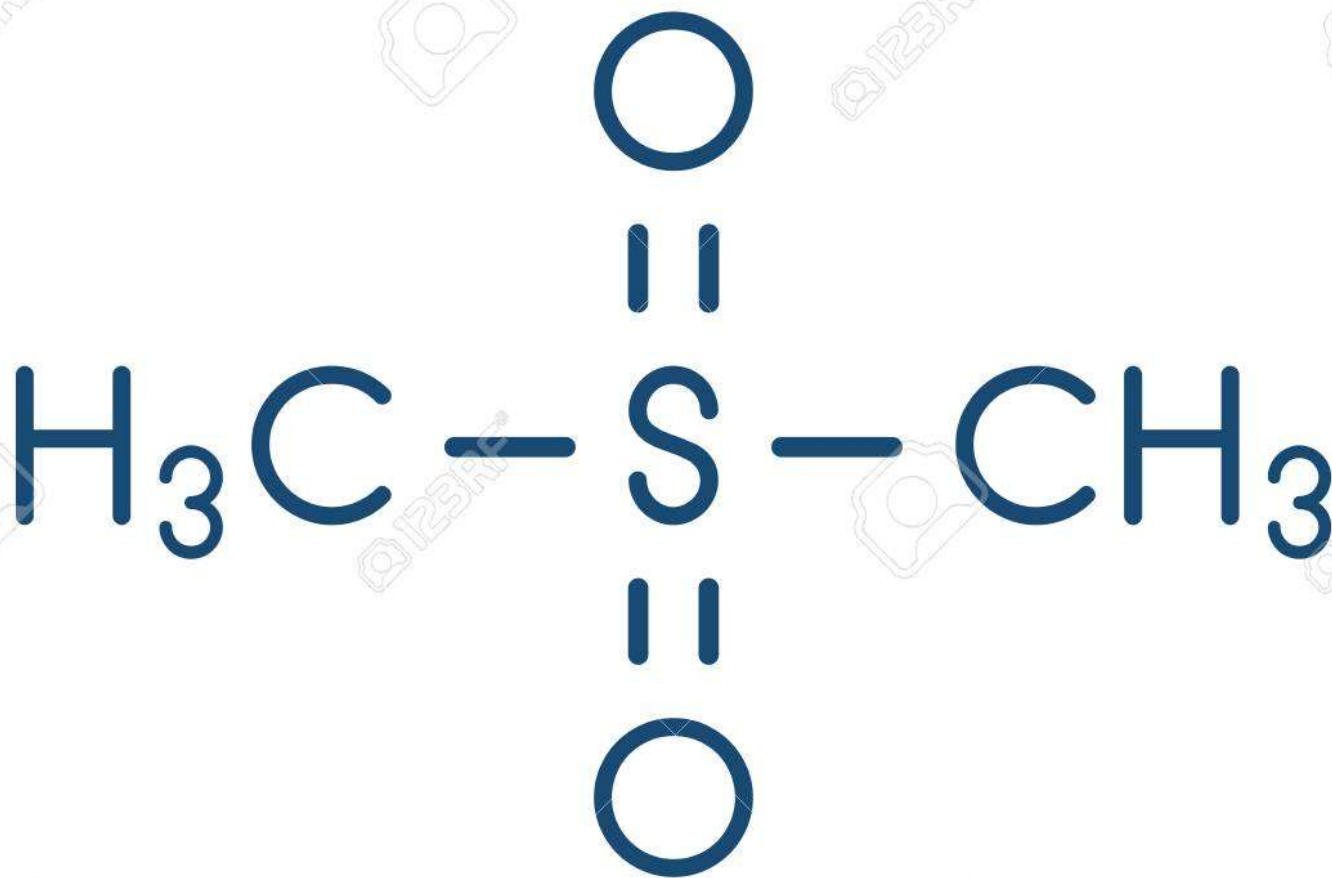




# MSM: The Mineral Essential for Health

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methylsulfonylmethane

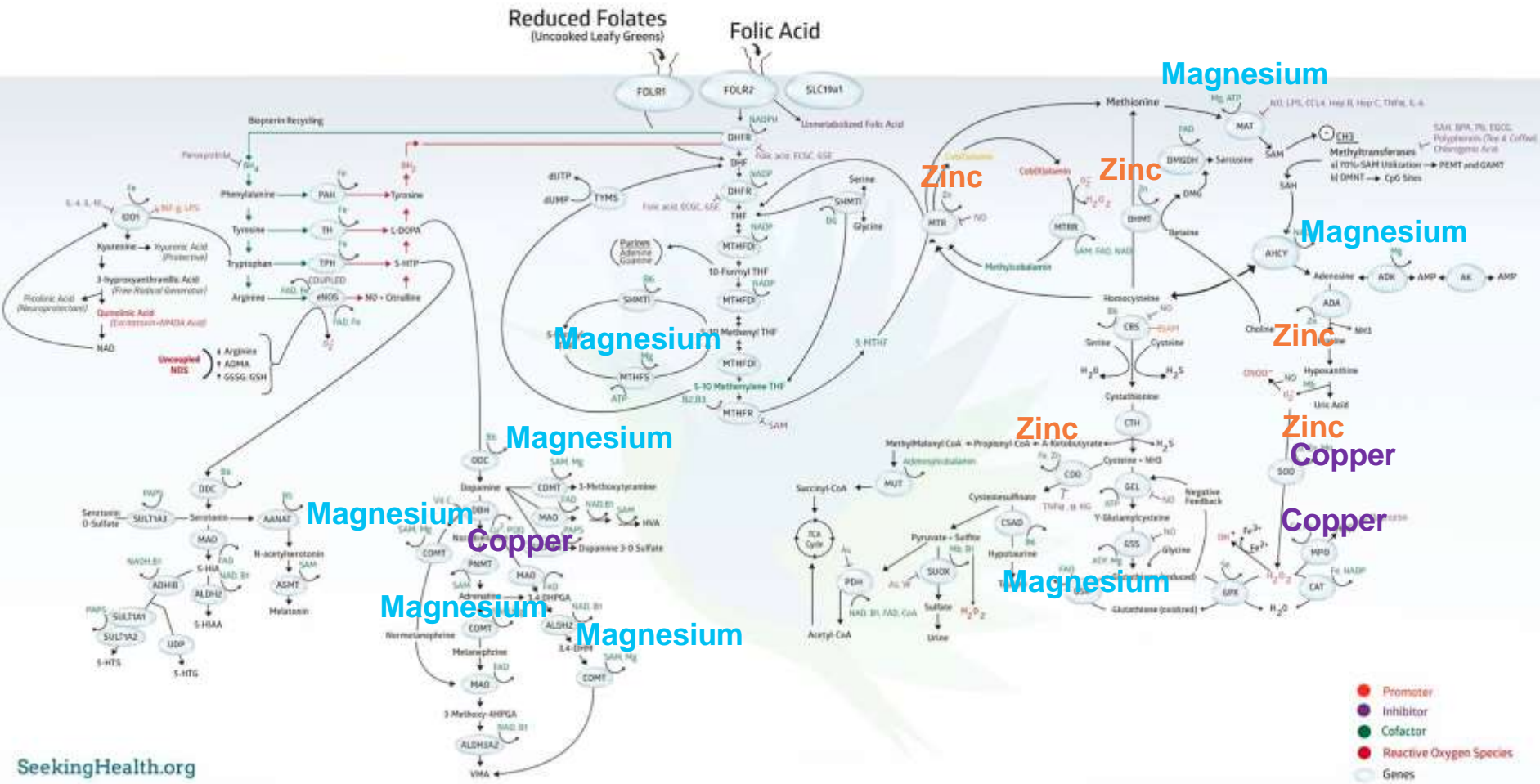
# Minerals are Essential

- Vitamin deficiencies can be temporarily tolerated
- Mineral deficiencies are poorly tolerated (and can be fatal)
- Vitamins cannot function without minerals
- In 1928, 3 minerals were recognized: iron, iodine, copper
- Currently, 22 minerals are recognized as essential to health

# The Purpose of Minerals

- Structure
  - Calcium, phosphorus, boron - for bones
  - Silicon - for collagen
  - Sulfur - for protein configuration and tissue structure
- Function
  - catalysts and enzyme cofactors - to assist and speed biochemistry
  - muscle function, nerve impulse transmission
  - cell permeability and membrane receptor function

# Nutrient Cofactors



# Sulfur: The 4th Most Plentiful Mineral

- A pale yellow, brittle, bitter, nonmetallic mineral called sulfur
- Referred to in Genesis as brimstone, associated with hell (volcanoes & hot springs)
- A component of black gunpowder
- Used in the vulcanization of rubber
- Farmers use it as a fertilizer and a fungicide

# The Life Cycle of Sulfur

- Algae converts inorganic sulfur to an organic molecule, dimethyl sulfide
- Dimethyl sulfide is released to upper atmosphere, in the ozone layer
- UV light catalyzes formation of DMSO (dimethyl sulfoxide) - then into MSM (methylsulfonylmethane)
- MSM falls to earth, dissolved in rainwater

# Plant Roots Love MSM

- MSM added to soil in 5 ppm water, concentrates in roots to 100 ppm in hours
- Plants are natural reservoirs of MSM - animals eat the plants
- Inorganic sulfur is captured by phytoplankton and algae into a volatile gas (DS)
- DS --> DMSO --> MSM --> rain water --> root uptake --> food consumption



# Organic Minerals

- Minerals are inorganic by nature
- Minerals cannot be synthesized
- Minerals bind to carbon molecules in plants and animals
- Bound minerals are easier to absorb and utilize

# MSM Defined

- A safe, natural, crystalline food substance originating in the ocean
- Dr. Stanley Jacob heated and crystallized DMSO to derive consumable MSM
- MSM has no unpleasant sulfur odor or taste, unlike DMSO
- MSM is a dietary element derived from many raw foods. DMSO is not

# Food Sources

- Animal protein sources
  - Eggs, meats, fish, poultry, and milk
- Plant sources
  - Unprocessed grains, legumes
  - Fresh onions, garlic, cabbage, brussels sprouts, broccoli, asparagus
- Low protein diets (i.e. vegetarian) at risk for sulfur deficiency

# Sulfur vs. Sulfa

- Sulfur is a natural mineral
- Sulfa is a synthetic drug, to which many people have an allergy
- There have been NO reports of intolerance or allergic reactions to MSM
- All studies to date find MSM free of toxicity!
- MSM's side effect profile is similar to pure water

# Sulfur Functions

- Half the bodies sulfur is found in muscles, skin, and bones
- Sulfur is present in keratin, the tough stuff in skin, hair and nails
- Sulfur is essential for healthy collagen, the rebar of cartilage and connective tissue
- Disulfide bonds holds connective tissue proteins in proper place
- There is 1.2 mg of inorganic sulfur in every 100 mls of blood

# MSM and Amino Acids

- Inorganic sulfur poorly utilized
- Plants convert MSM to methionine and cysteine
- Two other sulfur-amino acids are taurine & cystine (made from cysteine)
- Proteins cannot hold their molecular configuration without sulfur linkages
- 80% of body's amino acids are nonessential

# Methionine

- May have been the first amino acid...the spark of life
- Methionine is one of 8 essential aminos
- Detoxifies heavy metals

# Cysteine

- Two cysteine molecules bond together --> cystine
  - Cystine determines protein configuration and properties
- Cysteine + methionine --> lipoic acid (see below)
- Major detoxification agent
- Given in Tylenol overdoses
- Onions, garlic, yogurt, wheat germ, red meat high in cysteine



# Taurine

- Synthesized from cysteine in the liver, from methionine in other cells
- Not found in vegetable proteins
- Conditionally essential (B6 and cysteine needed to synthesize)
- Stabilizes cell membranes, regulates ion pumps
- Inhibitory neurotransmitter (helps epilepsy)
- Most abundant free amino acid in heart cells (helps CHF)

# Sulfur in Biochemistry

- MSM contributes organic sulfur to a many important biochemical pathways in the body
  - Glutathione
  - Glucosamine
  - Homocysteine
  - Lipoic Acid
  - Coenzyme A

# Glutathione

- Tripeptide = cysteine + glycine + glutamic acid
- Neutralizes free radicals... aids liver detox pathways
- Prevents oxidation of LDL cholesterol (the “bad” one)
- Promotes eye health (low levels accompany every eye disease)
- NAC (N-acetylcysteine) a good precursor supplement)

# Glucosamine

- A building block for all connective tissue...gives cartilage strength
- Glucose + glutamine --> sulfonation enzymes -> glucosamine
- An effective treatment for arthritis

# Homocysteine

- A metabolite of methionine
- If deficient in B6, B12, and folate, homocysteine accumulates
- 20% rise = significant increased risk for heart disease
- Methotrexate poisons folic acid metabolism and can raise homocysteine
- 2 cholesterol lowering agents (Colestid & Questran) raise homocysteine

# Lipoic Acid

- A most potent antioxidant
- Regenerates oxidized E, C, and glutathione
- Reverses liver damage in alcoholics and hepatitis pts
- Helps diabetic neuropathy
- Lowers blood sugar levels in diabetics

# Coenzyme A

- Made from pantothenic acid (vitamin B5)
- Important in fatty acid bio-pathways
- Needed for cholesterol synthesis and utilization
- Acetylcholine cannot be made without it
- Red blood cells formation also dependent on it

# Benefits of MSM

- Skin, hair and nails
- Gut function and parasites
- Allergies
- Pain relief



# Collagen

- Skin is the body's largest organ
- Collagen holds the skin together (most abundant protein in body)
- Elastin gives skin its pliability (aging and cross-linking takes this away)
- MSM + vitamin C blocks cross-linking in the skin
- Inadequate MSM and/or C = cracking, wrinkles, keloid scars

# Skin Detox

- By keeping skin cells soft and permeable, MSM makes the skin an “auxiliary kidney”

# Acne

- Testosterone stimulates production of keratin and sebum
- Overproduction of testosterone (puberty) = acne
- Acne more common in adolescent boys
- Poor diet = “pore” glandular function
- Studies have shown MSM to benefit acne

# Happy Hair, Healthy Nails

- Sulfur containing cysteine is present in keratin, a major component of hair and nails
- Keratin is a tough protein, with a high sulfur content
- Biotin is a sulfur bearing B vitamin crucial to healthy hair and nails
- Plenty of high quality protein, MSM, B complex, E & A will help your hair and nails

# Digestion

- MSM coats mucosal surfaces of the gut
- Offending allergens bound up by sulfur conjugation
- Sulfur bearing vitamins thiamine and biotin needed for digestion

# Constipation

- 21 subjects with constipation given 500 mg MSM and 1000 mg C
- Normal colon function was restored in all subjects
- Whole foods and H<sub>2</sub>O are major helps
- Watch for side effects of other meds

# Allergies

- MSM makes cell walls more permeable
- Cells better able to flush out foreign substances
- Better gut and liver function (better processed of environmental chemicals)
- Less leaky gut and undigested peptide absorption

# Parasites

- Demonstrated benefits against Giardia, Trichomonas, roundworms, nematodes, etc.
- Presents a blocking interface between parasite and gut lining
- MSM competes for the receptor site at the mucous membrane surface
- Parasites have nothing to cling to and are flushed out



# Predicting the Weather

- Pain can be attributed to pressure differentials in contiguous cells
- When outside pressure drops, unhealthy cells may swell with inflammation
- Inflammation triggers nerve impulses that register PAIN !
- Cellular membrane health and permeability compensates for inappropriate swelling
- MSM facilitates healthier membrane function, thus reducing barometric pain !

# Arthritis

- A 19 month study using MSM in various amounts proved helpful in:
  - osteoarthritis
  - bursitis
  - joint swelling and pain
- MSM and glucosamine a particularly good combination

# Muscle Soreness

- Race horse trainers discovered the benefits of MSM to prevent muscle soreness and post race cramping
- Postathletic fatigue syndrome prevented by 1-2 grams of MSM daily

# Lung Dysfunction

- 5 subjects with emphysema
- Walked a measured distance compatible with their capabilities
- Within 4 weeks of MSM use, walking distance doubled

# Oral Hygiene

- Subjects found by professional hygienists to have mild gum inflammation
- Toothpaste mixed 50/50 with MSM powder
- After one weeks use, oral mucosa was free of gum inflammation

# Snoring

- Nasopharyngeal narrowing causes turbulent air flow
- 15 subjects, 8-16 drops of MSM intranasal solution instilled
- Subject's mates did not know about treatment program
- 80% reported lessening or absence of snoring
- Try 3000 mg of MSM orally if you snore

# Sunburn

- 500 to 2000 mg of MSM
- prevents sunburn blistering
- promotes faster healing
- MSM skin-protection lotions coming

# Dosage

- Optimal dosage depends on body size, age, and starting MSM reserves
- The nature and severity of the condition being treated also influences dose
- Often, one must experiment with different doses to determine best dose
- MSM declines with age. Older individuals may thus need more.
- Start with 2000 mg and slowly increase until therapeutic effect achieved



# Forms of Sulfur

- Available in powder or capsule
- Best when combined with vitamin C (to help with collagen formation)
- Lotion is available for localized inflammation
- Eyedrop formulas treat dry, red, inflammed and allergic eye conditions
- Allow up to 3 weeks for therapeutic benefits to manifest

# Conclusions

- More benefits than you can remember
- As safe as pure water - occurs naturally in fresh food
- Inexpensive and tested for 15 years
- Helps food allergies, gut function, detox, integument



Questions?



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