



# S-adenosylmethionine

## Overview

S-Adenosylmethionine (SAME) is a naturally occurring compound that is found in almost every tissue and fluid in the body. It is involved in many important processes. SAME plays a role in the immune system, maintains cell membranes, and helps produce and break down brain chemicals, such as serotonin, melatonin, and dopamine. It works with vitamin B12 and folate (vitamin B9). Being deficient in either vitamin B12 or folate may reduce levels of SAME in your body.

Numerous scientific studies have shown that SAME helps relieve the pain of osteoarthritis, and other studies suggest that SAME may help treat depression. Researchers have also examined SAME's use in the treatment of fibromyalgia and liver disease, with mixed results. Many of the early studies used SAME given intravenously or as an injection. Only recently have researchers been able to look at the effects of SAME taken by mouth.

### Depression

Some research suggests that SAME is more effective than placebo in treating mild-to-moderate depression and is just as effective as antidepressant medications without the side effects (headaches, sleeplessness, and sexual dysfunction). In addition, antidepressants tend to take 6 - 8 weeks to begin working, while SAME seems to begin more quickly. Researchers aren't sure exactly how SAME works to relieve depression, but they speculate it might increase the amount of serotonin in the brain (just as some antidepressants do).

However, many of the studies have examined injectable forms of SAME, not an oral supplement, and the quality of the studies has varied. One well designed study failed to find any benefit. More research is needed to determine whether SAME works for depression. Because serious depression is a dangerous illness, you should seek help from your doctor before taking SAME or any supplement. Don't try to self treat.

### Osteoarthritis

A number of well designed clinical trials show that SAME may reduce pain and inflammation in the joints, and researchers think it may also promote cartilage repair, although they are not clear about how or why this works. In several short term studies (ranging 4 - 12 weeks), SAME supplements were as effective as nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen and naproxen in adults with knee, hip, or spine osteoarthritis. SAME was as effective as these medications in lessening morning stiffness, decreasing pain, reducing swelling, improving range of motion, and increasing walking pace. Several studies also suggest that SAME has fewer side effects than NSAIDs. Another study compared SAME to celecoxib (Celebrex), a type of NSAID called a COX-2 inhibitor, and found that over time SAME was as effective as celecoxib in relieving pain. However, other studies show no differences in pain relief or

tolerability between treatment with SAME or habumetone over 8 weeks in patients with knee osteoporosis.

### **Fibromyalgia**

SAME can be effective in reducing symptoms of fibromyalgia -- including **pain, fatigue, morning stiffness, and depressed mood -- although most of these studies used an injectable form of SAME.** Among studies that examined a dose of SAME by mouth, some found that it was effective at reducing these symptoms, while others found no benefit.

### **Liver Disease**

**People with liver disease often cannot synthesize SAME in their bodies, and some preliminary studies suggest that taking SAME may help treat chronic liver disease caused by medications or alcoholism.** A study of 123 men and women with alcoholic liver cirrhosis (liver failure) found that SAME treatment for 2 years improved survival rates and delayed the need for liver transplants better than placebo. Other studies show that SAME may help normalize levels of liver enzymes in people with liver disease. Studies in mice show that SAME protects against and can also reverse liver damage. However, these studies have been small and of short duration. Larger and longer studies are needed to confirm these findings.

### **Other**

Some studies suggest SAME can effectively inhibit cancer tumor cells. Other studies suggest that taking the drug levodopa (L-dopa) for Parkinson's disease may lower the levels of SAME in the body, which may contribute to depression and increase the side effects of L-dopa. However, researchers have also found evidence that taking SAME may make L-dopa less effective. If you have Parkinson's disease, do not take SAME without talking to your doctor first.

## **Dietary Sources**

SAME is not found in food. It is produced by the body from ATP and the amino acid methionine. (ATP serves as the major energy source for cells throughout the body).

## **Available Forms**

SAME is available in tablets or capsules, which are more stable and may be more dependable in terms of the amount of SAME in the pill. They should be stored in a cool, dry place, but not refrigerated. Tablets should be kept in the blister pack until you take them.

## **How to Take It**

**Starting with a low dose (for example, 200 mg per day) and increasing slowly helps avoid stomach upset.**

It is important to note that many of the studies of SAME have tested injectable, not oral, forms. It is not as clear how reliable or effective taking SAME orally is. Small studies suggest that oral supplementation with SAME is not well absorbed by the body. Clinicians recommend taking oral SAME with vitamin B12, folic acid, methionine and trimethylglycine to enhance absorption.

### **Pediatric**

SAME should never be given to a child without your doctor's supervision.

## Adult

Recommended doses of SAMe vary depending on the health condition being treated. The following list gives information on the dosages used in studies for each condition:

- Depression: 800 - 1,600 mg of SAMe per day, in 2 divided doses (morning and afternoon)
- Osteoarthritis: 600 - 1,200 mg per day in 2 - 3 divided doses
- Fibromyalgia: A dosage of 400 mg 2 times per day for 6 weeks
- Alcoholic liver disease: 600 - 1,200 mg per day by mouth in divided doses for 6 months enhances liver function. For liver disease, a qualified health care provider should supervise administration of SAMe.

## Precautions

Because of the potential for side effects and interactions with medications, you should take dietary supplements only under the supervision of a knowledgeable health care provider.

Side effects may include dry mouth, nausea, gas, diarrhea, headache, anxiety, a feeling of elation, restlessness, and insomnia. Sweating, dizziness, and palpitations have also been reported. For this reason, you should not take SAMe at night.

Large doses of SAMe may cause mania (abnormally elevated mood). Start at a low dose and gradually increase it. Do not exceed recommended doses.

Pregnant and breastfeeding women should not take SAMe.

People with bipolar disorder (manic depression) should not take SAMe since it may worsen manic episodes.

SAMe should not be combined with other antidepressants without first consulting your doctor.

People taking SAMe may want to take a multivitamin that contains folic acid and vitamins B12 and B6.

## Possible Interactions

If you are being treated with any of the following medications, you should not use SAMe without first talking to your health care provider.

Taking SAMe at the same time as these drugs may increase the risk of serotonin syndrome (a potentially dangerous condition caused by having too much serotonin in your body):

- Dextromethorphan (Robitussin DM, other cough syrups)
- Meperidine (Demerol)
- Pentazocine (Talwin)
- Tramadol (Ultram)

**Antidepressant medications** -- SAMe may interact with antidepressant medications, increasing the potential for side effects including headache, irregular or accelerated heart rate, anxiety, and restlessness, as well as the potential fatal condition called Serotonin Syndrome, mentioned above. Some experts theorize that taking SAMe increases the levels of serotonin in the brain, and many antidepressants do the same. The concern is that combining the two may result in a dangerous increase in serotonin levels. Talk

to your doctor before using SAME if you are taking any medications for depression or anxiety.

**Levodopa (L-dopa)** -- SAME may reduce the effectiveness of this medication for Parkinson's disease.

**Medications for diabetes** -- SAME may reduce levels of blood sugar and may strengthen the effect of diabetes medications, which increases the risk of hypoglycemia (low blood sugar).

## Supporting Research

Alpert J E, Papakostas G, Mischoulon D, Worthington J J, Petersen T, Mahal Y, et al. S-adenosyl-L-methionine (SAME) as an adjunct for resistant major depressive disorder: an open trial following partial or nonresponse to selective serotonin reuptake inhibitors or venlafaxine. *J Clin Psychopharmacol*. 2004;24(6):661-664.

Chavez M. SAME: S-Adenosylmethionine. *Am J Health Syst Pharm*. 2000;57(2):119-123.

Delle Chiaie R, Pancheri P, Scapicchio P. Efficacy and tolerability of oral and intramuscular S-adenosyl-L-methionine 1,4-butanedisulfonate (SAME) in the treatment of major depression: comparison with imipramine in 2 multicenter studies. *Am J Clin Nutr*. 2002;76(5):1172S-1176S.

Dey A, Caro AA, Cederbaum AL. S-adenosyl methionine protects ob/ob mice from CYP2E1-mediated liver injury. *Am J Physiol Gastrointest Liver Physiol*. 2007;293(1):G91-103.

Fetrow CW, Avila JR. Efficacy of the dietary supplement S-adenosyl-L-methionine. *Ann Pharmacother*. 2001;35(11):1414-1425.

Kim J, Lee EY, Koh EM, et al. Comparative clinical trial of S-adenosylmethionine versus nabumetone for the treatment of knee osteoarthritis; an 8-week, multicenter, randomized, double-blind, double-dummy, Phase IV study in Korean patients. *Clin Ther*. 2009; 31(12):2860-72.

Lieber CS. Hepatic, metabolic, and nutritional disorders of alcoholism: from pathogenesis to therapy. *Crit Rev Clin Lab Sci*. 2000;37(6):551-584.

Luo J, Li YN, Wang F, Zhang WM, Geng X. S-adenosylmethionine inhibits the growth of cancer cells by reversing the hypomethylation status of c-myc and H-ras in human gastric cancer and colon cancer. *Int J Biol Sci*. 2010; 6(7):784-95.

Mato JM, Lu SC. Role of S-adenosyl-L-methionine in liver health and injury. *Hepatology*. 2007;45(5):1306-12.

Morelli V, Zoorob RJ. Alternative therapies: Part 1. Depression, diabetes, obesity. *Am Fam Phys*. 2000;62(5):1051-1060.

Najm WI, Reinsch S, Hoehler F, Tobis JS, Harvey PW. S-adenosyl methionine (SAME) versus celecoxib for the treatment of osteoarthritis symptoms: a double-blind cross-over trial. *BMC Musculoskelet Disord*. 2004 February 26;5:6.

Rakel, D. *Rakel Integrative Medicine, 2nd ed*. Philadelphia, PA: Saunders Elsevier; 2007.

Stern. *Massachusetts General Hospital Comprehensive Clinical Psychiatry, 1st ed*. Philadelphia, PA: Mosby, An Imprint of Elsevier; 2008.

## Alternative Names

Ademetionine; SAMe

## Version Info

- Last Reviewed on 06/17/2011
- A.D.A.M. Health Solutions, Ebix, Inc., Editorial Team. Previously reviewed by Steven D. Ehrlich, NMD, Solutions Acupuncture, a private practice specializing in complementary and alternative medicine, Phoenix, AZ. Review provided by VeriMed Healthcare Network (6/17/2011).

A.D.A.M., Inc. is accredited by URAC, also known as the American Accreditation HealthCare Commission ([www.uran.org](http://www.uran.org)). URAC's accreditation program is an independent audit to verify that A.D.A.M. follows rigorous standards of quality and accountability. A.D.A.M. is among the first to achieve this important distinction for online health information and services. Learn more about A.D.A.M.'s editorial policy, editorial process and privacy policy. A.D.A.M. is also a founding member of Hi-Ethics and subscribes to the principles of the Health on the Net Foundation ([www.hon.ch](http://www.hon.ch))

The information provided herein should not be used during any medical emergency or for the diagnosis or treatment of any medical condition. A licensed medical professional should be consulted for diagnosis and treatment of any and all medical conditions. Call 911 for all medical emergencies. Links to other sites are provided for information only -- they do not constitute endorsements of those other sites. © 1997- 2013 A.D.A.M., Inc. Any duplication or distribution of the information contained herein is strictly prohibited.

This page was last updated: June 24, 2013

[Find a Doctor](#) [Ask the Expert](#)

## Related Links

- [Patient Success Stories](#)
- [Awards and Honors](#)

© 2015 University of Maryland Medical Center (UMMC). All rights reserved. UMMC is a member of the University of Maryland Medical System, 22 S. Greene Street, Baltimore, MD 21201. [1.800.492.5538](tel:18004925538) TDD: [1.800.735.2258](tel:18007352258) Physician Referral: [1.800.373.4111](tel:18003734111)