

get the facts

S-Adenosyl-L-Methionine (SAME): An Introduction



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S-Adenosyl-L-methionine (also called S-adenosyl methionine, S-adenosylmethionine, SAME, or SAM-e in the United States or ademetonine in Europe, and also often abbreviated as SAM and AdoMet) is a chemical that is found naturally in the body. SAME is sold in the United States as a dietary supplement. This fact sheet provides basic information about SAME, summarizes scientific research on safety and effectiveness, and suggests sources for additional information.

Key Points

- Research has provided hints that SAME might be helpful for depression, osteoarthritis, and a liver condition that can occur during pregnancy. However, there is no conclusive evidence about whether SAME is useful for these diseases.
- SAME may interact with medicines, and data on the long-term safety of SAME and on its safety for use during pregnancy are too limited to make any conclusions. There is theoretical reason to believe that taking SAME may promote *Pneumocystis* infection in people who are HIV positive.
- Tell all your health care providers about any complementary health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

About SAME

SAME is produced in the body from methionine, an amino acid found in foods. Early research showed that SAME is involved in a variety of body functions, especially in the brain and the liver. These findings prompted researchers to investigate the possible value of SAME in the treatment of mental illnesses and liver diseases. During clinical trials in people with depression, some study participants who also had osteoarthritis reported that their joint symptoms improved when they were taking SAME. Researchers therefore began to investigate SAME as a possible treatment for osteoarthritis.

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Safety

- Information on the long-term safety of SAME is limited because the participants in most studies took it only for short periods of time. However, in one study of alcohol-related liver disease, participants took SAME for 2 years; in that study, no serious side effects were reported.
- In several small studies that evaluated the effect of SAME on cholestasis (a liver condition) of pregnancy, no harmful effects were seen in either the mothers or the infants, but the numbers are too small to be certain that the use of SAME during pregnancy is safe. Cholestasis is a condition in which the flow of bile from the liver is blocked. Pregnant women with cholestasis should use caution if they are considering SAME and should follow their health care provider's instructions for treatment of this condition. Pregnant women should not take SAME without their provider's approval.
- SAME may decrease the effects of levodopa (L-dopa), a drug used to treat Parkinson's disease. It is also possible that SAME might interact with drugs and dietary supplements that increase levels of serotonin (a chemical produced by nerve cells), such as antidepressants, L-tryptophan, and St. John's wort, but the evidence for such interactions is very limited. Dietary supplements may interact with drugs; if you take medication, consult your health care provider before taking any dietary supplement, including SAME.
- SAME promotes the growth of *Pneumocystis*, a fungus that can cause pneumonia in people with suppressed immune systems. It is possible that taking SAME might increase the likelihood or severity of *Pneumocystis* infection in people who are HIV positive.
- Side effects of SAME are uncommon, and when they do occur they are usually minor problems such as nausea or digestive upsets.
- For more information about the safety of dietary supplements, see the National Center for Complementary and Alternative Medicine (NCCAM) fact sheet *Using Dietary Supplements Wisely* at nccam.nih.gov/health/supplements/wiseuse.htm.

What the Science Says

SAME has been investigated most extensively for depression, osteoarthritis, and cholestasis associated with pregnancy. For all three conditions, research has not conclusively shown that SAME is helpful.

About Scientific Evidence on Complementary Health Approaches

Scientific evidence on complementary health approaches includes results from laboratory research as well as clinical trials (studies in people). It provides information on whether an approach is helpful and safe. Scientific journals publish study results, as well as review articles that evaluate the evidence as it accumulates; fact sheets from NCCAM—like this one—base information about research findings primarily on the most rigorous review articles, known as systematic reviews and meta-analyses.

Depression

Overall, the evidence that oral SAME may be helpful for depression is not conclusive.

- At least 40 clinical trials have evaluated SAME for depression, and many of them showed beneficial effects. However, most of these trials lasted only a few weeks, included a small number of participants, and were not of the highest scientific quality. Also, some used injected SAME rather than an oral form (taken by mouth).
- People with **bipolar disorder** (an illness characterized by mood swings, from depression to mania) should not take SAME for their depressive symptoms except under the supervision of a health care provider because SAME may worsen symptoms of mania.

Osteoarthritis

The results of research on SAME for osteoarthritis are mixed.

- Clinical trials have compared oral SAME with nonsteroidal anti-inflammatory drugs (NSAIDs; medicines used to relieve osteoarthritis pain) or placebos (inactive substances) in patients with osteoarthritis of the knee or hip.
 - In general, trials that compared SAME with NSAIDs showed that each had similar pain relief and improvement in joint function, with fewer side effects in the patients taking SAME.
 - The smaller number of trials that compared SAME with placebo did not consistently show SAME to be beneficial.

Liver Diseases

Studies involving small numbers of women have suggested that SAME might be helpful for **cholestasis** during pregnancy; whether SAME helps other liver problems has not been established.

- There is some evidence linking decreased levels of SAME in the body with the development of liver diseases, and animal studies have suggested that SAME may be of value for liver problems.
- Cholestasis can have a variety of causes. Several small clinical trials have investigated SAME for a form of cholestasis that can occur during pregnancy and have found hints that SAME might be helpful. In some of these studies, SAME was given orally; in others, it was given by injection. Because the number of women who have been studied is small, it is not possible to definitely conclude that the use of SAME during pregnancy is safe. Pregnant women with cholestasis should use caution if they are considering SAME and should follow their health care provider's instructions for treatment of this condition. Pregnant women should not take SAME without their provider's approval.
- Whether SAME is beneficial for other liver conditions has not been established. One long-term study in patients with **alcohol-related liver disease** had promising results, but they have not been confirmed by other research.

Other Conditions

SAMe has also been investigated for other conditions, including **fibromyalgia, migraine, schizophrenia, Alzheimer’s disease, cancer, amyotrophic lateral sclerosis** (ALS, commonly known as **Lou Gehrig’s disease**), and **attention-deficit hyperactivity disorder**, but there isn’t enough evidence to reach conclusions about its effects in these conditions.

If You Are Considering SAMe

- Do not use SAMe to replace conventional care or to postpone seeing a health care provider about a medical problem.
- Look for published research studies on SAMe for the health condition you are interested in.
- Consult your health care provider before using SAMe supplements. If you are pregnant or nursing a child, if you take medicine or other dietary supplements, if you have bipolar disorder or Parkinson’s disease, if you are HIV positive, or if you are considering giving SAMe to a child, it is especially important to consult your (or your child’s) health care provider.
- Tell all your health care providers about any complementary health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care. For tips about talking with your health care providers about complementary health approaches, see NCCAM’s Time to Talk campaign at nccam.nih.gov/timetotalk.

NCCAM-Funded Research

Current NCCAM-supported studies are investigating:

- The role of SAMe in liver function and liver injury
- The possible roles of SAMe and an enzyme involved in its formation for colon cancer.

Key References

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For More Information

NCCAM Clearinghouse

The NCCAM Clearinghouse provides information on NCCAM and complementary health approaches, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

Toll-free in the U.S.: 1-888-644-6226

TTY (for deaf and hard-of-hearing callers): 1-866-464-3615

Web site: nccam.nih.gov

E-mail: info@nccam.nih.gov

PubMed®

A service of the National Library of Medicine (NLM), PubMed contains publication information and (in most cases) brief summaries of articles from scientific and medical journals.

Web site: www.ncbi.nlm.nih.gov/pubmed

NIH Clinical Research Trials and You

The National Institutes of Health (NIH) has created a Web site, NIH Clinical Research Trials and You, to help people learn about clinical trials, why they matter, and how to participate. The site includes questions and answers about clinical trials, guidance on how to find clinical trials through ClinicalTrials.gov and other resources, and stories about the personal experiences of clinical trial participants. Clinical trials are necessary to find better ways to prevent, diagnose, and treat diseases.

Web site: www.nih.gov/health/clinicaltrials/

NIH National Library of Medicine's MedlinePlus

To provide resources that help answer health questions, MedlinePlus (a service of NLM) brings together authoritative information from the National Institutes of Health as well as other Government agencies and health-related organizations.

Web site: www.nlm.nih.gov/medlineplus

SAMe information: www.nlm.nih.gov/medlineplus/druginfo/natural/786.html

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