S-Adenosylmethionine (SAMe): An Aid to Managing Liver Disease in Dogs and Cats

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What is S-Adenosylmethionine?

S-Adenosylmethionine (SAMe) is a substance produced by the body from the amino acid methionine.

What does SAMe do?

SAMe affects all cells in the body, but especially liver cells. Through three chemical processes in the liver, SAMe is converted into very important compounds:

1. Through a process called transsulfuration, SAMe is converted into glutathione, a powerful antioxidant. Glutathione plays a major role in protecting hepatocytes (liver cells) from damage from waste products that the liver removes from the blood stream and detoxifies (reduces toxic properties). Other cells in the body, such as red blood cells (RBC's) are also protected. Transsulfuration also produces taurine and other compounds that aid in the movement of bile acids out of the liver.
2. Through transmethylation, SAMe helps to stabilize cell membranes and promote the secretion of bile.
3. Through aminopropylation, SAMe is converted into other antioxidants and methylthioadenosine, which has anti-inflammatory and analgesic properties.

These three processes that rely on SAMe all aid in supporting the structure and function of the liver, and also play an important role in nutritional pathways, cell replication, and protein synthesis (formation of protein from smaller proteins and/or amino acids).

What is the relationship between SAMe and liver function?

Normally, the liver produces SAMe from the amino acid methionine, which is present in the animal's food. If the liver is damaged, less SAMe is produced, and thus less glutathione is produced. With less of this antioxidant, even more liver cells become damaged and a vicious cycle is started.

By giving an animal with liver dysfunction "pre-made" SAMe, the liver can produce more glutathione and protect itself from further damage. The increased glutathione may also help in the healing and repair of cells.

Even though SAMe is produced from methionine, it is not beneficial to give an animal with liver damage additional methionine; in fact, it can be harmful.

SAMe has been recommended for animals with various forms of liver disease including hepatic lipidosis (fatty liver), cirrhosis, leptospirosis, toxicities from acetominophen (Tylenol) and other non-steroidal anti-inflammatories (NSAIDS), hepatic fibrosis, cholangiohepatitis, and certain breed-specific liver diseases. It may also be useful in pets receiving long-term treatments for diseases such as epilepsy, in which the medication used is metabolized by the liver.

Is SAMe beneficial to organs other than the liver?

Some researchers believe that SAMe may be helpful in other conditions related to the damage of cell membranes. Such conditions may include:

- Diabetes
- Cushing's disease
- Pancreatitis
- Inflammatory bowel disease
- Certain anemias
- Autoimmune disorders
- Certain heart conditions

The effectiveness of SAMe in these conditions has not been determined through controlled research studies.

How is SAMe given?

SAMe is considered a dietary supplement and is available in an oral form. There are important considerations in giving SAMe:

- Always follow the dosage schedule recommended by your veterinarian.
- Give SAMe on an empty stomach. Do NOT give SAMe with a meal, since food will decrease the body's absorption of SAMe from the digestive system. Give SAMe at least

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one hour before feeding your pet. You may give the SAMe in a small treat or bite of food. You do not need to withhold water.

- SAMe can cause irritation of the throat and esophagus if it is not quickly swallowed and moved to the stomach. This is especially true for cats. For this reason, give your pet a small amount (one teaspoon) of water after giving the SAMe to help your pet swallow. You may wish to try tuna water or other liquid your cat likes; however, do not use milk.
- Use the form of SAMe directed by your veterinarian. The veterinary form is a stabilized form of SAMe made by Nutramax Laboratories, Inc., and is called Denosyl® SD4. Human products containing SAMe are available, but may not have the same form of SAMe or the quality control when compared to the veterinary product.
- Unless specifically directed by your veterinarian, do NOT break tablets of SAMe. A special enteric coating on the veterinary form helps protect the SAMe from destruction by stomach acid. If you must split a tablet, discard the portion you do not give the animal.

How should SAMe be stored?

SAMe is not a stable compound, being adversely affected by moisture and other environmental conditions. This is one reason it cannot be incorporated in high levels in pet foods. SAMe should be stored at room temperature in a childproof container, out of reach of children and pets. It should be protected from humidity and moisture (e.g., do not store in the bathroom). If the tablet comes in a foil pack, do not open it and remove a tablet until ready to use.

What are the side effects of SAMe?

SAMe has been shown to be very safe, and there are usually no side effects if it is given correctly. Vomiting may occur in rare instances.

How is an animal's response to SAMe monitored?

Your veterinarian will assess your pet's response by changes in the pet's appetite, weight, activity level, and attitude. Always notify your veterinarian of any change in your pet's condition. Results of physical examinations, and radiography (x-rays) and ultrasound exams will also aid in determining the response. Blood tests to monitor liver function will be performed periodically. In some instances, a liver biopsy may be necessary.

It takes some time (often 1 to 4 months) before improvements may be noticed. In some instances, your veterinarian may lower the dose after a response is seen.

Can SAMe be given with other supplements or medications?

Thus far, there have been no adverse reactions resulting from giving SAMe with other supplements or medications in dogs and cats. However, consult with your veterinarian before giving your pet any other products or changing your pet's diet while your pet is taking SAMe.

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