

# The Pet Prescription:
## Xylitol Toxicity and Canines

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Each morning I pour a cup of coffee with one of the loves of my life, an 85-pound Golden Retriever, by my side. Since I've immersed myself in veterinary pharmacy the last two years, this morning ritual has taken on a new meaning. Each day that I pour a packet of sugar substitute into my coffee, I think of the harm it and so many other household items could cause my big handsome furball.

With the increasing use of xylitol in the U.S., there has also been a steady increase in the number of toxic canine exposures reported to the ASPCA Animal Poison Control Center. Interestingly, dogs seem to be the only species that experiences adverse effects from xylitol consumption. "What is xylitol?" you may ask. Xylitol is found in many sweeteners, baked goods, gums, toothpastes, dental rinses, nicotine gums and throat lozenges. Some medications also contain xylitol, particularly some oral suspensions and orally disintegrating tablets such as gabapentin, fexofenadine, clonazepam, loratadine and mirtazapine to name a few.

With ingestion of 100 mg/kg (45 mg/lb) or more, the dog's pancreas will release insulin, leading to hypoglycemia (low blood sugar). For reference, sugar-free gum contains 0.5-1 gram per piece. Therefore, a 20-pound dog could begin showing signs of toxicity after just one piece of gum. If enough is ingested, your dog may begin showing signs of hypoglycemia, which include unsteadiness, depression, dilated pupils and seizures. Of note, vomiting is often the first sign of toxicity. Clinical signs of hypoglycemia can be seen rapidly, within 10-60 minutes of ingestion. The prognosis is good for uncomplicated hypoglycemia.

Research shows a less encouraging prognosis for elevated liver enzymes and/or liver failure. These outcomes can occur with ingestion of 500 mg/kg (227 mg/lb) of xylitol (or 5 pieces for our 20-pound dog) or more. Clinical signs related to liver failure include lethargy, loss of appetite, vomiting and diarrhea. If you keep xylitol around your household it is wise to be aware that signs of liver failure may take days to occur and, therefore, they should monitor the patient for at least 72 hours post-ingestion.

There is no known antidote for xylitol toxicity. Inducing vomiting, preferably under veterinary supervision, should ideally occur within 1-6 hours of ingestion if the animal is not showing signs of hypoglycemia. However, in some situations of extremely large consumption delaying vomiting may be helpful. The ingested xylitol may come together to form a large mass within the abdomen, delaying absorption into the bloodstream.

Standard therapy for xylitol toxicity includes IV fluids with initial boluses of dextrose (or sugar) to prevent hypoglycemia. If the animal is willing and able to eat small, frequent meals, this should be encouraged in order to prevent hypoglycemia. Intravenous dextrose therapy continues for 12-24 hours or until the patient can maintain normal blood glucose levels.

It is important to note that not all dogs will exhibit hypoglycemia post-ingestion but still may develop liver complications. If you know your dog has ingested xylitol, but is not exhibiting any signs of toxicity, it is still prudent to have your dog monitored for at least 72 hours in case of toxic effects to the liver. As far as medication management, data is lacking on the usefulness of liver-protectant medications, but they may be implemented in an effort to protect the patient's liver. These include N-acetylcysteine, S-adenosyl methionine, silymarin, and vitamin E. Treatment of liver involvement may last for several weeks.

Your awareness and education about xylitol toxicity is imperative to protecting your four-legged pals. Encourage all family members to keep all xylitol-containing products out of your dogs' reach- this includes handbags that hold chewing gum. As always, contact your local veterinarian immediately if ingestion occurs.