



By Deva Khalsa, VMD

Glutathione

–the king of antioxidants

This tiny but *powerful* nutrient is vital to his cell health, liver function and *immunity*.

Mention antioxidants, and most people think of vitamin C or beta carotene. But there are other, less commonly known antioxidants that are even more important to overall health and well being.

One of these is glutathione. It's a tiny but powerful and abundant protein compound made up of three amino acids. Glutathione exists in every single cell of your dog's body, where it protects the minuscule but important energy machines called mitochondria.

Though small, glutathione is the uncontested king of antioxidants. Without it, all your dog's cells would disintegrate and die from unrestrained oxidation. To understand what oxidation is, think about when a freshly cut apple turns brown, a bicycle fender becomes rusty, or a copper penny turns green. Unchecked oxidation is a destructive process that results in breakdown, illness and cellular death.

Other antioxidants depend on it

More well-known antioxidants, such as vitamins C and E, have short lifespans, but glutathione has the ability to bring these spent antioxidants back from the dead; it even can recharge itself. In other words, all other antioxidants depend on glutathione to function properly. No wonder, then, that doctors respectfully call it the "master antioxidant".

In short, few things in your dog's body are more important than glutathione. It's a powerful healing and cleansing agent. Without it, not only would cells die, but the immune system wouldn't work and the liver would fail from toxic overload (see sidebars).

Giving him glutathione

The level of glutathione found in your dog's body will affect his health and longevity.

Three important functions

- 1 None of the antioxidants you purchase over the counter would work without the glutathione that's already present in your dog's body.
- 2 Glutathione acts as very important fuel for his immune system.
- 3 The highest levels of glutathione are found in his liver. That's no accident because the liver is the major organ for detoxifying heavy metals, herbicides and other toxins. Glutathione is absolutely necessary because of all the toxins our dogs are exposed to on a regular basis. It's only because of the vast quantities of glutathione in the liver that the body can detoxify and eliminate these toxins before they do permanent damage. In fact, studies show that half of dogs with chronic liver disease have reduced glutathione levels in their blood and livers.

But here's the rub. Since glutathione is made up of three amino acids, the oral route of administration simply does not work because the glutathione is digested. For example, asparagus contains more available glutathione than any other food, but the GI tract digests most of it.

The best way to administer glutathione is intravenously or intramuscularly. Since that's not practical (except in cases of Xylitol poisoning when dogs are often hospitalized – see sidebar), I typically use a topical gel preparation placed on a hairless area to be absorbed through the skin.

10 ways to optimize his levels

The good news is that there are several glutathione precursors as well as certain foods that will work to boost glutathione production in your dog's body.

- ① A little extra vitamin C on a daily basis will recharge the glutathione already present in his body. The powdered buffered form of this vitamin is relatively tasteless and easy to sprinkle on a bit of wet food. The suggested dose is 50mg to 100mg per day.
- ② Garlic is a sulfur-rich food. A little fresh garlic each day supports glutathione production.
- ③ Kale and broccoli have compounds that support the natural production of glutathione in the body.
- ④ Selenium is an important mineral that helps your dog's body recycle and produce more glutathione.
- ⑤ SAMe (S-Adenosylmethionine) is converted into glutathione and readily available at health food stores and through veterinarians. The recommended dose is 20mg/kg/day.
- ⑥ Another readily available supplement called N-acetyl-cysteine helps boost glutathione levels in your dog's blood and liver. As mentioned in the sidebar, it's used in human hospital ERs to treat people with liver failure from Tylenol overdose.
- ⑦ Whey protein has been shown to increase glutathione levels. Quality whey protein contains all the key amino acids for glutathione production, along with a unique and highly bioactive compound called glutamylcysteine, which promotes glutathione production.
- ⑧ There is evidence that vitamin D3 increases intracellular glutathione.
- ⑨ Milk thistle is an excellent source of an antioxidant called silymarin, which may help prevent glutathione depletion in the liver.
- ⑩ Exercise boosts glutathione levels.



More health benefits

As you can see, healthy levels of glutathione are tremendously important for maintaining health. In people, glutathione deficiency has been linked to cancer, arthritis, autoimmune disease and Alzheimer's. I have successfully used glutathione gel in one dog with senior dementia. And intramuscular glutathione literally saved the life of a dog dying from Xylitol ingestion; it turned him around in a matter of hours.

You may not have heard much about glutathione before now, but it's a good idea to get to know this nearly miraculous antioxidant. It can help give your dog all the support he needs for a long and healthy life. 🐾

Toxic overload!

You probably know that Tylenol (containing acetaminophen) is toxic to cats but you may not know why. Acetaminophen rapidly depletes a cat's stores of glutathione, resulting in a high burden of unhandled toxic metabolites and destruction of liver tissue. The artificial sweetener, Xylitol, can do the same thing in dogs.

When humans overdose on Tylenol, they're treated with something called NAC (N-acetylcysteine) to prevent or minimize liver damage. N-acetylcysteine is a pre-cursor to the formation of glutathione in the body, and helps replenish intracellular levels of glutathione.

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