

Hypovitaminosis C in Guinea Pigs

Introduction

Guinea pigs, like humans, are unable to produce their own vitamin C. This crucial nutrient must be obtained through their diet to prevent the development of vitamin C deficiency, also known as hypovitaminosis C or scurvy.

Vitamin C (ascorbic acid) is not just a dietary supplement for guinea pigs, it's a life-saver. It's essential for forming collagen and elastin, which are connective tissue components in skin and blood vessels. Hypovitaminosis C, if left untreated, can lead to fragile blood vessels, compromised joint integrity, poor wound healing, and reduced immune function. This deficiency may even be fatal. It's crucial to be aware of the signs and take immediate action.

QUICK FACTS



- Guinea pigs cannot synthesize their own vitamin C.
- The main signs of vitamin C deficiency include:
 - Weight loss
 - Decreased appetite
 - Redness of the feet
 - Lameness
- Vitamin C deficiency can be prevented by providing your guinea pig with a healthy, balanced diet, including high-quality commercial guinea pig pellets and a selection of fresh vegetables.

Clinical Signs and Symptoms

Guinea pigs may exhibit clinical signs of hypovitaminosis C within just 2-3 weeks of consuming a deficient diet. The initial signs often include inflammation of the feet (pododermatitis), weight loss, and decreased appetite. Many guinea pigs also show signs of discomfort, such as limping, reluctance to move, and teeth grinding. Other indications of the deficiency include a rough coat, bleeding from the mouth, gum sores, dental issues, and slow wound healing. Furthermore, hypovitaminosis C weakens the immune system, making affected guinea pigs more susceptible to other diseases like pneumonia, diarrhea, and skin infections.

Diagnostics & Treatment Options

In some instances, your veterinarian may make a presumptive diagnosis of hypovitaminosis C based on clinical signs and dietary history. Since many of the clinical signs are non-specific, your vet may recommend performing radiographs (x-rays) or other diagnostics to diagnose hypovitaminosis C and rule out other possible diagnoses.



The good news is that hypovitaminosis C is treatable and preventable. The only cure for this condition is vitamin C supplementation. In advanced cases, treatment consists of stabilization with fluid therapy and pain control, followed by several days of vitamin C injections administered into the muscle or under the skin. Mild cases can be treated with oral vitamin C supplementation alone. Guinea pigs must be introduced to the correct diet during recovery to prevent recurring disease. With the right care and attention, your guinea pig can recover and thrive.

Prevention

Hypovitaminosis C in guinea pigs is preventable with a healthy, balanced diet. As a responsible guinea pig owner, you play a crucial role in ensuring your pet's health. A typical healthy adult guinea pig requires 10-25 mg/kg of vitamin C per day. However, requirements for growing animals, breeding, lactating or pregnant females, and those with other illnesses will be greater. It is best to communicate with your veterinarian about your guinea pig's specific vitamin C requirements.

In addition to grass hay provided ad-lib, guinea pigs should be offered fresh, commercial guinea pig pellets and a selection of fresh herbs and vegetables. It is essential to confirm that store-bought pellets are labeled for guinea pigs and contain stabilized vitamin C (written as L-ascorbyl-2-monophosphate). Since rabbits and rodents other than guinea pigs can synthesize their vitamin C, it is unnecessary in their pelleted feeds. This makes these feeds unsuitable for guinea pigs. Additionally, vitamin C



is broken down rapidly when exposed to light and oxygen, so it is important to store pellets correctly and adhere to the recommended shelf-life. Bags opened for more than 3 months should be discarded. Additional dietary sources of vitamin C can include leafy greens and bell peppers. It is important to provide a rotating variety of greens to avoid providing too much calcium in the diet, as many greens high in vitamin C are also high in calcium. A full list of options is shown in the table below (Table 1). Be sure not to feed greens from unknown sources and wash vegetables thoroughly to avoid pesticide contamination obtained from the USDA FoodData Central database. Avoid feeding large amounts of foods high in calcium and sugar, as these may cause other health problems. Do not use vegetables from unknown sources, and wash all greens thoroughly to avoid pesticide contamination.

Please do not add commercially available vitamin C supplements to your guinea pig's drinking water, as vitamin C is quickly inactivated in water via oxidation. Since guinea

Produce	Vitamin C (mg/100g)	Comments
Parsley	133.0	High in calcium
Peppers, sweet(bell) red	128.0	High in sugar
Dill	85.0	
Peppers, sweet yellow	82.7	
Peppers, sweet green	80.4	
Mustard greens	70.0	High in calcium
Kohlrabi	62.0	High in sugar
Watercress	43.0	High in calcium
Dandelion greens	35.0	High in calcium
Swiss chard	30.0	
Beet greens	30.0	High in calcium
Turnip greens	27.3	High in calcium
Cilantro	27.0	
Spinach	26.5	
Basil	18.0	High in calcium
Tomatoes	16.5	
Lettuce, romaine	9.2	
Celery	3.1	
Cucumber	2.8	

Table 1: The amount of vitamin C available per 100g of selected raw foods, based on nutritional data obtained from the USDA FoodData Central database.

pigs can be picky and dislike change, adding any substance to drinking water may alter the flavor and reduce water intake, resulting in other health problems. Additionally, certain laboratory animal studies suggest long-term high-dose vitamin C supplementation can lead to osteoarthritis.

Risk Factors

Any guinea pig fed an inappropriate diet is likely to develop hypovitaminosis C. However, young, growing animals, pregnant females, and guinea pigs with illness have the

highest vitamin C requirements (2-3 times more than a healthy, adult guinea pig) and, therefore are most at risk. Pay special attention to these individuals to ensure they receive adequate vitamin C.

AEMV: Advancing the Care and Treatment of Exotic Companion Mammals since 2000

The purpose of AEMV is to advance the health and welfare of companion exotic mammals through information dissemination, scientific research, collaboration, and professional development.

Online Resources

Follow AEMV on Facebook (www.facebook.com/AEMVeterinarians) for exotic companion mammal tips and resources. Our website, www.aemv.org, offers a Find-a-Vet tool to help exotic companion mammal owners find veterinarians around the world.

Authors and Editors

Ashleigh Pienaar, Marian Allison, Rae Porter-Blackwell.
Catherine Johnson-Delaney

Image Credits

Images generated using Adobe Firefly

References:

- 1.Pignon C, Mayer J. Guinea pigs. In: Quesenberry et al. (eds.) Ferrets, Rabbits and Rodents. 4th ed. St. Louis, Missouri: Elsevier, Inc., 2021: 270–297
- 2.Mahmoodian F, Peterkofsky F. Vitamin C deficiency in guinea pigs differentially affects the expression of type IV collagen, laminin, and elastin in blood vessels. J Nutr. 1999; 129(1): 83–91
- 3.Witkowska A, et al. The Effects of Diet on Anatomy, Physiology and Health in the Guinea Pig. J Anim Health Behav Sc. 2017; 1(1): 1–6
- 4.National Research Council (US) Subcommittee on Laboratory Animal Nutrition. Nutrient Requirements of the Guinea Pig. In: Nutrient Requirements of Laboratory Animals. 4th ed. Washington (DC): National Academies Press (US). 1995
- 5.Riggs SM. Guinea pigs. In: Tully TN, Mitchel MA (eds) Manual of Exotic Pet Practice. St. Louis, Missouri: Elsevier, Inc. 2019; 456–473
- 6.USDA Agricultural Research Service. FoodData Central. 2019. Available at: <https://fdc.nal.usda.gov/index.html> (Accessed: 13 March 2024)
- 7.Pollock C. Vitamin C Content of Selected Foods, LafeberVet. 2019. Available at: <https://lafeber.com/vet/vitamin-c-content-of-selected-foods/>
- 8.Peregoy J, Wilder FV. The effects of vitamin C supplementation on incident and progressive knee osteoarthritis: a longitudinal study. Public health nutrition. 2011; 14(4):709-15.