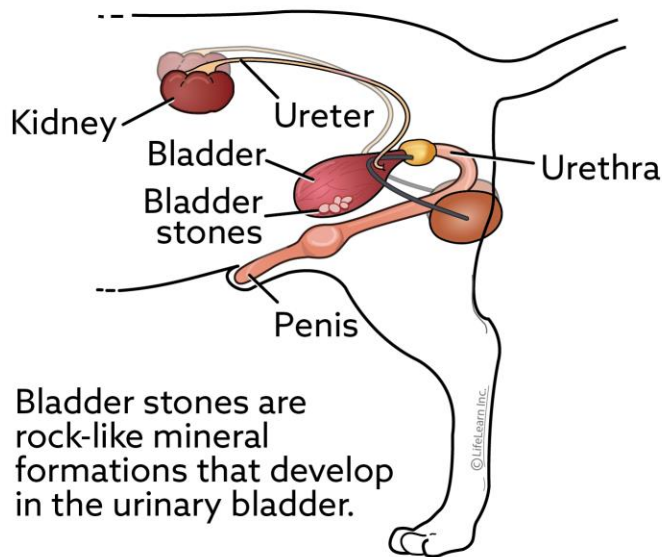


The Role of Nutrition in Managing Urinary Stones



Bladder stones are rock-like mineral formations that develop in the urinary bladder.

What is a urinary stone?

Urinary stones (also called uroliths) are aggregates of minerals and other organic compounds in the urinary tract. Struvite and calcium oxalate are the most common urinary stones in dogs and cats. Urate and cystine stones are also seen, but not as frequently. See handouts

"Bladder Stones in Dogs" and "Bladder Stones in Cats" for more information about urinary/bladder stones.

How can nutrition affect urinary diseases?

The main role of the kidneys is to maintain hydration by conserving and eliminating water, removing waste, and maintaining a balance of electrolytes and minerals like sodium, potassium, phosphorus, and calcium. The resulting urine output is affected by how much an animal drinks and what they are consuming in their diet.

The animal's diet, including the amount of water it takes in, can prevent or decrease the risk for specific medical conditions, including urinary stones. For a pet with urinary stones, it is important to monitor both food and water intake.

- Any food the pet receives, including treats, affects its urine composition. Monitor and review these foods with your veterinarian to avoid reducing the benefits of the diet.
- Water sources also affect urinary composition. Filtered water might be recommended for pets with urinary stones if the water source is hard (rich in minerals).

What is RSS testing?

Relative supersaturation (RSS) trials may be conducted for certain veterinary diets. These tests measure the relative risk of crystal or stone formation in the urine for a group of dogs or cats consuming a specific diet. The assessment considers the urinary pH, urine volume, and urinary concentrations of various compounds (e.g. calcium, citrate, magnesium). Diets with RSS values within a given range for struvite and calcium oxalate have been shown to be effective at preventing and dissolving struvite stones and may help prevent, but not dissolve, calcium oxalate stones. At the time of writing, no diet has been proven to dissolve calcium oxalate stones.



A pet food manufacturer may carry a claim or statement on a product indicating the diet has undergone RSS testing (e.g. Hill's S+OX Shield™, Purina Urinary® St/Ox Defense™, Royal Canin S/O Index®). It is important to note that RSS-tested diets are proven to be effective **only** when you feed your pet that diet exclusively. Using **any** other foods (e.g.,

treats, toppers) can negate the diet's effectiveness at preventing or dissolving stones.

What nutrients are important for a pet with urinary stones?

Water is the most important nutrient because it can dilute the urine and prevent the formation of all urinary stones.

Minerals are important, especially for the most common urinary stones: struvite (magnesium and phosphorus) and calcium oxalate (calcium).

However, ingredients that have high oxalate should also be avoided to prevent calcium oxalate formation.

Protein amount and source can also be modified to address the risk for specific urinary stones (i.e., cystine or purine stones).

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Depending on the type of urinary stone, your veterinarian may recommend nutrient supplementation to assist with stone prevention. Your veterinarian

can advise you on the best diet for your pet's condition and will monitor to ensure that the diet has a positive effect.

Why is urinary pH important, and how is it affected by the diet?

Depending on the type of urinary stone, a lower (acidic) urinary pH or a higher (alkaline) urinary pH can reduce or increase the risk of stone formation. Like urinary composition, urinary pH depends on the levels of many substances in the blood and is also affected by diet. Some minerals in the diet can affect the urinary pH and be part of the urinary stones (e.g., calcium, magnesium, phosphorus). In diets formulated to prevent urinary stones, the levels of certain minerals are measured very precisely to keep the animal's pH within an optimal range.

What is the importance of urine dilution?

Urinary dilution is one of the primary recommendations for preventing urinary crystals and stones. Urine dilution reduces the concentration of mineral precursors, making it less likely for them to aggregate in the bladder.

Think of the bladder as a bowl ready to hold liquid. If you put a teaspoon of water and a teaspoon of sugar into the bowl, the sugar crystals will not fully dissolve and will settle on the bottom: this is a very **concentrated** sugar solution. Now add more water to that bowl and the sugar crystals will disappear as they dissolve. This is a more **dilute** sugar solution. There is still the same amount of sugar crystals in the bowl, but the crystals have dissolved in the increased volume of water. More liquid entering the bladder dilutes the urine, which decreases the likelihood of stone formation.

The other way dilution helps is by encouraging more frequent urination, which moves minerals and organic material out of the bladder frequently, preventing it from piling up and sticking together, and thereby decreasing stone formation. Some diets designed for urinary health have moderately increased sodium levels to make the animal drink more, leading to urine dilution. This approach is effective and safe unless your pet has a medical condition that leads to hypertension (cardiac disease, renal disease, primary hypertension).

Monitoring the pet's urinary specific gravity (USG) by urinalysis is helpful to see if the water intake is improving, and USG decreasing.

How can I increase my pet's water intake?

To promote urine dilution, increase your pet's water intake.

- Place multiple water dishes throughout the house.
- Some dogs and cats enjoy water added to their food.
- For pets that eat kibble diets, transition to a canned diet or add water to the kibble.
- For cats, combining dry (kibble) and canned food is not ideal for increasing water intake because they will drink less on their own. However, if cats eat only wet (canned) food, their water intake from the diet is much higher, and urine dilution will improve.
- Ensure water is always fresh and clean, especially for a pet that dislikes drinking or that shares their water dish with other pets.
- Add ice cubes during hot seasons to make the water appealing.
- Consider a water fountain to keep water fresh for cats or dogs.
- Experiment with different sized bowls. Cat especially don't like their whiskers touching the side of the bowl, so larger bowls are more likely to encourage increased water intake.

What treatment is recommended for urinary stones?

Treatment recommendations for any pet with urinary stones will depend on the size, number, stone type, and individual patient factors. Nutritional strategies for prevention and management are centered on increasing water intake, controlling mineral precursors, and adapting urinary pH. Talk to your veterinarian to see what diet is best for your pet.