presents

A Guide to Maintenance of a Healthy Urinary Tract in Dalmatians

As many breeders are aware the Dalmatian's distinctive appearance is matched by a fairly unique metabolic idiosyncrasy. In fitting with his character the Dalmatian has found his own way of doing things and metabolises certain dietary components in a different way from other breeds. This can, on occasion, give rise to the formation of urinary stones, usually of a type referred to as urate uroliths. With the potential to cause complete blockage of the urinary tract this is a distressing condition, requiring a surgical solution and a strictly controlled diet to prevent recurrence. Increasingly breeders are looking at what can be done to help keep the urinary tract healthy in unaffected dogs. This article explains a little about how the condition occurs and both what and how to feed to minimise the risks.

A Unique Metabolism

Every living cell contains a central component: the nucleus. Within that nucleus are substances that play a role in nearly all biochemical processes. Purines are components of these substances. When a dog eats foods containing the cells of plants or meats he will be supplying his body with some of these purines. In turn he will use them to renew some of his own cells. It is unlikely he will be able to use all of the purines he eats and the excess have to be broken down and expelled from the body. As his cells age and have to be renewed the older purines will also have to be broken down.
These purines are processed in the intestine by a series of enzymes, to convert them into uric acid. Other breeds of dogs then go on to convert uric acid into a substance called allantoin, using an enzyme called uricase, found in the liver. Any uric acid that is not metabolised is saved by the kidney, which traps the uric acid and circulates it round again until it can be broken down into allantoin. This is important because allantoin is easily dissolved in fluid and can easily be passed out in the urine. The small amount of uric acid that is not converted is turned into a salt called urate. Urate, in contrast to allantoin, does not like to dissolve in fluid and remains sludgey when the body tries to dissolve it.

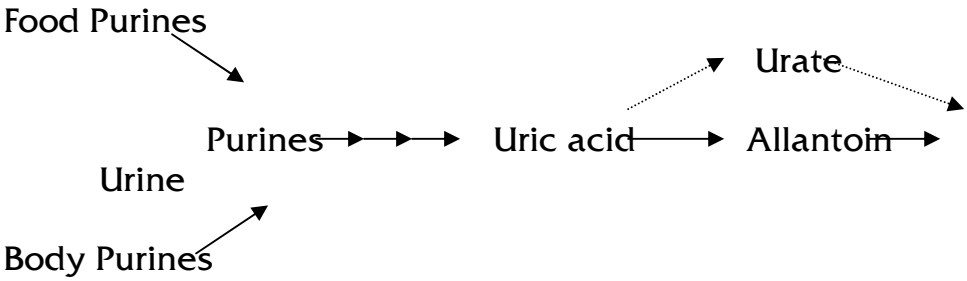

Fig 1.1 The normal process in Non Dalmatian Breeds

Dalmatians manage to follow this process right up to producing uric acid. The Dalmatian liver has a supply of the enzyme uricase but unfortunately it does not do its job very well so only a little allantoin is produced. Normally this wouldn't be a problem, as the uric acid could be "saved" by the kidney and run through the process again until it was broken down. However, Dalmatians do not save much at all so the uric acid is passed into the urine as sludgy urate.

This condition in Dalmatians has been likened to "gout" in humans. This is because humans don't convert their uric acid to allantoin.

The crucial difference in humans is that the kidney tries to save the urate which then builds up in the body and is deposited in joints causing painful swelling.

Fig 1.2 Non- Dalmatian breed's urine vs Dalmatian Urine

Consequences

So if all Dalmatians are producing urine containing sludgy urate, why do they not all experience problems? The answer is that all sorts of factors can affect how much urate is produced and how concentrated it is. Urine obviously contains lots of other substances that the body wants to expel and these can also influence the likelihood of true stones being formed. It is also known that although male and female Dalmatians can develop stones, males are most likely to do so. Interestingly gout is much more likely to occur in human males and women will generally have lower levels of urate in their bloodstream.

Understanding the metabolic processes at work can help when to comes to evaluating the right diet to help keep the urinary tract free flowing in the healthy Dalmatian.

Fluid Intake

Imagine the sludgy urine becoming more saturated with urate. It is almost inevitable that such a sludgy mass would eventually cause the urinary tract to "silt up" of for stones to form from the sludge. If a Dalmatian can be encouraged to pass very dilute urine, on a frequent basis, the chances of keeping the urinary tract healthy are maximised. Ensuring lots of freshly filled water bowls in numerous locations is one way of aiding this. It may be tempting to add salt to

the food but this is inadvisable as this can cause an increased amount of calcium to be excreted into the urine and predispose to other types of stones. Adding water direct to the food if feeding a dry food can be useful if an individual dog will tolerate this- most prefer to actively crunch their food. Another important point is to ensure that the food you feed produces stools that are solid and well formed. Large, loose stools mean that water lost from the body is being lost through this route, potentially making the urine more concentrated. In evaluating a food look for the presence of highly digestible ingredients, such as rice, for smaller, firmer stools. Insoluble fibres such as cellulose and wheat bran may bulk out the faeces and reduce overall digestibility, while other fibres such as beet pulp can help regulate the intestinal environment.

Urinary pH

Those who have studied chemistry may remember that under certain conditions of acidity and alkalinity, certain salts are encouraged to precipitate out of solution- i.e. barely visible dissolved components can merge together to form larger lumps or aggregations. If urine becomes more acidic then the purines and the products of their break down are more likely to come out of solution. This means that Dalmatians are unlikely to be helped by passing acidic urine. However most carnivores will pass acidic urine when fed on a typical high meat diet. This is one suggested reason for keeping the meat content of the food fed to Dalmatians lower.

The ingredients list of a petfood will start with the ingredient that is present in the highest quantity in that food and the rest follows in reducing order of content. If meat is one of the first ingredients on the label this might not be ideal food for Dalmatians. However, animal proteins will always remain the most digestible of proteins and provide a useful source of essential amino acids.

Other ingredients that may have a potentially acidifying influence include maize gluten meal. Like any ingredients the overall effect on the food will depend on the amounts and proportions of the other ingredients that are present. This same acidifying effect will not be seen with whole maize, and remember too that maize is one of the best balanced cereals, containing easily absorbed carbohydrate for energy and linoleic acid for good coat and skin condition. Generally speaking a diet with higher amounts of cereals is likely to have an overall alkalinising affect on the urine when metabolised.

Protein and Purine Content

So far you could be forgiven for thinking that the best way to keep your Dalmatian healthy is to feed a low protein, high cereal diet. This tells us only part of the story. As we highlighted earlier the source of purines is partly dietary. Foods that are higher in purines will produce more break down products and potentially more problems. Ingredients that are higher in purine content include the offal meats, such as heart, liver and kidney. These cuts of meat should be avoided but may not always be listed separately on the petfood label. Some manufacturers choose to list their ingredients in groups, and the terms "meat and animal by products" could refer to lean steak beef or offal meats. Under normal circumstances this is not in itself a bad thing since some offal meats are highly nutritious and easily digested. However for Dalmatians such diets may prove less than ideal. When it comes to dry products there is a need to differentiate between poultry by product meals, which could contain offal meats, and chicken meal, which does not.

Other unexpected sources of high levels of purines include wheat germ, bran and peas and beans. As peas and beans are good vegetable sources of protein you can start to see that a purely vegetarian diet may find it difficult to deliver adequate amounts of protein to meet a dog's nutritional needs while keeping the purine content low.

Style of feeding

There is as yet little agreement on the best style of feeding Dalmatians. Immediately after eating the digestive enzymes that have been used to digest food are swept from the body in the faeces and the urine. These enzymes work in the alkaline environment of the small intestine and for a period of time after eating, the urine will become more alkaline naturally. It has been suggested that free choice feeding results in the urine being more acidic more of the time because there are no peaks in alkalinity to balance things out, so this would suggest that free choice feeding is not beneficial. However it has also been said that peaks in uric acid in the urine after feeding a meal may also lead to more problems because the uric acid is more concentrated in the urine at these times. Perhaps the main message to learn from this is when routinely measuring urine pH that the length of time from the last meal could impact upon the results.

Summary

In summary the main features to look for in a diet that could be more suited to meet a healthy Dalmatians needs are:

- A nutritionally complete and balanced diet
- A digestible recipe that gives good stool formation
- More of the protein from cereal sources that are low in purines
- Inevitably this will tend to produce a lower protein diet overall, since cereals tend not to be as concentrated a source of protein as meats.
- Animal protein should be **not** be the first ingredient on the ingredients list as a preference
- Meat proteins should be derived from muscle meats or meat meals, rather than offals
- Do not add supplements, including salt, unless advised by your vet
- Always supply fresh drinking water and encourage fluid intake.

One point to consider is that urate uroliths have been reported in puppies as young as one month old. Puppies have a greater need for protein than adult dogs to provide for growth and restricting them to an adult diet could result in dietary deficiency with respect to protein, fats and minerals in particular. A complete puppy food is the best option for Dalmatian puppies, unless clinical signs of urate urolithiasis are seen and/ or a dietary recommendation made under the supervision of your veterinary surgeon. For most adult dogs a food for senior dogs can usually be safely fed since it should still be formulated within safe levels for healthy adults, although it may contain slightly less protein. Some dogs may need higher levels of protein when exercising intensively, or under conditions creating a greater physiological requirement for protein and in these cases a senior diet is less suitable. Lastly do be aware that severe protein restriction can potentially cause liver abnormalities that will in themselves cause urate urolithiasis so always feed healthy dogs a petfood that has been formulated to meet accepted nutritional standards.

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Europa Petfoods

Europa Petfoods make a range of petfoods suitable to meet the nutritional requirements of healthy dogs throughout their lifestages. All varieties within the lifestage range contain rice as the principal ingredient, ensuring each meal is easily assimilated and highly digestible. Cereal based proteins are lower in purines than meat based ingredients making the range ideal for healthy dogs that need to avoid high purine content ingredients. Only the highest quality chicken meat meal is used throughout the range, while lamb meat meal is used in our Lamb variety adult formula, thus avoiding any inclusion of offal which further decreases the potential purine level.

Senior Formula is specially formulated with lower levels of protein and fats to match the older dog's nutritional profile. Gentle on the mature dog's stomach with added beet pulp and Yucca extract added to the supportive nutritional matrix to provide for a healthy gastrointestinal tract.

Lite Formula is the food of choice for inactive dogs, or those with a tendency to weight gain. With lower levels of oil and calories the recipe helps support optimum body condition. The recipe remains highly digestible, without compromising on taste.

Adult - Lamb Formula is a highly palatable food, ideally suited for finicky eaters, and those dogs with a sensitive digestive tract. Free from ingredients commonly associated with food intolerances and allergies including wheat gluten, soya and dairy products. This highly digestible recipe contains tasty, high quality meat meal and no chicken at all making it especially useful for those dogs who cannot tolerate any form of protein or fat derived from chicken.

Junior/Activity Formula is specifically designed to meet all the nutritional requirements of growing dogs. With higher levels of protein and oils than adult foods this lifestage can also be fed to those dogs with a higher energy requirement due to lactation or high levels of performance.

Puppy/Growth Formula is designed to provide for all a puppies nutritional requirements from weaning to junior stages. This formula has the highest protein and oil levels in the range and balanced levels of minerals to provide for the needs of fast growing puppies.