

# Minnesota Urolith Center \* UNIVERSITY OF MINNESOTA

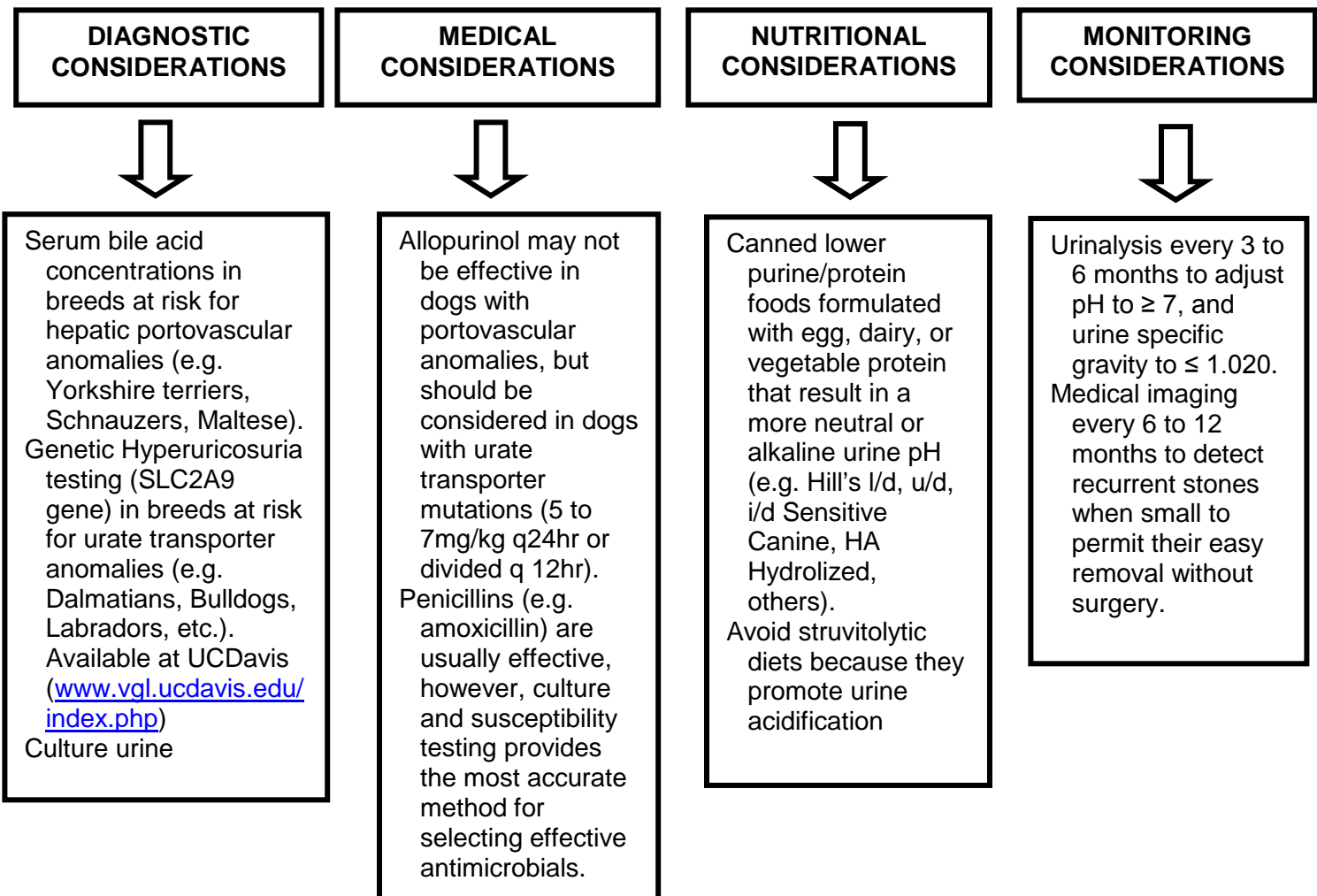
College of Veterinary Medicine \* 1352 Boyd Avenue \* St Paul, MN 55108

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## CANINE STRUVITE AND URATE UROLITHS

Uroliths with considerable amounts ( $\geq 25\%$ ) of struvite and urate indicate that two disease processes are occurring concurrently. In almost all dogs, struvite (magnesium ammonium phosphate hexahydrate) forms as a consequence of urinary tract infection. When infection is adequately prevented, struvite will not recur. Urate formation may be associated with portovascular anomalies or less commonly genetic mutations in the urate transporter. Struvite prevention diets are contraindicated because acidic urine increases the risk for urate precipitation.

## PREVENTION



**Review manufacturer's therapeutic food literature to determine indications/contraindications. For pets with multiple health concerns, consult a veterinary nutritionist to select an optimal food.**

In depth recommendations and references are available on our website: [urolithcenter.org](http://urolithcenter.org) under the resources tab.

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## Canine Uroliths Containing Struvite and Urate

For dogs with uroliths predominantly composed of struvite with a smaller amount of ammonium urate, we commonly recommend treating it as if the urolith was all struvite. However, some breeds (Dalmatians, Russian Terriers, Bulldogs, and others) have been reported to have a genetic mutation in the urate transporter. Visit [www.vgl.ucdavis.edu/index.php](http://www.vgl.ucdavis.edu/index.php) for information on currently identified breeds and instructions on sample submissions for genetic testing.

In other breeds ( e.g. small breeds with a Terrier heritage; Yorkshire, Cairn, Havanese, Maltese, Schnauzer, Poodle, Pug, and others), urate uroliths have been associated with portovascular anomalies.

Based on these possibilities, we have the following recommendations.

1. For breeds known to carry the mutation or unlikely to have a portovascular shunt, consider submitting blood to the Veterinary College at the University of California, Davis to determine if this dog has defects in the urate transporter.
2. For breeds likely to have a portovascular shunt, consider performing provocative bile acids to rule out liver disease as the cause of hyperuricosuria.
3. If the gene test is negative or the serum bile acid concentrations are normal, treat as if the dog had an infection-induced struvite stone (you can find a flow sheet at [www.urolithcenter.org](http://www.urolithcenter.org); activate the "recommendation" tab on the left; and then activate the tab for Canine Magnesium Ammonium Phosphate Urolith), which will provide a plan for further diagnosing and monitoring urinary tract infections with urine cultures. Diet is not the primary therapy for infection-induced struvite, and urine acidification can promote precipitation of urate.
4. If the gene test is positive for the mutation or the bile acids concentrations are abnormally increased, manage struvite as indicated above (i.e. controlling urinary tract infection -even if urine becomes alkaline, struvite stones rarely form unless bacterial infection with urease producing micro-organisms also occurs) and consider diet to minimize urate uroliths. Additional information can be retrieved at [urolithcenter.org](http://urolithcenter.org) following the flow sheet for Canine Urate. The diets we use for urate are k/d, l/d or u/d. In some cases low doses of allopurinol can also be considered.

Treatment of uroliths should complement, and not supersede appropriate management of any identified liver disease.