

## Nutritional Management of Chronic Kidney Disease

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### **How Kidney Disease Progresses:**

The kidneys are responsible for filtering and reabsorbing various proteins and electrolytes such as sodium, chloride, calcium, phosphorus and potassium. In certain instances the kidney allows these substances to enter into the urine for excretion from the body and in other instances these substances are reabsorbed so the body can further utilize them.

When there is a loss of 75% of the kidney's functional components, we begin to see changes on the blood work including increased blood urea nitrogen (BUN) and creatinine with a decrease in the kidney's ability to concentrate the urine. With decreased kidney function, the kidneys are no longer able to process the proteins that are normally filtered. Instead, these proteins induce further inflammation in the kidney, which leads to increased protein being excreted in the urine.

Changes in blood pressure affect the functional component of the kidney. High blood pressure can lead to further kidney damage and kidney damage can lead to high blood pressure.

When the kidney retains phosphorus, parathyroid hormone is stimulated. Typically this hormone signals the kidney to get rid of more phosphorus in the urine. However, since the kidney is unable to get rid of phosphorus effectively more and more parathyroid hormone is released. Hyperparathyroidism is the result of this cycle and also results in increased calcium release from bone resulting in increased kidney mineralization and further inflammation in the kidney.

### **Why Nutritional Management of Chronic Kidney Disease is Important:**

A few studies have been performed examining the impact of commercial therapeutic diets on the management of chronic kidney disease. In one study of 50 cats, median survival time was 633 days in the cats on the kidney diet and was 264 days for the cats eating a maintenance diet.

Another study of 38 dogs with stable chronic kidney disease evaluated a diet formulated to be similar to grocery store brand foods compared with a therapeutic diet. In this study median survival time was 594 days in dogs on the therapeutic diet and was 188 days in the dogs on the maintenance-type diet. Dogs on the therapeutic diet had increased time to uremic crisis.

In another study, 45 cats with stable chronic kidney disease were evaluated after transitioning onto a therapeutic diet or a maintenance diet. 91% of these cats accepted the diet they were placed on throughout the study. None of the cats on the therapeutic diet went into uremic crisis, while 22% of those eating the maintenance diet passed away.

### **Main Dietary Goals:**

The main dietary goals for dogs and cats with kidney disease are:

- Decreased protein:
  - o While the protein content should be decreased, the protein should be of good quality and amino acid requirements met. The food should be of high calorie density to help preserve lean body mass from being utilized and support the pet during periods of decreased food intake.
- Decreased phosphorus:
  - o Decreasing phosphorus content of the diet will help to decrease excess parathyroid hormone secretion, which is correlated with progression of chronic kidney disease.
- Decreased sodium and chloride:
  - o Reduced sodium intake helps to reduce chances of increased blood pressure and progression of chronic kidney disease
- Increased omega-3 fatty acids:
  - o Omega-3 fatty acids decrease inflammation and are considered protective of chronic kidney disease
- Decreased acid load:
  - o Pets with kidney disease have increased acid load, feeding foods which promote less acidic urine and blood may help them compensate

### **Why An Over-the-counter Diet Shouldn't Be Used:**

Over-the-counter diets are designed to benefit the majority of the pet population. They are typically higher in protein, sodium and chloride than is appropriate for the management of chronic kidney disease. In addition, prescription therapeutic diets are restricted in phosphorus below recommended daily amounts and therefore cannot be sold without a prescription. Therapeutic diets are formulated to match those that have proven to help increase survival time in patients with disease or have undergone studies showing them to help increase survival time in patient with kidney disease.

### **Commercial Therapeutic Diet Options:**

Hill's Canine k/d canned lamb or egg or dry egg

Hill's Feline k/d canned pork and chicken or ocean fish in pate or stew or dry chicken and egg

Hill's g/d: Canine and feline canned and dry

Royal Canin Canine Renal LP and MP canned and dry

Royal Canin Feline Renal LP chicken or pork dry and pate or morsels in gravy canned

Purina NF: Canine and feline dry and canned

BalanceIT Grain Free Potato and Pork dry food

### **Homemade Therapeutic Diets:**

A homemade therapeutic diet can be formulated to meet the needs of your pet if needed. Please discuss a nutrition consultation with your veterinarian if you think this may be the best option for your pet.