Chronic kidney disease (CKD) is very common in cats, especially in aging cats. It is a progressive and irreversible disease, but good medical management can help these patients to have a good quality of life after diagnosis. Nutritional management is essential to achieve this goal in IRIS Stages II-IV patients. Recently, the introduction of some of the strategies in the early stages has also raised some interest.

**FEATURES OF THE DIETS FOR NUTRITIONAL SUPPORT IN RENAL PATIENTS**

Modifying the protein levels in the diets for the feline CKD is not the only possible strategy, nor necessarily the most important. Modifying inclusion levels or supplements of other key nutrients is essential in such diets. Do we know how these nutritional features can help us and why are they so important for our renal patients?

**Phosphate** - Renal secondary hyperparathyroidism occurs in early CKD. Kidney's inability to excrete phosphorus results in an increase of parathyroid hormone (PTH), which has negative effects on various organ systems and promotes disease progression due to kidney mineralization. The reduction of phosphorus in the diet results in a decreased PTH concentration and, according to experimental data, diets low in phosphorus increase survival time. Therefore, this strategy is crucial and should be established as soon as possible, even if there is no hyperphosphatemia, because PTH is already increased in early stages. The use of phosphate binders to control this disease feature is possible, but the evidence of their efficacy is very low, thereby restricting dietary phosphorus is imperative.

**Protein** - Dietary protein, as opposed to phosphorous, is not restricted (restriction meaning the nutrient amount is below the minimum requirements) but reduced: maintenance diets tend to provide higher protein levels than the minimum requirements. Renal diets, therefore, are lower in protein than maintenance diets but are not actually restricted. But being closer to the minimum, it is very important that the protein source is of high quality (i.e. high biological value and high digestibility amino acid profile).

Staying within requirements, moderate protein levels reduce nitrogen compounds in blood, and excess amino acids that are over the requirements are deaminated and the nitrogen is excreted as urea and other compounds. This helps to reduce the uremic crisis, although this doesn't necessarily mean helping to slow the progression. The exception are proteinuric animals, where protein moderation helps reducing the loss of protein by the glomerulus and potentially help slowing the process, since the presence of protein in renal tubules is harmful. It is very important to ensure that the patient does not suffer protein deficiency.

**Sodium** - Moderate sodium levels in renal diets allow the management of hypertension, common in cats with CKD, which contributes to the progression of the disease.

**Potassium** - Blood concentration of potassium in patients with CKD can be normal, high or low. In cats, hypokalemia is more than in dogs due to the combination of acidosis, hiporexia and polyuria. Hyperkalemia occurs in oliguric CKD or in patients treated with angiotensin-converting enzyme inhibitors. Renal diets have different potassium concentrations, allowing us to choose the most appropriate for patients with altered potassium metabolism.
**B group vitamins** - Polyuria promotes the loss of water-soluble vitamins, thus diets for CKD patients should have high enough levels to compensate for this loss.

**Omega 3 fatty acids** - Data from dogs with experimentally induced CKD suggest that the inclusion of fish oil rich in EPA and DHA helps slowing the progression, reduces proteinuria and glomerular hypertension. The recommended dose of EPA and DHA in dogs is 140 mg/kg. The amount included in the renal diet should be evaluated and add supplements whenever needed. In cats, a retrospective study showed that cats on renal diets had better survival times than those fed maintenance diets, suggesting that cats on renal diets rich in fish oil were those who lived most.

**Fermentable fibre** - Certain types of prebiotic fibre have been proposed as a strategy to reduce the concentration of blood urea, promoting bacterial synthesis in the gut (and these bacteria use blood urea as nitrogen source) and increasing the faecal removal of nitrogen while reducing the renal clearance. There are no data to validate this strategy for preventing uremic crisis or affecting survival times. In any case, the amount should be reduced not to affect the digestibility or reduce the energy density.

In addition, renal diets promote a more alkaline pH, to counteract the typical metabolic acidosis in this disease.

These strategies, however, are not exempt from limitations; studies evaluating their benefits in patients with CKD have proven the utility of some of these strategies together, but there is little evidence of the benefits of the modification of some of the nutrients by themselves.

---