

## WHY ARE THE KIDNEYS IMPORTANT?

The kidneys play multiple roles in maintaining an optimal environment within the body for everyday function and survival. They help to maintain the correct levels of body fluids and electrolytes, stimulate the bone marrow to produce new red blood cells, aid in the control of blood pressure and play a critical role in removing waste products from the body.

## HOW DO THE KIDNEYS WORK?

Mammals have two kidneys, one on each side in the region of the mid to lower back. Each kidney is connected to the urinary bladder by a small tube called the ureter. The urinary bladder is emptied to the outside of the body by a single larger tube called the urethra. The kidneys are made up of millions of “nephrons”. The nephron is the functional unit of the kidney and together, they regulate the amount of water, electrolytes, waste products and other substances that are excreted in the urine or reabsorbed into the blood depending on the needs of the body. There are millions of nephrons in the kidneys, which allow them to sustain a certain amount of damage. The kidneys cannot however, replace damaged nephrons, so once damage occurs, it is irreversible. Because of their large reserve capacity, we typically do not start to see signs of kidney disease until at least half of the total nephrons are damaged. This makes it difficult to evaluate renal failure in a pet until it has progressed significantly.

## WHAT IS RENAL FAILURE?

Renal failure results from damage to the nephrons, causing them to not function properly. Renal failure can be divided into acute (a rapid onset) or chronic (slowly progressive over time). Acute renal failure is often the result of major damage to the kidneys, such as infection, decreased blood flow to the kidneys, drugs that can be harmful to the kidneys, toxins such as antifreeze, or blockage of urine outflow from the kidneys, such as stones lodged in the ureters or urethra. The pet usually becomes sick shortly after the kidney has been damaged. Depending on the cause and if it is discovered early enough, it can sometimes be reversed and the kidneys can recover. At the other extreme, irreversible damage can occur where the kidney is unable to be repaired and the disease can be fatal. Chronic renal failure is often more gradual in onset and by the time the pet is showing clinical signs it is difficult to pinpoint what initially caused the insult to the kidneys. There is no way to cure chronic renal failure and it will continue to progress as more nephrons become non-functional. In many cases, pets with chronic renal failure can be treated with medications, fluid therapy and dietary changes to help them feel better and slow the progression of the disease for months or even years.

## CAN MY PET BE TESTED FOR RENAL FAILURE?

Blood work and urinalysis are helpful tests for looking at kidney function. There are many other toxins that build up in the body with renal failure. Most of these lead to the clinical signs that we see, but they are difficult to evaluate with tests. Unfortunately, two thirds of the nephrons must be lost before the BUN and creatinine become elevated. Urinalysis can evaluate the ability of the kidneys to concentrate the urine as well as look for any evidence of infection, crystals or other substances such as protein that shouldn't be in the urine under normal circumstances. Your veterinarian may also suggest other tests such as radiographs or ultrasound to get an idea of the size, shape and architecture of the kidneys.

### WHAT ARE THE SIGNS OF RENAL FAILURE?

With acute renal failure, the pet will often become lethargic, have a decreased appetite or vomiting, foul smelling breath and may have reduced or no urination. The clinical signs are usually rapid in onset. With chronic renal failure, the initial clinical signs are usually drinking more water and urinating more frequently. As the disease progresses, the pet may have a decreased appetite, weight loss, intermittent vomiting, lethargy, weakness, poor hair coat, ulcers in the mouth and foul-smelling breath. Many of these clinical signs can occur with medical conditions other than renal failure and it is important to seek veterinary attention for your pet if they are experiencing any of these clinical signs.

### HOW DO YOU TREAT RENAL FAILURE?

The treatment of renal failure is performed on a case-by-case basis to meet the individual needs of each patient. If the initial cause of the kidney insult can be identified, your veterinarian will aim treatment efforts at correcting or removing the source of the problem. In many cases, intravenous fluid therapy is required in attempt to diurese the kidneys to aid in flushing many of the built-up waste products, such as BUN and creatinine out of the body. Fluid therapy might also be required to correct electrolyte imbalances. Other medications might be used to help the kidneys filter fluids more effectively or to help increase the blood flow to the kidneys. Some pets with renal failure also develop high blood pressure. If this is a problem, medication to control the blood pressure might also be indicated.

Medications can be used on a long-term basis at home to help with the other clinical signs such as nausea, decreased appetite and anemia. Fluids can also be administered under the skin at home. Your veterinarian may prescribe a special diet for your pet that is lower in proteins, salt and other substances that may be difficult for the failing kidneys to eliminate in the urine. It is important for a pet with kidney disease to always have access to fresh water. Since the kidneys can't concentrate the urine adequately, they need to drink more to make up for water that is lost in the urine. Your veterinarian will be able to formulate the best treatment protocol for you and your pet.