



Research to **protect, treat & cure** animals.
100% of donations fund animal health.

Diagnosing kidney disease

Investigator: Dr. Kay Rutherford-Markwick
Massey University, New Zealand
Status: Year 1 of 1

With MAF funding, Dr. Rutherford-Markwick is studying a better method for diagnosing chronic renal disease, a leading cause of death in cats. Dr. Rutherford-Markwick is a senior research scientist at Massey University in New Zealand, where she also received her Ph.D. She conducted postdoctoral work at the Beckman Research Centre of the City of Hope National Medical Centre, in Duarte, California.



How does chronic kidney disease (CKD) affect cats?

Dr. Rutherford-Markwick: Chronic kidney disease (CKD) is a significant cause of illness and death in cats. It usually progresses slowly, leading to a gradual loss of kidney function. The primary functions of the kidney are to regulate the body's water levels and to remove waste by-products from the blood, and excrete them in the urine. Other functions include the regulation of blood pressure and the production of hormones that stimulate red blood cell production and maintain normal blood calcium and phosphorus concentrations. As the kidneys fail, each of these vital functions is impaired, making it difficult for the cat's body to conserve water, excrete waste products, regulate blood pressure, produce red blood cells, and maintain normal calcium and phosphorus concentrations in the blood.

What are the symptoms?

Dr. Rutherford-Markwick: The most common signs of CKD reported by owners are excessive thirst, increased urination, weight loss, a poor quality coat, reduced appetite and vomiting. When tests are performed on cats with CKD, many abnormalities can be detected including:

- Accumulation of waste products in the blood
- Dehydration
- High blood pressure
- Too few red blood cells (anemia)
- Excessively high blood phosphorus
- Mineral deficiencies

How common is it?

Dr. Rutherford-Markwick: Chronic kidney disease is one of, if not the most common cause of death in older cats. In a study of 600 cats from a large colony, 31 percent died or were euthanized because of kidney disease.

Are there any current and effective tests to diagnose (CKD)?

Dr. Rutherford-Markwick: Diagnosing CKD once a cat has developed clinical signs is straightforward and can easily be done using routine blood and urine tests. Unfortunately, by the time CKD is able to be diagnosed by these tests, at least 75

percent of kidney function has already been lost and will never be regained. Treatment of CKD in cats at this stage is based around managing the side effects and trying to prevent further deterioration. What is not known currently is how effective other therapies may be if the disease were identified much earlier. Measuring kidney function directly in cats is possible, but is difficult and requires expensive equipment not available in regular veterinary practices, so is not a suitable screening test. Many cats with early stages of CKD will have increased levels of protein in their urine, but the current test has yet to effectively predict the development of CKD because many other diseases also cause increased protein in the urine.

What do you hope to learn from your study?

Dr. Rutherford-Markwick: We hope to learn whether a novel urine test can detect CKD earlier than the currently available tests. We propose that as kidney function declines, the proportions of compounds actively produced by the kidney will alter. Thus, even very mild and early kidney disease may be detectable by measuring these compounds. If the test is able to detect early CKD, it will provide the first real opportunity to evaluate therapies designed to prevent the development of clinical signs associated with CKD before they occur.

Results so far that you wish to share?

Dr. Rutherford-Markwick: We are in the early stages of the study, which involves collecting blood and urine samples from and accurately measuring the kidney function in 50 adult cats. We will be measuring the urine compounds we are interested in from the samples, and eagerly await the results.

Why should the average animal lover care about your study?

Dr. Rutherford-Markwick: As stated before, CKD is a very common cause of disease and death in cats. Frustratingly, by the time it is diagnosed by a veterinarian, the cat has already lost the majority of its kidney function. Any test that can identify CKD earlier in the disease process will have a huge impact on cat welfare. Until such a test is available, we are unable to determine if early treatments can prevent the disease from progressing to cause clinical signs, and ultimately death. Such a test will allow owners and veterinarians to be aware of impaired kidney function and avoid circumstances that may worsen the disease. It is our hope that the development of an inexpensive test performed on a normally collected urine sample could detect early kidney disease and reduce the enormous number of cats that suffer and die from chronic renal failure.