

**BRIGHT FUTURE**

Antech unveils RenalTech, a predictive tool for diagnosing chronic kidney disease in cats.

**DIAGNOSTICS**

# Smart Medicine

Patricia Wuest, Editorial Director, NAVC

Mars Inc. is a \$35 billion empire that makes some of the world's most popular candies, including Snickers, M&Ms, Milky Way, and Twix. It is also in the pet-health and pet-care business. And for the past several years, scientists at Mars Petcare have been working on developing predictive diagnostic tools using its vast repository of anonymized pet medical records and machine learning. RenalTech, which can predict chronic kidney disease (CKD) in cats 2 years prior to the patient showing any signs or symptoms of the disease, is the first one to be released.

RenalTech was created through a collaboration led by the Mars Petcare family of companies, including the Waltham Centre for Pet Nutrition, Antech Diagnostics and Imaging, Royal Canin, VCA Animal Hospital, Banfield Pet Hospitals, and the Mars Advanced Research Institute, along with several outside partners. Mars says RenalTech has been shown to be more than 95% accurate. Antech Diagnostics released the tool in September free of charge to its customers.

CKD is the number 1 cause of death for cats over the age of 5 and affects 30% to 40% of all cats over the age of 10. The associated nephron damage is progressive and irreversible, even though some cats with CKD have stable serum creatinine concentrations for months and, in some cases, years.

Feline renal disease is usually diagnosed by looking at the level of two biochemical byproducts in the bloodstream, blood urea nitrogen (BUN) and creatinine, in conjunction with the urine specific gravity (USpG). Tests to measure the blood levels of other substances, such as potassium, phosphorus, and calcium, as well as the cat's red and white blood cell counts, help to determine the extent of failure and the best course of treatment. A cat's survival often depends on early diagnosis of CKD.

## A New Approach

"Traditionally, the cat is diagnosed when the owner notices their cat isn't doing well and takes it to the vet," says Kay O'Donnell, vice president of Waltham Centre for Pet Nutrition, a Mars Petcare science institute located in the UK. "The vet diagnoses CKD through blood and urine tests. The gold standard for diagnosis is GFR, which is glomerular filtration rate. By the time [CKD] has become noticeable, the cat is in trouble. Between 40% and 70% of kidney function can be lost. At that point, it is a place of management of the disease, making modifications to the diet to try and increase quality of life."

"The advantage to RenalTech is that you can pick it up much earlier," says O'Donnell. "It gives us a chance to change the outcome."

### How It Was Developed

A research team evaluated 20 years of data from 150,000 cats treated at Banfield Pet Hospitals and looked at 35 possible parameters, such as age, sex, breed, signalment, and various lab values. In the end, the researchers narrowed it down to 6 laboratory parameters that appeared to be the most important for identifying cats at high risk of CKD development—BUN, creatinine, USpG, urine protein, urine pH, and white blood cell count—plus the cat's age to predict whether a cat will develop CKD within the next 2 years. Essentially, researchers used artificial intelligence to develop a predictive modeling tool that indicates when CKD is in a cat's future.

"We are very fortunate that we can access this data," says O'Donnell. "The data originally comes from 150,000 cats and 750,000 patient visits from those cats. Essentially, you're looking at all the data you have and making associations. You're looking at what happened with the cats that developed CKD and those that didn't."

### How It Works

RenalTech measures the 6 lab values at 2 different time points and compares those values with each other (the tests should be run about 3 to 6 months apart).

After Antech runs a complete blood cell count, chemistry panel, and urinalysis, RenalTech uses that information to determine whether a cat is likely to develop CKD in the future.

"By identifying those cats at very high risk of disease development, this will allow vets and owners to intervene early," says O'Donnell. "[RenalTech] will allow us to take a more proactive approach. Treatment of disease is typically reactive. The pet gets sick, you take them to the vet, and the vet treats it. The approach is changing."

"There is no downside to intervening early for cats identified as high risk," says O'Donnell. "So far, the feedback [in pilot cases] has been very good."

As additional patient information is added to the database, researchers should gain a better understanding of CKD and how to treat it in cats.

### What's Next?

"The key is having the data and being able to connect the data and integrate that data," says O'Donnell. "What can we understand about early disease identification? My prediction is that we will see more tools developed that will assess the risk of disease development. We will be able to pick up diseases much earlier and then intervene earlier."

As for applications for specific diseases, O'Donnell says there are a number of opportunities. "Diabetes is another area [where this type of tool could predict the development of diabetes] in cats and dogs," she says. "It has a major impact on quality of life. It's difficult to manage. Can we intervene earlier so the diabetic stage doesn't ever develop?"

O'Donnell says that predicting disease isn't the only application for a tool like RenalTech. "We should also start to be able to identify when things are going well, and the pet is in a healthy stage," she says. "How can we monitor that over time to keep the pet in a healthy stage? We will see a world in the future where it is a standard part of wellness plans. We are on the edge of something quite remarkable that will increase the quality of life for the pets that we serve." **TVP**



  
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