

# Could NC State Research Win the Battle Against MVD?



By Sherry Buckles

Owners of Cavalier King Charles Spaniels usually become familiar with mitral valve disease at some point. MVD strikes half of these dogs by the age of 5, almost all by the age of 10 and remains the leading cause of death for the breed.

So far, there's no cure. But what if no-body needed one?

That's the concept behind research at North Carolina State University's College of Veterinary Medicine (NC State). Kathryn Meurs leads an investigation there that could someday forestall MVD before it becomes debilitating. The key? Identifying genetic markers that cause the condition.

"Right now, we just give drugs to treat symptoms," says Meurs, associate dean of research and graduate studies at the school. "Once you identify these markers you'll know who's at risk and why. Then you can develop medication to help prevent the disease."

The mitral valve separates the left atrium (upper chamber) and left ventricle (lower chamber) of the heart. Unoxygenated blood returns to the heart via the right atrium and goes to the right ventricle,

which sends it to the lungs for oxygen. Oxygen-rich blood comes back to the left atrium and goes to the left ventricle, which pumps it to the rest of the body.

Because that left ventricle operates under high pressure from the strongest muscles around the heart, the mitral valve can wear out and leak. Blood flows backward into the heart, causing multiple problems that end in congestive heart failure.

Meurs' team, which is funded by a grant from the Morris Animal Foundation, took blood samples from 11 Cavaliers with MVD for whole genome sequencing, the process of determining the complete DNA sequence of an organism. They compared the results to DNA from dogs that don't get this disease, using larger breeds such as collies and Dobermans. If they'd used small breeds, Cavaliers or corgis or dachshunds, they might accidentally have included dogs with muta-

tions in the mutation-free control group. The DNA comparison produced thousands of variants to be analyzed.

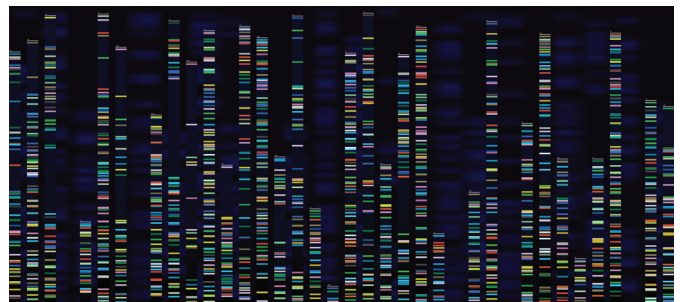
"This type of research is different from testing a new drug to see whether it works," says Meurs. "It's difficult to measure how far we've come. You don't know if the road you're on is three miles long or 300. We've completed the whole genome sequencing, and now we're looking at a huge amount of data. In our research laboratories' history, we have discovered seven different mutations that cause heart disease; we found two or three in less than two years, and a couple took a full decade."

Meurs doesn't expect gene therapy to be feasible, because the mitral valve in small dogs has become too abnormal to be fixed that way. She thinks anticipating this disease remains the best hope for owners.

"If someone walks into the clinic with an 8-week-old Cavalier, can we introduce medication and make diet and lifestyle changes that ultimately prevent the valve from going bad?" she asks. "That's the pipe dream. But it's a reasonable pipe dream – to head MVD off at the pass."

For more information on CKCS research studies underway at NC State, please contact:

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**[Top left:]** Cavalier Cheek Swab: Julia Condit, a NC State veterinary research technician, swabs the cheek of a Cavalier King Charles Spaniel for genetic testing.

**[Bottom left:]** DNA Map: Through DNA sequencing, NC State College of Veterinary Medicine researchers can identify genetic markers for canine mitral valve disease.