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Researcher to Study Dog Genome for Clues to Lymphoma in Humans

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They've fetched our slippers and provided us with companionship and unconditional love for generations, but those aren't the only benefits that dogs provide. According to a North Carolina State University researcher, the humble canine may hold the key to unlocking the cause of non-Hodgkins lymphoma, one of the deadliest forms of cancer.

Dr. Matthew Breen, a professor of genomics at NC State's College of Veterinary Medicine, has been awarded a five-year, $1 million grant by the National Institutes of Health (NIH) to find cancer-associated genes in canines.

Breen, who worked on sequencing the canine genome in 2004, says that not only is the dog genome very similar to the human genome, it is also much easier to pinpoint the location of abnormal areas within the dog genome, due to the lack of genetic variability within breeds.

"If you take DNA samples from members of a particular breed of dog, you'll see very little genetic variation in the samples, because in creating a particular breed, variation gets 'squeezed out' over time as breeders try to get dogs that conform to the breed standard," Breen says.

"The end result is that when you compare the DNA samples from one breed, any aberration within the genome really stands out, making it much easier to identify."

In addition to having similar genomes, dogs and humans also have

similar cancers, in part because they share the same environment. Most human cancer research is conducted on mice, but the cancers have to be artificially induced, and the mouse genome is not as similar to the human genome as the dog's is. Cancers in dogs, on the other hand, occur under the same circumstances and have the same characteristics as they do in people.

Golden retrievers, one of the most popular breeds of dog in the United States, have a one-in-eight chance of developing lymphoma. And the lymphoma they suffer from is almost identical to non-Hodgkins lymphoma in humans, which Breen believes may work to the advantage of both species in terms of finding the genetic cause and a possible cure.

"The same genes that affect dogs with cancer affect people with cancer," Breen says. "If we can pinpoint these genes in dogs, where it's much easier to find them, then we know where to start looking for them in people."

Breen has already started to identify aberrant regions within the dog genome, and hopes to have the cancer-associated genetic candidates identified in dogs within the next few years.

"When we identify the three or four genes within a particular region that play a role in cancer in dogs, we can translate that information to the human genome and look to see what impact they will have in the human population. It will benefit both dogs and people."

Source: North Carolina State University

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