

Slobbery kisses from 'man's best friend' aid cancer research

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Fido's wet licks might hold more than love. They could provide the DNA keys to findings new treatments for rare cancers and other diseases in both dogs and human patients.

The Translational Genomics Research Institute (TGen) and the Van Andel Research Institute (VARI) have created the Canine Hereditary [Cancer](#) Consortium, a program designed to study naturally occurring cancers in dogs to better understand why both pets and people get sick.

"[Rare diseases](#) in humans also show up in dogs. By studying the DNA of canines, we expect to more quickly discover the genomic causes of disease and more quickly find ways to better treat dogs, and people," said Dr. Mark Neff, director of the new TGen-VARI Program for Canine Health and Performance.

Using voluntarily donated saliva, blood and tumor samples from many breeds of privately owned dogs, researchers hope that by studying canine cancers they can pinpoint the causes of human cancers. The goal is to translate that knowledge into therapeutics useful to both veterinarians and clinical oncologists.

No dogs will be harmed and many should be helped. Nearly half of all dogs 10 years and older die from cancer. Dogs will be treated as patients at veterinary clinics nationwide. The research is endorsed by the American Kennel Club and by the Morris Animal Foundation. Samples will be gathered with the consent of owners and veterinarians.

In addition to cancer, TGen and VARI eventually will study neurological and behavioral disorders as well as hearing loss and other debilitating conditions in dogs that could relate to people.

The cancer research will be supported by the recent approval of a 2-year, \$4.3 million federal stimulus grant to the Canine Hereditary Cancer Consortium, which includes TGen and VARI in partnership with the National Cancer Institute (NCI), the University of Pennsylvania, Michigan State University, dog breeders and veterinarians.

The public-private program also is funded by \$1 million in grants from businesses involved in pet care — \$500,000 from PetSmart, and \$500,000 from Hill's Pet Nutrition.

"We're proud to be part of such an innovative approach that fully supports our mission of providing total lifetime care for pets, and one that will offer hope to people and dogs who are suffering from these illnesses," said Phil Francis, Executive Chairman of PetSmart.

Neil Thompson, President and CEO of Hill's Pet Nutrition, said support of cancer research in dogs "goes hand-in-hand with the company's mission of enriching and lengthening the special relationships between people and their pets. Maintaining the health of dogs goes beyond good nutrition. We support this research and the hope it provides, which will ultimately benefit dogs and dog lovers everywhere."

Through the federal grant, researchers also will draw on experts at the National Cancer Institute's Pediatric and Genetics Branches and Comparative Oncology program, including Dr. Paul Meltzer, Chief of NCI's Genetics Branch. Dr. Meltzer and his colleagues will use gene expression profiling to identify genes involved in osteosarcoma to determine if the same genetic markers, alterations, and targets found are also found in human osteosarcoma, and in dogs. Comparing data

between humans and dogs has the potential to significantly advance understanding of this cancer.

Dr. Meltzer indicated he is hopeful the study will pinpoint the genetic causes of osteosarcoma, as well as identify individualized treatment options.

The program's "bark-to-bedside" approach represents an unprecedented alliance of veterinarians, basic scientists and private practice clinicians, non-profit research institutes, universities, industry and government. The project also will involve TGen Drug Development Services (TD2), a subsidiary of TGen, which will seek partnerships with pharmaceutical companies.

Why study dogs?

Dr. Jeffrey Trent, President and Research Director for TGen and VARI, said that it is difficult to study rare cancers in people, because there is insufficient data. But by studying similar types of cancers more prevalent in dogs, researchers should be better able to help those who currently have little hope.

"There's no question that you are doubly-cursed if you get a rare cancer. You may have a very difficult disease course, and you have very little information about how to guide the physician, and what treatment would be best. For some of these rare cancers, we don't even have consensus on what the best treatments might be," Dr. Trent said.

For example, children with osteosarcoma, a rare bone cancer, still often results in the loss of limbs.

"Many rare human cancers are very common in dogs. We're excited about the idea that we may be able to identify areas that could be

mutually beneficial — that could help the canine patient and can help the human patient with these various cancers," Dr. Trent said. "The unique and exciting aspect of this is that it's a rare occasion where industry, academia, government and the private sector are joined together in a common goal of obtaining information to advance both pet and human health."

Study will investigate many diseases

The study is focused on sarcomas, those cancers that originate in the connective tissues such as bone, cartilage and fat.

"The sad reality of sarcoma, because it is such a rare human disease, is that very few scientists take the time to do any research on it because it is not possible to get the number of samples you need for those kinds of studies," said Dr. Nick Duesbery, co-director of VARI's Center for Comparative Biology and Genetics.

The project began with the study of hemangiosarcoma — angiosarcoma in humans — a cancer for which there are currently no effective treatments. These tumors start in the lining of blood vessels and in the spleen. They are highly malignant and can be found most anywhere in the body.

Although rare in humans, these tumors are relatively common in certain breeds of dogs, such as Golden Retrievers, German Shepherds and Clumber Spaniels. After as many as 150 years of breeding, there are few genetic variations in these dogs, making it easier to identify the few genetic differences that can affect cancer susceptibility and response to drugs.

Study initiated by VARI

With the support of the American Kennel Club and the Clumber Spaniel Health Foundation, VARI in February 2008 began to study hemangiosarcoma in Clumber Spaniels. Researchers are using new genetic technologies developed at VARI to create genetic screens, diagnostic tests and treatments for hereditary canine cancers. VARI is analyzing the DNA and RNA of Clumber Spaniels, looking for genetic patterns that eventually could indicate if a particular dog is a carrier of a defective gene that could cause cancer.

With the addition of TGen and federal and private funding, the program is expanding to study four other cancers among as many as 20 breeds of dogs.

In the first two years, the project also will study osteosarcoma, oral melanoma, malignant histiocytosis, and non-Hodgkin lymphoma. Information from these studies will be used to develop diagnostic DNA tests for larger groups of dogs, enabling researchers to look for genes that influence cancer.

"We've got an incredible advantage here with the dogs, because these diseases are much more common in dogs than they are in humans. We can get some insight into the biology. Our strongest hope and desire is that we can translate that into therapies we can use for people," Dr. Duesbery said.

Study compared to the Human Genome Project

Dr. Trent drew a parallel between the Human Genome Project and the new study of [dogs](#), predicting that new and useful information will soon become available to aid human health.

"The Human Genome Project provided a new playbook for biomedical research and patient care," Dr. Trent said. "As we begin to catalog the

dog genome, we have the opportunity to really understand a number of the problems that afflict the dog, but also a number of possible health solutions for people."

Provided by The Translational Genomics Research Institute

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