

Can golden retrievers live longer? Researchers find gene associated with longevity in the breed

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UC Davis researchers have found a gene associated with longevity in Golden Retrievers, one of the most popular breeds of dogs. Credit: Jessica Hecock, UC Davis

Golden retrievers are one of the most popular breeds of dogs. But research shows they have up to a 65% chance of dying from cancer. In a

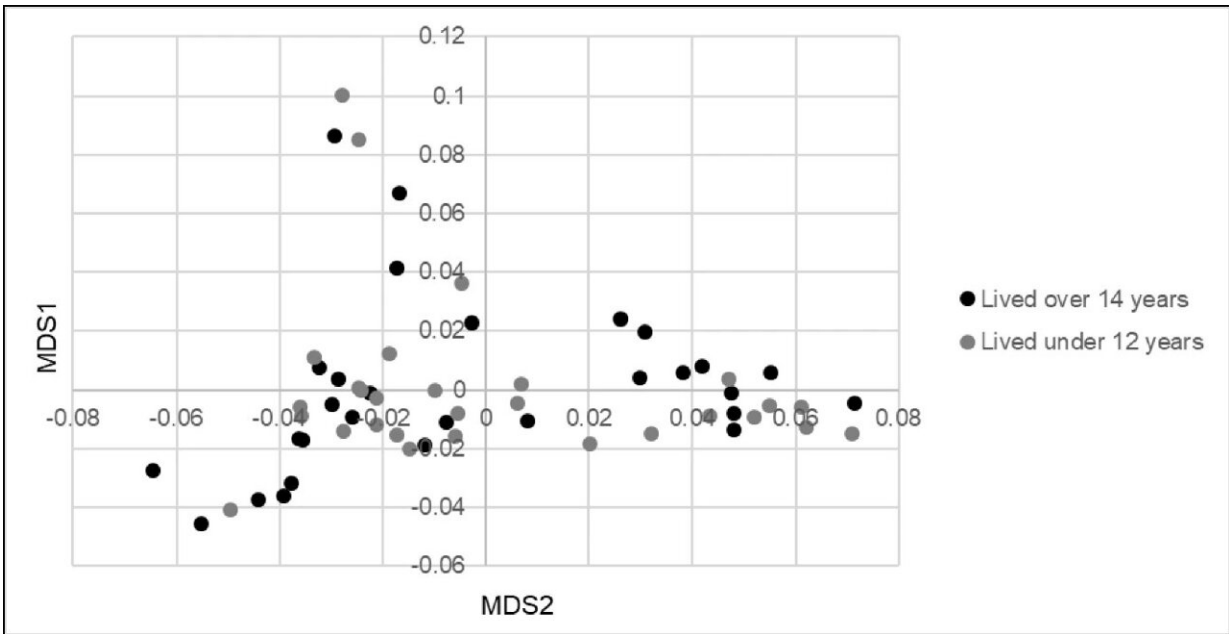
[new study](#), University of California, Davis, researchers set out to find if certain genetic factors could help their survival rate. But instead of searching for genes associated with a cancer diagnosis in the breed, they instead chose to look for genes associated with longer life.

The gene they found is in a family of proteins long known to be important in [human cancers](#). Specific versions or variants of the gene were associated with an increased lifespan of nearly two years. The study was published in the journal *GeroScience*.

"We assume that the majority of golden retrievers have a [genetic predisposition](#) to cancer, but if some of them are living to be 14, 15 or 16, we thought there could be another genetic factor that is helping to mitigate the bad genes, and the gene that popped out for us is HER4," said co-corresponding author Robert Rebhun, Maxine Adler Endowed Chair in oncology at the UC Davis School of Veterinary Medicine.

HER4, also known as ERBB4, is a member of the family of human epidermal growth factor receptors. It is the same family of genes in humans as HER2, a gene well-known for making [cancer cells](#) grow quickly. Rebhun said dogs get many of the same kinds of cancers as humans, which could make this discovery important for humans, as well.

"If we find that this variant in HER4 is important either in the formation or progression of cancer in golden retrievers, or if it can actually modify a [cancer risk](#) in this cancer predisposed population, that may be something that can be used in future cancer studies in humans," he said.



Multidimensional scaling plot of the Golden Retrievers used in the study. Dimensions one (y-axis) and two (x-axis) are plotted against each other. As made visible, the cases and controls are mixed evenly throughout the MDS plot. Credit: *GeroScience* (2023). DOI: 10.1007/s11357-023-00968-2

Hope for golden retrievers

More than 300 golden retrievers were part of the study. Researchers compared the DNA from blood samples of golden retrievers that were alive at 14 years of age to those that died before age 12. They found that dogs with certain variants of the gene survived longer, on average 13.5 years compared to 11.6 years.

"Almost two years is a significant difference in a dog's life," said co-corresponding author Danika Bannasch, Maxine Adler Endowed Chair in genetics with the UC Davis School of Veterinary Medicine. "Wouldn't we all want our beloved pets to live another two years? Two years in

goldens is about a 15-20% increase in lifespan, the equivalent of 12-14 years in humans."

Bannasch said the finding is still one small piece to the complex puzzle of what could cause a golden retriever to get cancer.

"There are going to be many [genes](#) involved, but the fact that the gene associated with longevity is also a gene involved in [cancer](#) was really interesting to us."

The study also found the gene variant seemed to be most important to the longevity of female dogs compared to male dogs. HER4 has been shown to interact with hormones such as estrogen and may also play a role in processing environmental toxins. Rebhun said the next step is to enroll a larger population of golden retrievers in a study to see if they can reproduce these results and discover how this genetic variant may impact expression or function of the gene.

More information: Robert B. Rebhun et al, A variant in the 5'UTR of ERBB4 is associated with lifespan in Golden Retrievers, *GeroScience* (2023). [DOI: 10.1007/s11357-023-00968-2](https://doi.org/10.1007/s11357-023-00968-2)

Provided by UC Davis

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