Sex, disease resistance linked to elite aging in study of oldest-living dogs

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To understand what it takes to live to be 100, scientists in the field of aging research have been enlisting help from the oldest-living humans. But a powerful observation - when it comes to aging and cancer, pets and people are in the same boat - is opening the door to a new research possibility: the oldest dogs as our greatest teachers.

A study conducted by scientists at the Gerald P. Murphy Cancer Foundation's Center for Exceptional Longevity Studies reports that exceptional longevity in pet dogs is associated with female sex and profound disease resistance. The results were presented Thursday (April 23) at the ninth annual meeting of the Organization for the Study of Sex Differences at Stanford University.

"In this first study of exceptional longevity in pet dogs, we discovered a female longevity advantage of 5:1 over males in dogs that achieve the most extreme longevity," said David J. Waters, DVM, Ph.D., the scientist who led the study.

Waters is director of the Gerald P. Murphy Cancer Foundation's Center for Exceptional Longevity Studies, based at the Purdue Research Park of West Lafayette. The center is home to the Exceptional Longevity Database, the first systematic study of highly successful aging in pet dogs in which Waters' research team has cataloged the lifetime health and medical histories of more than 300 canine "centenarians." The study focused on Rottweiler dogs that lived at least 13 years, which is more than 30 percent longer than the breed average and equivalent to humans

reaching 100.

The investigators found that canine centenarians display profound resistance to cancer, with a cancer mortality rate of only 8 percent in dogs with the most extreme longevity, compared to more than 70 percent in dogs with usual longevity.

"A notable aspect of highly successful aging is the delay or avoidance of age-related diseases, such as cancer," Waters said. "The exceptionally long-lived Rottweilers we are studying have figured out how to side-step cancer, hold it in check. Our autopsy studies are showing that although relatively few of these dogs die of cancer, more than 90 percent of them are harboring one or more types of cancer at the time of death."

Like in humans, the study is showing that exceptional longevity in dogs is accompanied by what researchers refer to as "morbidity compression," or a squeezing of major age-related diseases into the final years of life. Among dogs with the most extreme longevity, 76 percent are "escapers" - free of all major diseases for the equivalent of the first 100 years of life.

Waters presented the work on day 49 of the 2015 Old Grey Muzzle Tour - a 68-day cross-country scientific expedition in which he is studying 15 of the oldest-living Rottweilers in their homes to get clues to the biology behind highly successful aging and cancer avoidance. The itinerary also includes 11 educational stops, where Waters presents research results and shares his "out of the laboratory and into the living room" approach to the study of aging.

The new data on the female longevity advantage in dogs complements a growing catalog of human sex and gender differences in biology and health, ranging from susceptibility to autoimmune disease and cancer, to adverse drug effects and the symptoms of heart attack. The meeting at

Stanford brings together experts from diverse disciplines with the intent of accelerating progress in sex-differences research.

Waters put the new study in perspective, noting that for centuries dogs have enriched people's lives in important ways as our pets and our companions. Now, for the first time, the oldest-living dogs are being investigated with the hope that their extreme natural biology will offer up fresh scientific clues.

"We have identified a special group of dogs that may have something important to tell us about sex-specific differences in successful aging and cancer avoidance," he said. "Our efforts send a simple message: We're ready to listen."

Provided by Purdue University