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MU Researchers Find Condition in Dogs that May Help Further Research Into Human Disease

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COLUMBIA, Mo. — Some people possess a small number of cells in their bodies that are not genetically their own; this condition is known as microchimerism. It is difficult to determine potential health effects from this condition because of humans' relatively long life-spans. Now, researchers at the University of Missouri have found that microchimerism can be found in dogs as well. Jeffrey Bryan, an associate professor of oncology at the MU College of Veterinary Medicine and director of Comparative Oncology and Epigenetics Laboratory, says this discovery will help doctors determine what diseases humans with microchimerism may be more likely to develop during their lifetimes.

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Jeffrey Bryan, an associate professor of oncology at the MU College of Veterinary Medicine and director of Comparative Oncology and Epigenetics Laboratory, along with fellow MU researchers Sandra Axiak-Bechtel and Senthil Kumar, found that microchimerism can be found in dogs as well as humans.

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"Dogs have a much shorter lifespan than humans, which allows us, as researchers, to better monitor what diseases they may develop throughout their entire lives," Bryan said. "We already have some evidence that microchimerism may increase risk of thyroid disease while lowering the risk of breast cancer in women. Finding microchimerism in dogs allows us to track this condition over a lifespan of about 10 years, as opposed to the 70 or 80 years of a human life. This will make it much easier to determine any increased risk of or protection from other diseases brought on by microchimerism."

"Our study demonstrates that male microchimerism of probable fetal origin occurs in the pet dog population," said Sandra Axiak-Bechtel, an assistant professor of oncology at the MU College of Veterinary Medicine. "Evidence exists in women that fetal microchimerism may have conflicting roles in disease formation. The pet dog represents an excellent model of many ailments in people, and the presence of fetal microchimerism in dogs will allow studies which further clarify its role in health and disease."

Microchimerism most often occurs when a mother gives birth to a child. Sometimes, cells from that child are left in the mothers' body and continue to live, despite being of a different genetic makeup than surrounding cells. Those cells can then be passed on to other children the mother may have later. Cells also can be passed on through blood transfusions as well as bone marrow and organ transplants.

In their study published in PLOS ONE, Bryan and Axiak-Bechtel, along with MU researchers Senthil Kumar, a co-investigator in this study and assistant research professor and assistant director of the Comparative Oncology and Epigenetics Laboratory, and Sara Hansen, a comparative medicine resident at MU, studied 90 golden retrievers and found that 36 percent of the dogs had microchimerism. Closer to 40 percent of female dogs that were at least eight years post-pregnancy had the condition.

Axiak-Bechtel, Bryan, and Kumar plan on continuing their research to follow the lifespans of dogs with

microchimerism to determine to what diseases those dogs may be susceptible. Bryan and Kumar also received a new grant for more than $400,000 to study epigenetic biomarkers in dogs, which will ultimately enhance diagnosis and treatment of dogs with cancer.

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