# Older siblings' cells can be passed from female dogs to their puppies in the womb

October 23 2013

Some people possess a small number of cells in their bodies that are not genetically their own; this condition is known as microchimerism. In prior studies, researchers from the University of Missouri College of Veterinary Medicine found that this condition also exists in dogs. Now, the researchers have found evidence that this condition can be passed from a female dog to her offspring while they are still in the womb. 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 further study into the health effects of microchimerism in dogs and in humans.

"We already have some evidence that microchimerism may increase risk of thyroid disease while lowering the risk of breast cancer in women," Bryan said. "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. Knowing that the condition can be passed on through birth will help us track the condition and its effects through several generations of animals."

Microchimerism most often occurs when a mother gives birth to a child. In some cases, cells from that child are left in the mothers' body and continue to live, despite being of a different genetic makeup than surrounding cells. The MU researchers have identified evidence that those cells can then be passed on to other children the mother may give birth to at a later time.

In their study, Senthil Kumar, a co-investigator in this study and assistant research professor and assistant director of the Comparative Oncology and Epigenetics Laboratory and Bryan, along with MU researchers Sandra Axiak-Bechtel, assistant professor of oncology, and Sara Hansen, a comparative medicine resident at MU,found microchimerism in a female dog that had given birth to male and female puppies. The researchers found cells with Y-chromosomes in the mother after these births, meaning the mother had male cells present in her female body. The researchers also found genetically similar male cells in the mother's female puppies from a later litter. Those puppies were newborn and had never been pregnant, strongly suggesting that they acquired the cells that were left behind by their older brothers while in the womb.

"These new findings are significant because they suggest that the movement, or trafficking, of fetal cells is quite extensive in dogs, as has been suggested in people," Bryan said. "This degree of cell trafficking can have an impact on health, disease, and therapy, including in transplantation. The identification of this phenomenon strongly suggests that companion dogs will help us more rapidly understand the real impact of microchimerism in human medicine."

Kumar, Hansen, Axiak-Bechtel, and Bryan plan on continuing their research to follow the lifespans of dogs with microchimerism to determine to what diseases those dogs may be susceptible.

This study was published in the journal, *Chimerism*.

Provided by University of Missouri-Columbia