

Low-cost sterilization method for cats and dogs is focus of new research project

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As an expert in molecular genetics, Colin E. Bishop, Ph.D.'s, usual role at the Wake Forest Baptist Medical Center's Institute for Regenerative Medicine is to apply the techniques of genetics and developmental biology to the regeneration of human organs.

But, with a background specifically in reproductive genetics, Bishop is also on a mission to help solve the over-population of homeless dogs and cats. Bishop has been awarded a two-year pilot grant from Michelson Prize and Grants (MPG), a division of the Found Animals Foundation, to develop a one-shot, non-surgical method for sterilizing companion animals.

According to MPG, an estimated six million to eight million cats and dogs enter U.S. shelters and three to four million of these animals are euthanized. Bishop is one of about 20 grant recipients worldwide working on developing non-surgical, single dose sterilization technology. The foundation will award a \$25 million prize to the first research entity to develop a successful product.

Bishop's approach is to develop an injection to destroy particular cells in the hypothalamus, an area in the brain about the size of a pearl that controls reproduction in mammals. Because [brain cells](#) do not regenerate, it is believed that the treatment will lead to permanent sterility in the animals. Just like neutering or spaying, this method has the potential to eliminate the unwanted mating behaviors of [companion animals](#) without affecting their general health.

Specifically, the treatment aims to destroy GnRH cells in the [hypothalamus](#) that stimulate hormones that control male and [female fertility](#). Bishop is designing a novel system for delivering a toxin to the GnRH cells. He will engineer nano-sized packages called exosomes that are generated from [adult stem cells](#). These packages will be tagged to carry the molecular "address" of the GnRH cells, so that other cell types will not be affected. Inside the package will be a deadly "message" – a toxin derived from influenza-A that is designed to bind with and kill the GnRH cells.

The milestones of the two-year project include generating engineered exosomes from mouse stem cells and evaluating their potential to fuse with the GnRH cells. The team will then load the exosomes with the toxin and test their ability to kill GnRH cells in a laboratory setting and in mice.

The ultimate goal of MPG and the Found Animals Foundation is "to end shelter euthanasia of healthy, adoptable animals." According to the Found Animals website, a one-shot sterilization method could also be used internationally to reduce the population of homeless dogs and cats.

Provided by Wake Forest University Baptist Medical Center

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