



RESEARCH PROGRESS REPORT SUMMARY

Grant 01840: Health Implications of Early Spay/Neuter on Canine Health

Principal Investigator: Dr. Benjamin L Hart, DVM, PhD

Research Institution: University of California, Davis

Grant Amount: \$146,589.00

Start Date: 2/1/2014 **End Date:** 1/31/2016

Progress Report: End-Year 1

Report Due: 1/31/2015 **Report Received:** 1/31/2015

Recommended for Approval: Approved

(Content of this report is not confidential. A grant sponsor's CHF Health Liaison may request the confidential scientific report submitted by the investigator by contacting the CHF office. The below Report to Grant Sponsors from Investigator can be used in communications with your club members.)

Original Project Description:

This project extends our just-completed ACORN grant with Golden Retrievers, where we found that spay or neuter was related to a significant increase in risk in five diseases of concern: hip dysplasia; cranial cruciate ligament tear; lymphosarcoma; hemangiosarcoma; and mast cell tumor. Importantly, the disease risk was dependent upon whether the dogs were female or male and whether the spay or neuter was performed early (before one year of age) or late. Mammary cancer occurred so infrequently that it could not be analyzed.

Because breeds differ in vulnerability to joint disorders and risks of various cancers, we propose to expand this approach, on a breed-by-breed basis, to additional popular breeds and analyze all important joint disorders and cancers in each breed. We propose to include in this phase Labrador Retrievers, German Shepherd Dogs and Dachshunds. Upon negotiation with CHF, we will include 1-2 additional breeds, such as Rottweilers, Chihuahuas, Standard Poodles or Miniature Poodles.

We now know the numbers of subjects needed for each breed and the minimum number of disease cases needed to perform statistical analyses. For the breeds mentioned above, our database has sufficient subjects. The expected results will be of immediate benefit to caregivers of the breeds wishing to reduce the likelihood of various devastating diseases.



Grant Objectives:

To develop a generalized understanding of the impact of early spay and neuter on disease risk in dogs.

Publications:

Hart, B.L., L.A. Hart, A.P. Thigpen and N. H. Willits. 2014. Long-term health effects of neutering dogs: Comparison of Labrador Retrievers and Golden Retrievers. PLoS ONE 9(7): 10.1371/journal.pone.0102241.

Report to Grant Sponsor from Investigator:

Adverse Long-term Health Effects of Neutering in Different Breeds of Dogs

Background

The long-term goal of this project is to evaluate, using one consistent and uniform data base at our large veterinary medical center, the breed-specific effects of neutering at different ages on joint disorders (hip dysplasia, cranial cruciate ligament tear and elbow dysplasia) and some cancers (lymphosarcoma, hemangiosarcoma, mast cell tumor) that can be increased by neutering. The effects of neutering at various ages are also examined with regard to mammary cancer, urinary incontinence, and pyometra in females.

Our previous studies on the Golden Retriever and Labrador Retriever (supported by CHF), and published in two papers in the open-access journal, PLOS ONE, found a 3- to 4-fold increase in the incidence of one of more joint disorders (hip dysplasia, cranial cruciate ligament tear and elbow dysplasia) with early neutering in males and females. In female Golden Retrievers, neutering at any age resulted in a 3 to 4 fold increase in the occurrence of at least one of the three cancers followed. This effect on cancers was not seen in males. The research over the past year covers the popular German Shepherd Dog, the most important military and police canine, and the Rottweiler and Boxer, two breeds known for overrepresentation in death rates due to cancer.

German Shepherd Dog

This work is pending review for publication. The database for this breed is 1,250. The German Shepherd Dog is a popular family pet and is heavily relied upon for military and police work, as well as service work. A devastating joint disorder, such as hip dysplasia and cranial cruciate ligament tear, can shorten the working life of a valuable police or military dog and can be emotionally heart-breaking and expensive to deal with in family pets.



We found that 7 percent of intact males and 5 percent of intact females were diagnosed with one or more joint disorders. But neutering in either sex at less than 6 mo., or between 6 mo. and 11 mo., increased the incidence of one or more joint disorders by 3-fold over that of the intact dogs, resulting in as high as 22 percent of dogs having a joint disorder. The occurrence of the cancers we followed in this breed was especially low in the intact males and females – 3 percent or less – and was not affected in either sex by neutering. The occurrence of mammary cancer in the non-spayed females was only about 3 percent. Urinary incontinence, a very inconvenient problem in some females, did not occur in any intact females, but got as high as 7 percent in females neutered in the first year.

German Shepherd, Bottom Line

Delaying neutering and spaying (if done) in German Shepherd Dogs until they are at least 1 year old markedly reduces the likelihood of one or more disabling joint disorders. Delaying spaying of females beyond 1 year also reduces the chance of urinary incontinence, while not increasing the chance of mammary cancer.

Rottweiler

The Rottweiler is appreciably larger than the retrievers and German Shepherd Dog, and possibly would be at least as vulnerable to neuter-induced joint disorders as the retrievers and German Shepherd. This breed is overrepresented in death rates due to cancer, so we were interested in any effects of neutering in increasing the likelihood of cancer. Statistical analyses, yet to be done, will be based on 696 cases.

We found that in Rottweilers those having at least one joint disorder were 9 to 16 percent. Neutering during the first year increased the likelihood of a joint disorder by up to 3 times. The occurrence of one or more of the cancers in the intact dogs was relatively high (12-13 percent), but neutering at any age did not increase the rate.

Boxer

We found that Boxers having at least one joint disorder were just 2 percent, and there was no indication of an effect of neutering at any age, a major contrast with Rottweilers, German Shepherds and the retrievers. We are tentatively attributing this to the compact sturdy body of this breed.

The underlying occurrence of at least one of the cancers was high; 12 to 16 percent. There was no indication of an increase in this measure for any neuter period with the exception of a higher cancer occurrence in the 1-year neuter period of males. A noteworthy finding regarding mammary cancer was that there was no diagnosis of this cancer in either intact females or those neutered at any age.