

**Following are excerpts from the proposed Grant submitted to
AKC's Canine Health Foundation.**

The Call for Samples is still being sought from Yorkshire Terriers, The researchers are seeking 40 unrelated samples from each breed- 20 affected and 20 unaffected dogs. If you can help with this requirement, please use the updated contact information below.

**As always, participation in research studies is confidential,
unless shared by the participants.
YTCA FOUNDATION, INC.**

Hereditary Evaluation of Legg-Calve-Perthes Disease in multiple breeds of dog.

Scientific Abstract

Legg-Calve-Perthes Disease (LCPD) is a debilitating developmental disease that affects toy and miniature breeds of dog. The only easily observable indications of this condition are pain, lameness, and muscle atrophy of the hip joint. These signs are not exclusive to LCPD, and are often attributed to minor trauma during the early stages of disease. LCPD is diagnosed primarily by radiographic changes in the coxofemoral joint, with patient breed and age also factored in the diagnosis. Due to the developmental nature and the unknown etiology of the disease, LCPD is difficult to predict and prevent. Surgical intervention provides the best prognosis for the dog, but places significant financial obligation on the owner. A whole-genome screen using the recently characterized canine single nucleotide polymorphism (SNP) array is proposed using multiple breeds of dog, in an effort to identify a marker, or markers in linkage disequilibrium with LCPD.

Lay Abstract

Legg-Calve-Perthes Disease (LCPD) is a debilitating developmental disease that affects toy and miniature breeds of dog. Pain, lameness, and muscle atrophy of the hip joint are the only easily observable indications of the condition, and are sometimes attributed to minor trauma. LCPD is diagnosed by examining x-rays (radiographs) of affected dogs. LCPD is difficult to predict and prevent, but good or excellent quality of life can be acquired with surgery. A new technology, the canine SNP array, will be used to evaluate potential regions of the genome which may harbor the gene(s) causative for LCPD in several miniature and toy breeds.

Significance of Research

Legg-Calve-Perthes Disease (LCPD) is an orthopedic abnormality affecting the femoral head and neck of puppies. The occurrence of LCPD is primarily in toy and miniature breeds of dog (those <20 pounds), with the highest susceptibility in the miniature pincher (Min Pin), pug, Yorkshire terrier (Yorkie), and West Highland white terrier (Westie) (LaFond et al. 2002). Surgery often offers the best prognosis for an affected dog, but creates a significant emotional and financial burden on the owner. Most breeders neuter LCPD puppies soon after the diagnosis to prevent the transmission to future generations.

Some breeders also remove the parents of affected puppies from the breeding population as a precaution. These breeding practices effectively reduce the gene pool within a breed. The identification of a genetic test is critical for developing sound breeding practices that minimize the number of cases of LCPD while maximizing the amount of genetic variation within a breed. The use of multiple closely-related breeds in the evaluation of a single disease will allow the identification of very narrow regions of interest for further investigation of candidate genes.

Specific Objectives

- (1) Collect blood samples from 150 to 200 LCPD and normal toy and miniature breeds of dog and extract DNA
- (2) Probe the version 2 custom canine SNP array with LCPD and normal dog DNA

Expected outcomes & potential applications

This work will identify SNPs that are linked to LCPD and have an immediate impact in the breeding community. Identification of linkage would allow us to develop a marker-based test to enable early classification of affected dogs as well as detection of carrier dogs. This would allow breeders to make informed decisions in their breeding programs and eliminate LCPD from their breeding lines.

UPDATED CONTACT INFORMATION (7-2008)

Alison N. Starr, Ph.D.
Research Assistant Professor
Department of Genetics and Biochemistry
Clemson University
100 Jordan Hall
Clemson, SC 29634-0318
Phone: (864) 656-0191
Fax: (864) 656-0393
Email: astarr@clemson.edu