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For the Health and Well-being of All Cats

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9 LIVES BECOME 99 LIVES

PROJECT STUDY:
9 Lives Cat Genome Sequencing Initiative

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The goal of the "9 Lives Cat Genome Sequencing Initiative" is multi-faceted and has been highly successful. Ten cats that had different heritable diseases and traits were whole genome sequenced to assist the determination of causal variants (mutations) for the conditions of interest. This project was the first to propose whole genome sequencing of cats beyond the one reference sequence that is available to the research community.

Using a strategy that combined several interesting traits into three different trios of cats, the project successfully identified DNA variants that cause two different inherited blindness in Bengal and Persian cats, a variant likely causing bobbed tails and also a variant likely causing ear curl. The genetic tests for the blindness traits have been released early while the investigators write and submit the manuscripts for scientific publication. By early release, breeders can take advantage of the tests more rapidly, preventing the production of blind cats while the scientific reports take time to get published.

Four additional traits have also been regionally localized to very narrow regions of the genomes and therefore, more testing is required to find the true causal DNA variants for inherited hydrocephalus, *Silver*, brachycephaly, and LaPerm. Two genes for lymphosarcoma are being examined. Additional funding will be necessary to pursue these DNA variants (new cat cases with mediastinal lymphoma to support DNA mutation confirmation).

In addition, the data from the nine cats (ten actually sequenced) launched the larger *99 Lives* project. Researchers from over a dozen different institutions are using the data for their studies. The investigators have supported the identification of a lymphadenopathy in British shorthair cats and the University of Missouri-Columbia laboratory has identified causal variants (mutations) for a Devon Rex myopathy, commonly called spasticity, which is a model for human congenital myasthenic syndrome. They are also confirming DNA variants (mutations) causing stretchy, fragile skin called cutaneous asthenia, similar to Ehlers-Danlos syndrome in humans. The DNA variant (mutation) found from the 9 Lives and the now 99 Lives, which has 51 domestic cats included, can be used by the research community to design a high density DNA array, which would be fortuitous for complex disease studies, such as diabetes, FIP, and heart disease.

Wild cats are also benefiting from the project with discoveries for retinal degeneration in the Black-footed cat (*Felis nigripes*) and polycystic kidney disease in the Pallas cat (*Otocolobus manul*). Other wild cats, such as lions and tigers, are being added to the project to help focus on health problems in these felines as well. Eventually, all data will be freely released to the scientific community to support feline research in a variety of fields.

Summary prepared by Vicki L. Thayer, DVM, DABVP (Feline) © 2015