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A Descriptive Pedigree of Cancer in Golden Retrievers (21-May-2001)

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Specific breeds of dogs have been identified as having high rates of particular malignancies. The etiology of breed predilections and development of cancer is poorly understood, in part historically due to the lack of canine genetic markers. With the recent advances in the canine genome map, identification of affected families within the canine population may lead to the identification of cancer susceptibility genes. Breeds with small number of founders and popular sires, such as the Golden Retriever, are desirable to study. In addition, the Golden Retriever as a breed has not had increases in AKC registration over the last 10 years that would explain the relative increase in cancer incidence. It was observed that 18% of dogs with lymphoma being treated with a new treatment modality were Golden Retrievers while comprising only 3.2% of the hospital population. Other tumor types including hemangiosarcoma, malignant histiocytosis, and other aggressive, soft tissue sarcomas with early age onset have been seen in the pedigree. Over 200 cases of cancer have been mapped with 100 cases of lymphoma identified. Consistently high coefficients of inbreeding have been found (>0.25). Within the overall large pedigree there was a critical one-time breeding of a sire and dam that produced 10 offspring, 2 of which died of lymphoma and at least 1 had a different type cancer. Five of the 10 littermates appeared repeatedly in the lymphoma pedigree with 32 cases (3 not mapped) of lymphoma in the first, second and third generation descendents of these dogs. It was also noted that the full brother of the dam had sired multiple dogs with lymphoma and a "subfamily" pedigree of lymphoma dogs was mapped. Affected littermates were seen in both pedigrees. Overall these 2 "families" accounted for 67% of the cases of lymphoma in this pedigree. Further within the "subfamily" pedigree there were 2 closely related key families in which multiple cases of lymphoma, hemangiosarcoma and other cancers have occurred. Both sets of parents have multiple ancestors in common. A one-time breeding resulted in a litter of 10, 6 of which have been diagnosed with cancer. Both parents and maternal grandmother died of hemangiosarcoma. Two dogs died of anaplastic sarcoma, 1 of hemangiosarcoma and 1 with melanoma. Two of the affected littermates had extranodal (cutaneous and mucocutaneous) at age 2 and 7. Subsequently the dog diagnosed at age 2 was bred and produced 1 offspring that was diagnosed at age 2 with mucocutaneous lymphoma. The dam of that 1 offspring died of hemangiosarcoma and both of her parents died of lymphoma, 1 at a very young age. Pedigree maps will be presented. Blood and tissue samples from this pedigree have been taken and shared with Dr. Elaine Ostrander. Unaffected related family members have also been collected. This pedigree may afford us an opportunity to detect cancer susceptibility genes within this breed and offer a model for other such studies in the canine population at large.

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