

AN OVERVIEW OF RECENT DEVELOPMENTS IN GENETIC STUDIES OF CANINE CUTANEOUS MALIGNANT MELANOCYTIC TUMORS

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Canine melanocytic tumors are relatively common, up to 70% being malignant neoplasms. Melanomas account approximative 7% of all malignant tumors encountered in dogs and 11-27% cases involve cutaneous sites. In human medicine, melanoma is known as having one of the highest levels of mutations. Thus, the dog is regarded as a reliable model for plenty human malignancies, including melanoma. The current work summarizes recently described molecular genetic characteristics of malignant cutaneous melanoma in dogs, in order to provide additional support for further studies regarding carcinogenesis, diagnosis, prognosis and therapies.

Numerous relevant articles published in the last 20 years were consulted for the present study.

Using current technology advances, several studies about application of RNA sequencing, DNA amplification, qRT-PCR and improvement of immunohistochemistry have been performed for canine melanoma. The majority of investigations are focused on oral canine melanoma due to carcinogenetic similarities with rare oral human melanoma. In case of cutaneous melanoma in dogs, various researches showed that B-Raf proto-oncogene serine, GDP/GTP binding protein RAS, GNAQ and tumor suppressor Neurofibromatosis Factor 1 mutations are encountered infrequently compared to human cutaneous UV-induced melanomas. Nevertheless, similarities of the phosphoinositide 3-kinase/protein kinase B (PI3K-Akt) pathway in canine and human cutaneous melanoma have been demonstrated.

Moreover, cytological and histopathological resemblance between species was noted. In addition to Melan-A, HMB45, PNL-2, tyrosinase related protein 1 and 2 markers, immunohistochemical positivity for Ki-67, COL1, THBS2, chondroitin sulfate proteoglycan-4 (CSPG4), HMB-45 (Human Melanoma Black) antibodies was reported lately.

Latest findings revealed that canine cutaneous melanomas represent a relevant model for human melanomas, such as non-UV-induced types of dermal melanomas. Furthermore, genetic analyses are significant for new diagnostic and therapeutic approaches. Further studies need to be conducted particularly for breeds with genetic predisposition in developing cutaneous malignant melanocytic tumors.

Keywords: canine, cutaneous, genetic, melanoma.