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KEYWORDS – Melanoma, Wnt signaling, Wnt5a

MAIN FIELDS OF RESEARCH; ABSTRACT

Cutaneous melanoma is an aggressive type of skin cancer formed by transformed melanocytes. Metastasis can be formed early during disease progression. Once metastasized, patients have extremely poor prognosis. It is therefore crucial to identify key players of metastasis formation in melanoma.
Wnt signaling pathways are evolutionarily highly conserved and play important roles in embryonic development as well as carcinogenesis. Wnt5a is one of the most investigated non-canonical Wnt ligands. Wnt5a plays distinct roles in different types of cancers. In melanoma, Wnt5a has been associated with metastasis formation. In a mathematical analysis of gene expressions of melanoma patient samples, Wnt5a was found to be the gene that can best separate highly aggressive tumors from less aggressive ones (Bittner et al., 2000). A series of in vitro experiments indicated an important role of Wnt5a in affecting the mobility and invasion of patient-derived melanoma cell lines. Thus, Wnt5a seems to play an important role in the phenotype switching of melanoma cells – from proliferative to invasive. Confirmation of this hypothesis and further investigation of the underlying molecular mechanisms in an *in vivo* system, which allows study of melanocytes in their natural microenvironment, could bring new hope for melanoma patients.
My project focuses on the role of Wnt5a during melanoma progression in a murine melanoma model that closely mimics the human disease. Briefly, Wnt5a will be knocked out in melanocytes at different stages of disease progression in this genetic mouse model. The function of Wnt5a will be also investigated using human melanoma cell lines as xenografts. The underlying mechanism will be further analyzed using the aforementioned systems.

SPECIAL TECHNIQUES AND EQUIPMENT

DNA and RNA extraction, cloning, qRT-PCR, in situ hybridization, western, cell culture, gene knock-down and overexpression in cell lines, Immunohistochemistry staining, imaging, FACS etc.
Animal breeding, health monitoring, drug administration, tumor cell xenograft, euthanization, tissue collection etc.