Role of arginase-II in melanoma growth and metastasis

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Background and Aim: Cancer metastasis involves a series of stages including the cell growth, migration, adhesion, and extravasation and causes extreme challenges to cancer therapies. Therefore, exploring the biological activities leading to the regulation of these stages may provide prominent therapeutic approaches for the cancer patients. Arginase-II (Arg-II) is a mitochondrial enzyme that metabolizes arginine into urea and ornithine, which serves as a precursor of polyamines necessary for cellular proliferation and wound healing. Recent evidences have indicated that enhanced arginase activity is expressed in various solid tumor cells. However, the function of Arg-II in tumor growth and metastasis is unknown. The aim of this study is to investigate whether and how Arg-II affects the growth and metastasis of human melanoma cells.

Methods: Expression levels of Arg-II, ICAM-1 and p-STAT3 in human melanoma cell line ME276 were examined using immunoblotting analysis. Arg-II gene silencing was employed using recombinant adenovirus expressing shRNA targeting human Arg-II. Cell numbers were determined by performing a cell count, using BIO-RAD assay. Adhesion of dye-labeled melanoma cells on cultured human umbilical vein endothelial cells (HUVECs) was quantified using adhesion assay and cell migration was evaluated by wound healing assay

Results: Silencing Arg-II decreased the cell numbers as well as the migration of human melanoma cells. Moreover, silencing Arg-II in human melanoma cells reduced ICAM-1 expression and cell adhesion between melanoma cells and HUVECs. Additionally, silencing Arg-II decreased the phosphorylation of STAT3 signaling in human melanoma cells

Conclusion: Taken together, our study reveals that Arg-II promotes the growth and metastasis of human melanoma cells through the p-STAT3 activation and ICAM-1 expression, suggesting the role of Arg-II as a novel therapeutic target for human melanoma cells.

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