VEGFA and SEMA3A recombinant proteins in stromal cell migration

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Microenvironment contributes to self-renewal regulation, differentiation, apoptosis and proliferation of progenitor cells and might be involved in the pathogenesis of bone marrow malignancies. Previous studies from our group identified several transcripts with differential expression in CD34+ and stroma cells of myelodysplastic bone marrows. Among them, SEMA3A was overexpressed in stroma cells and VEGFA was overexpressed in CD34+ cells. The SEMA3A gene produces semaphorins, which are a large family of immunoglobulins that can affect the vascularization and angiogenesis, and consequently cancer progression. The VEGFA gene encodes the vascular endothelial growth factor which is a pro-angiogenic cytokine that stimulate endothelial cells to proliferate, migrate and increases membrane permeability to plasma proteins, thereby contributing to tumor growth and metastasis. Although very studied, the functions of VEGFA and SEMA3A in hematologic diseases are poorly known. To a better knowledge of VEGFA and SEMA3A effects on the microenvironment, we cultured HS5 stromal cell line on RPMI medium supplemented with 2% fetal bovine serum and VEGFA recombinant protein (100ng/mL) or SEMA3A recombinant protein (250ng/mL) and performed a wound healing assay by scratch. After 20hrs, we analyzed the variation of HS5 cells migration and compare the results with HS5 control cells (without VEGFA or SEMA3A treatment). We identified a small increase of migration in HS5 cells with VEGFA treatment (75.71 ± 3.6% vs 71.81 ± 2.0%) compared to control cells and with SEMA3A treatment (73.0 ± 2.6% vs 71.81 ± 2.0%) compared to control cells. It is widely known that VEGFA increases HUVEC cell migration and the evidences of his involvement in MDS pathogenesis is growing by
day. Despite being largely studied in the nervous system, the role of SEMA3A in hematologic malignancies is little studied. This results highlights the importance of elucidating the influence of VEGFA and SEMA3A in the bone marrow microenvironment and MDS development.

Keywords: SEMA3A, VEGFA, Microenvironment.