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## Glioblastoma stem cells produce angiogenic factors through activation of chemokine receptor CXCR4

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### ABSTRACT

Tumor stem cells have been shown to be critical for tumor formation, angiogenesis and progression. In order for a better understanding of the role of tumor stem cells in angiogenesis, we isolated CD133+ glioma stem cells from a human glioblastoma cell line U87 and investigated their capacity to produce angiogenic factors. We found that CD133+ stem cells from U87 cell line produced increased levels of vascular endothelial cell growth factor (VEGF) and interleukin 8 (IL-8/CXCL8), two important angiogenic factors implicated in human malignant tumors. CD133+ glioblastoma stem cells also expressed chemokine receptor CXCR4, and upon stimulation with the ligand SDF-1 (CXCL12), markedly enhanced the production of both VEGF and CXCL8. In nude mice, CD133+ glioblastoma stem cells formed larger xenograft tumors with more vigorous neovascularization, in addition to exhibiting the capacity of self-renewal. Our results suggest that CD133+ human glioblastoma stem cells may play an active role in tumor angiogenesis through the CXCR4/CXCL12 interaction.

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