Human umbilical cord blood-derived mesenchymal stem cells inhibit C6 glioma via downregulation of cyclin D1

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Aims and Background: Glioma is difficult to treat and despite advances, outcomes remain poor and new treatment modalities are required. We studied the inhibitive effects of human umbilical cord blood-derived mesenchymal stem cells (UCB-MSCs) on glioma growth.

Material and Methods: UCB-MSCs were identified in mice by flow cytometric analysis, and neurogenic differentiation by immunohistochemistry. C6 cells were injected subcutaneously into the posterior right flank of each mouse. Dil-labeled UCB-MSCs were administrated by intravenous (IV) or intratumoral (IT) injection. Tumor blood vessel density was detected by counting the number of CD34-positive cells with endothelial morphology. Cyclin D1 protein expression was detected by immunohistochemistry and Western blot analysis.

Results: A 26% reduction in overall tumor volume was observed after IV UCB-MSCs treatment, 36% in animals who received IT UCB-MSCs. UCB-MSC administration was associated with reduced neovascularization. We identified a 48% and 27% reduction in the number of cyclin D1-positive cells in mouse glioma tissues treated with UCB-MSCs IV and IT, respectively.

Conclusion: We demonstrated that UCB-MSCs potently inhibit glioma growth, reduce neovascularization, and decrease cyclin D1 protein expression in vivo. IV or IT UCB-MSC administration significantly inhibits glioma growth, and may represent a promising new therapy.

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