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Receptor targeted engineered stem cells: therapeutic application for cancer and beyond

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Stem cell-based therapies are emerging as a promising strategy to tackle different disease types. We have identified different cell surface receptors on both tumor cells and tumor cell associated endothelial cells and engineered stem cells express bi-specific therapeutic agents that target these receptor types. Using our recently established invasive, recurrent and resection models of primary brain tumors (GBM) and breast and melanoma metastatic tumors in the brain that mimic clinical settings, we show that that engineered human mesenchymal stem cells and neural stem cells expressing novel bi-functional proteins or loaded with oncolytic viruses target both the primary and the invasive tumor deposits and have profound anti-tumor effects. These studies demonstrate the strength of utilizing engineered stem cell based receptor targeted therapeutics for developing cancer therapeutics and have implications for developing innovative therapies for different diseases.

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