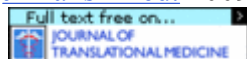




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1: [J Transl Med.](#) 2009 Sep 1;7(1):77. [Epub ahead of print]



Recent progress towards development of effective systemic chemotherapy for the treatment of malignant brain tumors.

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ABSTRACT: Systemic chemotherapy has been relatively ineffective in the treatment of malignant brain tumors even though systemic chemotherapy drugs are small molecules that can readily extravasate across the porous blood-brain tumor barrier of malignant brain tumor microvasculature. Small molecule systemic chemotherapy drugs maintain peak blood concentrations for only minutes, and therefore, do not accumulate to therapeutic concentrations within individual brain tumor cells. The physiologic upper limit of pore size in the blood-brain tumor barrier of malignant brain tumor microvasculature is approximately 12 nanometers. Spherical nanoparticles ranging between 7 nm and 10 nm in diameter maintain peak blood concentrations for several hours and are sufficiently smaller than the 12 nm physiologic upper limit of pore size in the blood-brain tumor barrier to accumulate to therapeutic concentrations within individual brain tumor cells. Therefore, nanoparticles bearing chemotherapy that are within the 7 to 10 nm size range can be used to deliver therapeutic concentrations of small molecule chemotherapy drugs across the blood-brain tumor barrier into individual brain tumor cells. The initial therapeutic efficacy of the Gd-G5-doxorubicin dendrimer, an imageable nanoparticle bearing chemotherapy within the 7 to 10 nm size range, has been demonstrated in the orthotopic RG-2 rodent malignant glioma model. Herein I discuss this novel strategy to improve the effectiveness of systemic chemotherapy for the treatment of malignant brain tumors and the therapeutic implications thereof.

PMID: 19723323 [PubMed - as supplied by publisher]
