

ABSTRACT

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The influence of the blood-brain barrier in the treatment of brain tumours.

Rathi S(1), Griffith JI(1), Zhang W(1), Zhang W(1), Oh JH(1), Talele S(1), Sarkaria JN(2), Elmquist WF(1).

Author information:

(1)Department of Pharmaceutics, University of Minnesota, Minneapolis, MN, USA.

(2)Department of Radiation Oncology, Mayo Clinic, Rochester, MN, USA.

Brain tumours have a poor prognosis and lack effective treatments. The blood-brain barrier (BBB) represents a major hurdle to drug delivery to brain tumours. In some locations in the tumour, the BBB may be disrupted to form the blood-brain tumour barrier (BBTB). This leaky BBTB enables diagnosis of brain tumours by contrast enhanced magnetic resonance imaging; however, this disruption is heterogeneous throughout the tumour. Thus, relying on the disrupted BBTB for achieving effective drug concentrations in brain tumours has met with little clinical success. Because of this, it would be beneficial to design drugs and drug delivery strategies to overcome the 'normal' BBB to effectively treat the brain tumours. In this review, we discuss the role of BBB/BBTB in brain tumour diagnosis and treatment highlighting the heterogeneity of the BBTB. We also discuss various strategies to improve drug delivery across the BBB/BBTB to treat both primary and metastatic brain tumours. Recognizing that the BBB represents a critical determinant of drug efficacy in central nervous system tumours will allow a more rapid translation from basic science to clinical application. A more complete understanding of the factors, such as BBB-limited drug delivery, that have hindered progress in treating both primary and metastatic brain tumours, is necessary to develop more effective therapies.

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