

# Blood-brain barrier and chemotherapy agents

Traditionally, the [Blood-brain barrier](#) has been considered to be a major hindrance to the use of [chemotherapy](#) for [brain tumors](#). In theory, the BBB effectively excludes many chemotherapeutic agents from the CNS, thereby creating a “safe haven” for some tumors, e.g. [metastases](#). This concept has been challenged <sup>1)</sup>.

Regardless of the etiology, the response of most brain tumors to systemic chemotherapy is usually very modest, with a notable exception being a favorable response of [oligodendrogliomas](#) and gliomas with deficient [MGMT](#) activity. Considerations regarding chemotherapeutic agents in relation to the BBB include:

1. some CNS tumors may partially disrupt the BBB, especially [malignant gliomas](#) <sup>2)</sup>.
2. lipophilic agents (e.g. [nitrosoureas](#)) may cross the BBB more readily
3. selective intra-arterial (e.g. intracarotid or intervertebral) injection <sup>3)</sup>: produces a higher local concentration of agents which increases penetration of the BBB, with lower associated systemic toxicities than would otherwise occur
4. the BBB may be iatrogenically disrupted (e.g. with mannitol) prior to administration of the agent
5. the BBB may be bypassed by intrathecal administration of agents via [LP](#) or ventricular access device, e.g. [Methotrexate for Primary central nervous system lymphoma](#).
6. biodegradable polymer wafers containing the agent may be directly implanted

<sup>1)</sup>

Stewart DJ. A Critique of the Role of the Blood-Brain Barrier in the Chemotherapy of Human Brain Tumors. J Neurooncol. 1994:121-139

<sup>2)</sup>

Salcman M, Broadwell RD, Salcman M. The Blood Brain Barrier. In: Neurobiology of Brain Tumors. Baltimore: Williams and Wilkins; 1991: 229-250

<sup>3)</sup>

Madajewicz S, Chowhan N, Tfayli A, et al. Therapy for Patients with High Grade Astrocytoma Using Intraarterial Chemotherapy and Radiation Therapy. Cancer. 2000; 88:2350-2356

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