



Blood Brain Barrier (Bbb) Role in Delivering the Chemotherapeutic Agents to the Brain in the Treatment of Brain Tumors



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Mini Review

Systemic chemotherapy would be challenging to treat brain tumors. Achieving the required concentrations of the chemotherapeutic agents in the brain would be influenced by some factors like the volume of distribution of the agent in the brain parenchyma, the ability of the agent to cross the blood brain barrier and active amount of the drug which can be transported out of the brain. Because of difficulties to reach the specific sites of the brain, drug delivering in systemic chemotherapy for brain tumors would encounter various failures [1]. Also, there are other barriers which influence drug delivering to the brain including blood-cerebrospinal fluid barrier, brain-cerebrospinal fluid barrier and the brain tumor barrier. A monolayer of brain capillary endothelial cells is the main part of the blood brain barrier. The interaction between endothelial and astrocyte cells and the tight junctions between endothelial cells, restrict the brain penetration by the chemotherapeutic agents [2]. Lacking intercellular fenestrations and having low ionic permeability and high electrical resistance in the endothelial cells of brain capillaries, make many of water-soluble agents to be unable to reach the brain.

Passive diffusion or catalyzed transportation via lipid-mediated transportation of small and nonpolar molecules, would be the main route of crossing the blood brain barrier by the compounds. up taking across the blood-facing membrane into the endothelial cells and then transporting through the transcellular membrane and effluxion through the parenchyma-facing membrane into the interstitial fluid, are the factors which make reaching the brain parenchyma by the agent,

successful [3]. Enough drug delivering to the tumor cells and the tumor-infiltrated brain parts located around the tumor, makes chemotherapy for brain tumors successful. Lipid solubility, having sizes less than 200 daltons, being minimally ionized and not being bound to plasma proteins are the factors which make chemotherapeutic agents, effective to treat brain tumors in systemic administration routes. Potential use of some agents like mannitol and bradykinin analogues to increase drug delivery to brain tumors, needs more studies to be done to be approved and be employed in chemotherapy for brain tumors [4,5].

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