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Blood-brain barrier integrity and breast cancer metastasis to the brain.

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Abstract

Brain metastasis, an important cause of cancer morbidity and mortality, occurs in at least 30% of patients with breast cancer. A key event of brain metastasis is the migration of cancer cells through the blood-brain barrier (BBB). Although preventing brain metastasis is immensely important for survival, very little is known about the early stage of transmigration and the molecular mechanisms of breast tumor cells penetrating the BBB. The brain endothelium plays an important role in brain metastasis, although the mechanisms are not clear. Brain Microvascular Endothelial Cells (BMECs) are the major cellular constituent of the BBB. BMECs are joined together by intercellular tight junctions (TJs) that are responsible for acquisition of highly selective permeability. Failure of the BBB is a critical event in the development and progression of several diseases that affect the CNS, including brain tumor metastasis development. Here, we have delineated the mechanisms of BBB impairment and breast cancer metastasis to the brain. Understanding the molecular mediators that cause changes in the BBB should lead to better strategies for effective treatment modalities targeted to inhibition of brain tumors.

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