Vascular mimicry

Vascular mimicry is a phenomenon in which aggressive cancer cells form channels that mimic the structure and function of blood vessels, allowing them to obtain nutrients and oxygen directly from the host tissue without relying on traditional blood vessels.

This process involves the formation of highly organized and functional networks of tumor cells that are lined by extracellular matrix proteins and are capable of transporting blood and nutrients. These channels can be seen under a microscope and can be mistaken for normal blood vessels.

Vascular mimicry is thought to be a mechanism by which tumors can grow and metastasize in the absence of proper blood vessels. It has been associated with poor prognosis and resistance to chemotherapy and radiation therapy in various types of cancer.

Research is ongoing to better understand the molecular mechanisms underlying vascular mimicry and to develop targeted therapies that can disrupt this process and improve outcomes for cancer patients.

The detailed ultrastructural survey of 18 isocitrate dehydrogenase-wildtype (IDH1-wt) glioblastomas and 12 isocitrate dehydrogenase-mutant (IDH1-mt) High-grade gliomas indicated that tumor vessels of both types had undergone deformities such as the thickening of the vessel wall (VW) and proliferation of the basement membrane, contour distortions, abnormal and discontinuous basal lamina, tumor cells' invasion and colonization of VW, disappearance of endothelial cells (ECs), pericytes, and smooth muscle cells, as well as the formation of a continuous ring of tumor cells attached to the luminal side of VW in numerous cases. The latter feature is a clear sign of vascular mimicry (VM) that was previously suggested in gliomas but never shown by TEM. Additionally, the vascular invasion was carried out by a large number of tumor cells and was accompanied by the accumulation of tumor lipids in the vessels' lumina and VWs; these two features are distinct for gliomas and may alter the course of the clinical presentation and overall prognosis. This raises the issue of how to specifically target tumor cells involved in vascular invasion in order to optimize prognosis and overcome these mechanisms employed by the tumor cells ¹⁾.

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Maraqah HH, Abu-Asab MS, Lee HS, Aboud O. Astrocytoma and glioblastoma IDH1-wildtype cells colonize tumor vessels and deploy vascular mimicry. Ultrastruct Pathol. 2023 May 5:1-8. doi: 10.1080/01913123.2023.2205927. Epub ahead of print. PMID: 37144386.

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