

Review Life Sci. 2024 Oct 28;358:123150. doi: 10.1016/j.lfs.2024.123150. Online ahead of print.

The roles of extracellular vesicles in gliomas: Challenge or opportunity?

Le Huang ¹, Jianhao Zhan ², Yao Li ³, Kai Huang ⁴, Xingen Zhu ⁵, Jingying Li ⁶

Affiliations

PMID: 39471898 DOI: [10.1016/j.lfs.2024.123150](https://doi.org/10.1016/j.lfs.2024.123150)

Abstract

Gliomas are increasingly becoming a major disease affecting human health, and current treatments are not as effective as expected. Deeper insights into glioma heterogeneity and the search for new diagnostic and therapeutic strategies appear to be urgent. Gliomas adapt to their surroundings and form a supportive tumor microenvironment (TME). Glioma cells will communicate with the surrounding cells through extracellular vesicles (EVs) carrying bioactive substances such as nucleic acids, proteins and lipids which is related to the modification to various metabolic pathways and regulation of biological behaviors, and this regulation can be bidirectional, widely existing between cells in the TME, constituting a complex network of interactions. This complex regulation can affect glioma therapy, leading to different types of resistance. Because of the feasibility of EVs isolation in various body fluids, they have a promising usage in the diagnosis and monitoring of gliomas. At the same time, the nature of EVs to cross the blood-brain barrier (BBB) confers potential for their use as drug delivery systems. In this review, we will focus on the roles and functions of EVs derived from different cellular origins in the glioma microenvironment and the intercellular regulatory networks, and explore possible clinical applications in glioma diagnosis and precision therapy.

Keywords: Drug delivery system; Extracellular vesicles; Glioma; Intercellular crosstalk; Tumor microenvironment.

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