Glioma microvesicles

Data suggest that the scope of potential actions of tumor-derived microvesicles is much broader and more complex than previously supposed, and highlight a number of new classes of small RNA that remain to be characterized [1)]

Tumor-derived small extracellular vesicles have played a vital role in the occurrence, development, associated immune response, chemotherapy resistance, radiation therapy resistance, and metastasis of glioma [2)]

Extracellular vesicles secreted by human glioma cells contain a wealth of tumor-specific proteins and nucleic acids that can be isolated from patients with these neoplasms. Thus, EV contribute to the development of biomarkers, and additionally have certain therapeutic potential for possible use in neurooncology and neurosurgery [3)].

EV secreted from mouse glioma GL261 and human primary Glioblastoma8 cell lines as well as from the plasma of 8 patients with diagnoses of GB and 2 healthy controls were isolated and processed for single vesicle analysis. EV were immobilized on glass slides and the heterogeneity of vesicle and tumor markers were analyzed at the single vesicle level.

They show that (i) MV are abundant, (ii) only a minority of MV expresses putative MV markers, and (iii) MV share tetraspanin biomarkers previously thought to be diagnostic of exosomes. Using MV capture and staining techniques that allow differentiation of host cell and GB-derived MV we further demonstrate that (i) tumoral MV often present as <10% of all MV in GB patient plasma, and (ii) there is extensive heterogeneity in tumor marker expression in these tumor-derived MV.

These results indicate that single MV analysis is likely necessary to identify rare tumoral MV populations and the single vesicle analytical technique used here can be applied to both MV and exosome fractions without the need for their separation from each other. These studies form the basis for using single EV analyses for cancer diagnostics [4)].

Growing interest in extracellular vesicles (EVs, including exosomes and microvesicles) as therapeutic entities, particularly in stem cell-related approaches, has underlined the need for standardization and coordination of development efforts. Members of the International Society for Extracellular Vesicles and the Society for Clinical Research and Translation of Extracellular Vesicles Singapore convened a Workshop on this topic to discuss the opportunities and challenges associated with development of EV-based therapeutics at the preclinical and clinical levels [5)].

1)
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