Differential RNA packaging into small extracellular vesicles by neurons and astrocytes

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Video Byte

Keywords: Cell Communication and Signaling, miRNAs, extracellular vesicles, miRNA signatures, neurons, astrocytes, RNA sorting, EXOmotifs, RNA sequencing, biomarkers, primary mouse cortical neurons, astrocytes, neurons, differential RNA packaging, intercellular communication, neurological disorders, transmission electron microscopy, nanoparticle tracking

Posted Date: October 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-966257/v1>

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Abstract

Small extracellular vesicles (sEVs) mediate intercellular communication by carrying RNA, proteins, and lipids between cells. These cargo molecules mirror the physiological state of their donor cells, but they are selectively loaded into sEVs. sEVs can cross the blood-brain barrier, and their contents may be influenced by neurological disorders, making them potential biomarkers. Identifying cell-specific signatures could be an important first step in the biomarker discovery process. Recently researchers examined sEVs isolated from cultures of primary mouse cortical neurons and astrocytes. They identified distinct total RNA and miRNA profiles between the two cell types. While astrocytes had a greater number of detected miRNAs than neurons, neurons expressed more sEV-associated miRNAs than astrocytes. They also identified short miRNA sequence motifs that were differentially loaded to or excluded from sEVs. One RNA motif, CACACA, was preferentially retained in both cell types, suggesting a cell-type-independent mechanism to maintain cellular miRNA. However, there was differential expression of RNA-binding proteins associated with RNA sorting between cell types. This study suggests that the sorting of miRNAs into sEVs is precisely regulated and may be specific to cell types and provides a starting point for biomarker and therapeutics research.