

## **Overall biological aspects, significance as diagnostic tools and biomarkers**

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Extracellular vesicles (EVs) are bilayer membranous structures that provide protection of their cargo from degradation and are produced by many cell types. Because of their specific content and relatively easy access, in recent years EVs have been at the center of intense research in cellular physiology and human pathology. While the interest in EVs in many cases stems from their potential to provide biomarkers for diagnosis, prognosis and assessment of therapies, physiologically EVs act primarily as tools for exchange of information between neighboring cells, but quite often they deliver their content to remote parts of the same organ or even cells of other organs. A better understanding of their biogenesis, the content of their cell specific cargo, their release from the cells and their traffic through Blood-Brain Barrier and Blood-CSF Barrier is particularly important in neural physiology and development, brain cancer and neurodegeneration. Newly developed and powerful omics approaches - proteomics and transcriptomics, for analysis of EVs cargo – particularly extracellular RNAs (exRNAs) of many different types, provide indispensable toolbox of diagnostic biomarkers. We will present recent challenges in EVs research and some aspects of our work in development and discovery of diagnostic biofluid biomarkers for Alzheimer's disease.