Title: **Purification and analysis of exosomes**

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Exosomes are 30-150 nm extracellular nanovesicles that can be found in biological fluids such as blood, urine, sweat, tears, etc. They are secreted by all types of cells through exocytosis processes. Exosomes contain a wide variety of biological relevant molecules such as lipids, proteins, mRNAs, and microRNAs. They are thought to function as messengers between cells due to their ability to endocytosis and membrane fusion. Therefore, they are involved in many physiological and pathological processes, including tumor initiation and immune response.

In this study, as an alternative to the techniques traditionally used to isolate exosomes, such as ultracentrifugation, it was explored polyethylene glycol (PEG) precipitation, which allows a facile, low-cost and effective isolation of exosomes from blood serum. Different variables of the method were studied, and the size of the isolated exosomes was measured by dynamic light scattering (DLS).

In addition, a novel capillary electrophoresis (CE) with ultraviolet (UV) detection method was developed to complement these particle size measurements. Different concentrations of hydroxypropyl cellulose (HPC, 0.2, 0.5, 0.8% v/v) were added in the background electrolyte (BGE, 0.1 M tris + 0.25 M boric acid pH= 7.9) to reduce the adsorption of the exosomes to the inner wall of the separation capillary. The best results were obtained with a 0.5% v/v of HPC in the BGE. In order to homogenize the charge of the exosomes and make the separation only size dependent 0.1% v/v of sodium dodecyl sulfate (SDS) was also added to the BGE. Under these optimized conditions, a characteristic electrophoretic profile of the isolated exosomes was obtained, and separation showed the highest reproducibility and shortest analysis times.

Keywords: Capillary electrophoresis (CE), coating, dynamic light scattering (DLS), electroosmotic flow (EOF), exosomes, extracellular vesicles (EVs).