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Isolation Strategies and Proteomic Characterization of Extracellular Vesicles

Extracellular vesicles is the collective term used to describe vesicular entities that are released from cells into the extracellular environment. The defining characteristics of an extracellular vesicle is its delineating lipid bilayer and the cargo for which it serves as a vessel. Bioactive molecules such as lipids, DNA, RNA and proteins have all been recognized as cargo-components and the fact that vesicles can ferry these components between cells is the very foundation for their recent popularity within the research community.

This thesis touches upon several aspects of extracellular vesicle research ranging from basic concepts such as the isolation of vesicles and deep analysis of its proteome to more clinically inclined research dealing with patient samples of both healthy and cancerous nature. We demonstrate the effect that discrepancies in ultracentrifugation protocols might bring about. Furthermore, we characterize the proteome of isolates and discover proteins of unexpected topological nature. We further develop a method for the isolation of vesicles from blood. Lastly, we demonstrate that the proteome of tumor-tissue derived vesicles is substantially different from that of vesicles derived from healthy tissue.

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