

Functional mRNA-encapsulating extracellular vesicles for biomedical applications

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## **Abstract**

Exosomes are a fascinating new class of therapeutics with the potential to transform the treatment of a wide spectrum of diseases with high unmet medical needs. Several key characteristics include low or no immunogenicity, ease of crossing cell membranes, and ability to communicate between cells. Herein, we focus on developing a precision-engineered exosome platform technology that can carry defined sets of effector molecules, such as mRNA, miRNA, and shRNA, that exert their effects through defined mechanisms of action. Our exosome manufacturing platform is a silicon wafer-based electroporation technology that facilitates the massive production of exosomes and carries effector molecules secreted by producer cells. We have several collaborations for the planned expansion of our exosome platform technology that is potentially used for exosome-based cancer therapies, anti-aging and regeneration applications, and the treatment of inherited diseases. Besides, exosomes are cell-free substances that can be stored, handled, reconstituted, and administered similarly to common biopharmaceutical products such as antibodies. Therefore, we are developing and commercializing our exosomes as an off-the-shelf product with preserved bioactivity. Together, we aim to pave the way towards engineering exosome-based biologics with a novel manufacturing approach for pressing unmet medical needs.