Cellular Nanoparticles for Drug and Gene Delivery

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Cell membrane-coated nanoparticles are made by wrapping natural cellular membranes onto synthetic nanoparticle cores. They leverage cell membranes to mimic some cell-like functions for biointerfacing, making it possible to enable novel biomedical applications. The targeting ability of these cell-mimicking nanoparticles is often mediated by specific proteins that are expressed on the source cells, and this bestows the nanoparticles with specific interactions with various disease substrates. On top of the natural biointerfacing capabilities of cell membrane-coated nanoparticles, their traits can be further enhanced by introducing exogenous moieties onto the membrane surface. One way to achieve this is to genetically engineer source cells to express desirable protein receptors, followed by membrane collection to prepare the nanoparticles. Herein, I will report on the latest development of genetically engineered cell-mimicking nanoparticle formulations for targeted drug and gene delivery.