

Biomimetic Nanoparticles for Tumor Targeting in Cancer Therapy

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Over the past few years, researchers have been exploring the use of nanoparticle-based drug delivery systems to overcome the limitations of traditional chemotherapy in cancer treatment. Nanoparticles (NPs) provide a platform for improved drug delivery to cancer by enhancing drug solubility, stability, and bioavailability.

In this frame we synthesized biomimetic nanoparticles composed by a polymeric core covered by cancer cell membrane, thus conferring to the assembled NPs the ability to entirely replicate the surface antigenic diversity of source cells selectively targeting cancer cells.

Resulting biomimetic NPs are physically characterized in morphology, size and correct coating with cancer cell membranes. The purity and retention of cancer cell membrane proteins on biomimetic NPs is assessed through biochemical analysis.

Also, cellular uptake of biomimetic NPs, and homotypic binding with different cell lines are assessed by flow cytometric analyses and Confocal Laser Scanning Microscopy imaging. These investigations confirm the higher internalization rates of biomimetic-NPs in their source cells, when compared to other cell lines, thus confirming the self-recognition capability typical of cancer. Resulting biomimetic NPs can be used to homotypically target cancer cells for biologically active molecules delivery thanks to a cancer-targeting strategy based on the intrinsic homotypic properties of cancer cell membranes.