

Bacteria-Cancer Cell Hybrid Membrane-Coated Gold Nanoparticles for Anticancer Therapy

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Extended Abstract

Biomimetics is a very promising method that is inspired by nature. It gives many advantages as non-immunogenic, better pharmacokinetic properties, low toxicity, and high biocompatibility. There has been a huge rise in research related to developing systems that mimic non-immunogenic biological entities known as biomimetic nanoparticles. Bacteria membrane-coated nanoparticles also called bacterial membrane-derived nanoparticles (BMDNs) are an emerging field in nanotechnology and biotechnology. These nanoparticles have been increasingly explored to leverage natural cellular functions and adapt to several biotechnological applications. Coating of nanoparticles provides many advantages as triggering the immune system and targeting cells. In our study, we are aiming to develop a hybrid coating system for gold nanoparticles in cancer therapy. Firstly, the outer membrane of *Escherichia coli* and human breast cancer cell membrane have been isolated by ultracentrifugation method. The fusion of these two membranes was applied by the extruder and, we coated the gold nanocore that we synthesized before. Finally, we get the BM-CCM hybrid coated nanoparticle and, we will use this nanoparticle as a drug carrier in cancer cell therapy. We use the doxorubicin in this system to inhibit the Bcl-2 expression. Thus, we are expecting to see an anticancer effect of this nanoparticle. Also, characterization of the nanoparticles, therapeutic effect of the BM-CCM hybrid coated nanoparticle, and colony assay formation will be applied. In summary, we investigated the integration of bacterial cytoplasmic membranes with cancer cell membranes to generate a HM-NP drug delivery platform for cancer treatment. These HM-NPs represent a high capacity for enhancing innate and tumour-specific adaptive immune responses.

Keywords: Bacteria membrane, Cancer cell membrane, Hybrid Coated Nanoparticles, Cancer Therapy