Citation (summary) on the outstanding research work:

Title: Aptamer-grafted, cell membrane-coated dendrimer loaded with doxorubicin as a targeted nanosystem against epithelial cellular adhesion molecule (EpCAM) for triple negative breast cancer therapy

Summary: The major issue associated with chemotherapeutics is the non-specific distribution, extended range of toxicity, and low intratumoral accumulation. Targeted therapy using aptamers could be a ground-breaking approach in cancer treatment. Poly(amidoamine) PAMAM dendrimers are a type of nanocarriers with a well-defined structure, higher encapsulation efficiency and modification surface groups. However, the toxicity of cationic dendrimers and non-targetability poses a great risk to patients' health. Considering this, we developed a EpCAM aptamer-functionalized, red blood cell (RBC) membrane-camouflaged PAMAM dendrimer loaded with doxorubicin to selectively target EpCAM-positive triple-negative breast cancer (TNBC) cells. An increase in size of doxorubicin (Dox) loaded PAMAM was observed from 11.34 nm to 108.4 nm post coating with RBC membrane and aptamer, respectively. The biocompatibility and blood circulation time were enhanced by the coating of the RBC membrane on the surface of the dendrimers while functionalization with aptamers improved its cancer cell internalization. The results obtained suggested that the coating with RBC provided controlled and sustained release during the 140 h of study. In vitro cell viability study showed enhanced apoptosis and significantly elevated uptake by the cancer cells as compared with the non-targeted preparation. Furthermore, the volume of the tumor was significantly reduced in groups treated with aptamer-modified, cell membrane-coated dendrimer due to selective internalization in the cancer cells only. This novel, personalized, and targeted therapy could be a potent platform for TNBC therapy.

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