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RESEARCH ARTICLE

Magnetic chitosan oligomer-sulfonate-stearic acid triple combination as cisplatin carrier for site-specific targeted on MCF-7 cancer cells: Preparation, characterization and in vitro experiments

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Abstract

In this study, a new amphiphilic target-specific adsorbent, chitosan oligomer-sulfonate-stearic acid triple combination (S-Cho-SA), and magnetic chitosan oligomer-sulfonate-stearic acid triple combination (M-S-Cho-SA) by oleic acid (OA)-modified Fe_3O_4 via hydrophobic interaction are fabricated. By modifying the nanoparticle surfaces and having the ability to magnetically allow the target region, these particles attract attention as important particles used in targeting mechanisms in cancer therapy. With magnetic nanoparticles and an external magnetic field, it is possible to transport therapeutic agents to the target site and keep them in the desired effect zone for a longer period of time. These new adsorbents are characterized by scanning electron microscopy (SEM), attenuated total reflection Fourier transform infrared (ATR FT-IR) spectroscopy, nuclear magnetic resonance (NMR), X-ray diffraction (XRD), vibrating sample magnetometer (VSM), and thermogravimetric analysis (TG/DTA). After chemical characterization, it is complexed with cisplatin (CDDP). The magnetic adsorbents were loaded with high efficiency (>50%), and the release experiments exhibited that cisplatin is released more at pH 4.5 compared with pH 7.4 at 37°C. It showed better drug release results under a magnetic field for magnetic adsorbents (36% for pH 4.5 and 3.6% for pH 7.4). The biocompatibility of the prepared adsorbents was demonstrated via the XTT assay in MCF-7 cell lines. The results also exhibited that S-Cho-SA and M-S-Cho-SA were biocompatible, and free cisplatin and cisplatin-complexed adsorbents showed an antiproliferative effect. The results showed that these new cisplatin-loaded (M-S-Cho-SA) nanoparticles are good candidates for thermotherapy in cancer treatment in the future, as they can provide

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Supporting Information

Filename	Description
cbdd14278-sup-0001-DataS1.xls Excel spreadsheet, 304 KB	**Data S1.**
cbdd14278-sup-0002-DataS2.doc Word document, 727.5 KB	**Data S2.**

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