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Targeted photodynamic treatment of colorectal cancer

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Abstract. Colorectal cancer (CRC) is a fatal malignancy with limited therapeutic options and its incidence is on the rise in recent years. Photodynamic therapy (PDT) has emerged as a promising minimally invasive therapeutic modality that employs three fundamentals to induce tumour damage: a photosensitizer (PS), light of a specific wavelength and molecular oxygen. However, PDT has shown undesirable lack of specificity for tumour cells. The aim of this study was to develop a targeted PDT multicomponent nanoparticle-antibody (ZnPcS4 – AuNP-PEG5000-SH-NH₂ - Anti-GCC Ab) based system that is capable of enhanced and targeted ZnPcS4 PS delivery within in vitro cultured CRC cells (CaCo-2) for improved PDT treatment. The final conjugate was successfully synthesized and characterized to confirm the efficient binding of the antibody and PS to functionalized gold nanoparticle surfaces. Immunofluorescent results noted that the final actively targeted PS nanoconjugate was able to actively and specifically localize in target CRC cells only. Thus, the increased bioavailability of ZnPcS4 PS in CaCo-2 cells elicited significant cytotoxic responses, suggesting that through nano active targeting the enhanced PDT treatment of CRC can be achieved.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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