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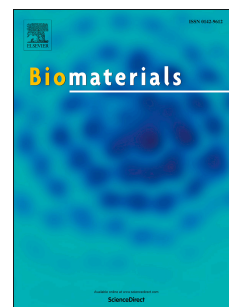
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Fullerene/ Photosensitizer Nanovesicles as Highly Efficient and Clearable Phototheranostics with Enhanced Tumor Accumulation for Cancer Therapy

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Abstract

A novel phototheranostic platform based on *tri*-malonate derivative of fullerene C₇₀ (TFC₇₀)/photosensitizer (Chlorin e6, Ce6) nanovesicles (FCNVs) has been developed for effective tumor imaging and treatment. The FCNVs were prepared from amphiphilic TFC₇₀-oligo ethylene glycol-Ce6 molecules. The developed FCNVs possessed the following advantages: (i) high loading efficiency of Ce6 (up to ~57 wt%); (ii) efficient absorption in near-infrared light region; (iii) enhanced cellular uptake efficiency of Ce6 *in vitro* and *in vivo*; (iv) good biocompatibility and total clearance out from the body. These unique properties suggest that the as-prepared FCNVs could be applied as an ideal theranostic agent for simultaneous imaging and photodynamic therapy of tumor. This finding may provide a good solution to highly efficient phototheranostic applications based on fullerene derivatives fabricated nanostructures.

Keywords: nanovesicle • fullerene • photosensitizer • phototheranostic

Introduction

Phototheranostics, which refers to diagnosis *via* application of light with simultaneous treatment of disease, has emerged as a promising interdisciplinary technique for imaging guided tumor treatment due to improvement in light generation, delivery, and sensing technologies.¹⁻⁵ Among

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