

Luciferase gene-loaded CS-Qdots as self-illuminating probes for specific hepatoma imaging

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Abstract

Chitosan encapsulated quantum dots (CS-Qdots) exhibit fascinating optical properties and can efficiently deliver genes into cells in a visualized process. By using CS-Qdots as gene carriers, specific hepatocellular carcinoma (HCC) expressed firefly luciferase genes (p[HRE]AFP-luc) were transfected into HCC cells for hepatoma bioluminescence imaging. The results obtained in this study show that nanocarrier CS-Qdots can be excited by the luciferase coded in the genes delivered into the cells. The maximum emission wavelength of the bioluminescence red-shifted from 560 nm to 630 nm. The excitation of CS-Qdots by bioluminescence occurs at the macroscopic scale and is independent of covalent bond. The luciferase gene-loaded CS-Qdots can act as wavelength-tunable self-illuminating probes thus holding potential for improved tumor optical molecular imaging.

