EFFECT OF THERANOSTIC PHOSPHOLIPIDIC SRCL2/SRI2AND β-D FRUCTOPYRANOSE BASED NANOPARTICLES ON CELL VIABILITY AND UPTAKE

Introduction

Nanoparticles can be engineered with precise sizes, shapes, composition and with surface targeting ligands that allow a specific interaction with target cells.

The aim of this work was to analyze the effect of non-toxic and low-cost Sr/I-based nanoparticles, in order to develop a new ^{89}Sr- and/or ^{131}I-based radiotherapy method on cell lines. In particular we analyzed the effect on cellular uptake and cell viability of compound 1 (^{89}Sr(fructose)$_2$Cl$_2$ · H$_2$O) and compound 2 (^{89}Sr(fructose)$_2$I$_2$ and Sr (fructose)$_2$^{131}I$_2$), on a non-tumour cell line, hTERT-HME1, and a tumour cell line, HT-29. The compounds studied exhibit some features that could be interesting for biomedicine applications, such as the biocompatibility due to their non-toxic components and the significant SH emission, that can permit exploitation for *in vitro* bio-imaging.

Materials and methods

We tested the effect of nanoparticles encapsulated in a hydrophilic shell of mPEG-DSPE that increases their biocompatibility on non-tumour and tumour cell lines, hTERT-HME1 and HT-29, respectively. In particular, we analyzed the cellular uptake of nanoparticles and the effect on cell viability. To evaluate the effect of nanoparticles on cell viability, we treated hTERT-HME1 and HT-29 cell lines with five different nanoparticles concentrations, and cell viability was assessed using ATP content and the CellTiter-Glo® Luminescent Cell Viability Assay (Promega).

Results

hTERT-HME1 cell line showed sensitivity to compound 1 already at the lowest concentration, while compound 2 reduced hTERT-HME1 cell viability in a dose-dependent manner; HT-29 viability was reduced of about 70% and 50% only at the highest concentration of nanoparticles of compounds 1 and 2, respectively. The nanoparticles covered with mPEG-DSPE can be detected for few days in a biological medium and can be internalized into hTERT-HME1 and HT-29 cells.

Discussion and Conclusions

In this work we have analyzed the effect of Sr/I-based nanoparticles, on cell uptake and viability. The nanoparticles formulation could be useful to concentrate the effect of ^{89}Sr and ^{131}I radio-API in a specific tissue, allowing a selective activity of the activated compounds. The nanoparticles are biocompatible and are internalized into the cell; the viability of cell lines utilized is influenced by the presence of the nanoparticles themselves rather than their chemical composition.

ha formattato: Inglese americano