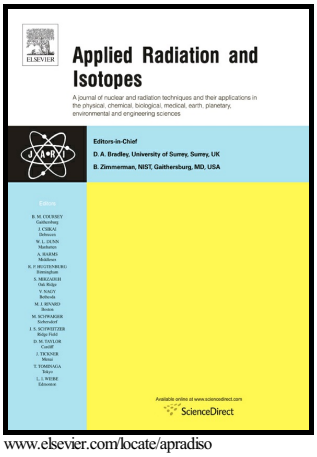

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Development of a method for the preparation of zirconium-89 radiolabelled chitosan nanoparticles as an application for leukocyte trafficking with positron emission tomography.

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Abstract

Positron Emission Tomography is an attractive imaging modality for monitoring the migration of cells to pathological tissue. We evaluated a new method for radiolabelling leukocytes with zirconium-89 (^{89}Zr) using chitosan nanoparticles (CN, Z-average size 343 ± 210 nm and zeta potential +46 ± 4 mV) as the carrier. We propose that cell uptake of ^{89}Zr-loaded CN occurred in a two-step process; cell membrane interaction with ^{89}Zr-loaded CN was followed by a slower cell internalisation step.

Keywords

PET; Zr-89; chitosan; nanoparticles; leukocyte trafficking; inflammation imaging.

Introduction

Nanoparticles (NPs) have been extensively used for *in-vivo* imaging of macrophages using modalities such as Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT) or fluorescence (Majmudar *et al*., 2013, Keliher *et al*., 2011, Jaffer *et al*., 2006, Devaraj *et al*., 2009). Application of macrophage-targeting nanoparticles as diagnostic tools for cancer, atherosclerosis or myocardial infarction has been actively investigated (Weissleder *et al*., 2014).

Among the nanomaterial-based imaging agents described, chitosan is attractive for clinical applications due to its bio-compatibility, bio-degradability and apparent low toxicity