

Accepted Manuscript

Review article

Nanoparticles in Practice for Molecular-Imaging Applications: An Overview

Parasuraman Padmanabhan, Ajay Kumar, Sundramurthy Kumar, Ravi Kumar Chaudhary, Balázs Gulyás

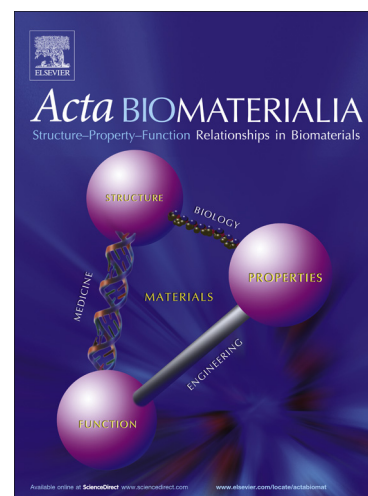
PII: S1742-7061(16)30271-9
DOI: <http://dx.doi.org/10.1016/j.actbio.2016.06.003>
Reference: ACTBIO 4275

To appear in: *Acta Biomaterialia*

Received Date: 11 December 2015
Revised Date: 28 May 2016
Accepted Date: 1 June 2016

Please cite this article as: Padmanabhan, P., Kumar, A., Kumar, S., Chaudhary, R.K., Gulyás, B., Nanoparticles in Practice for Molecular-Imaging Applications: An Overview, *Acta Biomaterialia* (2016), doi: <http://dx.doi.org/10.1016/j.actbio.2016.06.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Nanoparticles in Practice for Molecular-Imaging Applications: An Overview

Parasuraman Padmanabhan^{a*}, Ajay Kumar^{a, b}, Sundramurthy Kumar^a, Ravi Kumar Chaudhary^c, Balázs Gulyás^{a*}

^a Lee Kong Chian School of Medicine, Nanyang Technological University (NTU), Singapore 637553

^b School of Engineering, Gautam Buddha University, India-201312

^c School of Biotechnology, Gautam Buddha University, India-201312

*Corresponding author

ABSTRACT

Nanoparticles (NPs) are playing a progressively more significant role in multimodal and multifunctional molecular imaging. The agents like Superparamagnetic iron oxide (SPIO), manganese oxide (MnO), gold NPs/nanorods and quantum dots (QDs) possess specific properties like paramagnetism, superparamagnetism, surface plasmon resonance (SPR) and photoluminescence respectively. These specific properties make them able for single/multi-modal and single/multi-functional molecular imaging. NPs generally have nanomolar or micromolar sensitivity range and can be detected via imaging instrumentation. The distinctive characteristics of these NPs make them suitable for imaging, therapy and delivery of drugs. Multifunctional nanoparticles (MNPs) can be produced through either modification of shell or surface or by attaching an affinity ligand to the nanoparticles. They are utilized for targeted imaging by magnetic resonance imaging (MRI), single photon emission computed tomography (SPECT), positron emission tomography (PET), computed tomography (CT), photo acoustic imaging (PAI), two photon or fluorescent imaging and ultra sound etc. Toxicity factor of NPs is also a very important concern and toxic effect should be eliminated. First generation NPs have been designed, developed and tested in living subjects and few of them are already in clinical use. In near future, molecular imaging will get advanced with multimodality and multifunctionality to detect diseases like cancer, neurodegenerative diseases, cardiac diseases, inflammation, stroke, atherosclerosis and many others in

Download English Version:

<https://daneshyari.com/en/article/6483242>

Download Persian Version:

<https://daneshyari.com/article/6483242>

[Daneshyari.com](https://daneshyari.com)