

The use of radiolabeled nanoparticles for biomedical imaging

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Introduction: In the last years, the practice of medicine is being changing with a special emphasis on the application of technological innovations where medical imaging modalities play an important role. Between several imaging modalities, Molecular Imaging (that is essentially based on Nuclear Medicine) is one of the most interesting solutions. On the other hand, assuming that nanoparticles are being studied as drug delivery systems, its application as vectors for radionuclide-based imaging is in a clear growing.

Methods: A systematic review was done in the databases MEDLINE and CINAHL using the search engine EBSCOhost, for articles published between 2000 and 2013.

Results: A total of 87 articles were pre-analyzed and classified. The number of publications found demonstrates the increasing tendency and interest that scientific community is giving to this subject, with most of the experimental papers referring to *in vitro* and *in vivo* combined studies. All Nuclear Medicine procedures are being used in this context, but PET is the procedure showing wider range of radiolabelled nanoparticles application and with access to a maximum impact. A deeper analysis was also done according to specific technical aspects of published data, mainly related with radionuclides and nanoparticles applied.

Conclusions: Nanotechnology is one of the most notable achievements of modern science that should really play a key role in the future, namely via personalized medicine. In this sense, the present work summarizes some findings obtained with the review of existing literature concerning nanoparticle-based radiopharmaceuticals, and it is possible to conclude the actual predominance of Oncology-tailored applications, either using Conventional Nuclear Medicine or PET. In the future it is expected development of nanoparticle synthesis processes and radiolabelling procedures, to be used within more preclinical/clinical studies.



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