MED-107

Effect of size on blood clearance of ^{68}Ga-USPIO-BBN as a dual-modality molecular imaging contrast agent for PET/MRI

A. Lahooti[12], S. Laurent[2], S. Sarkar[1], S. Shanehsazzadeh[2]

[1]Department of Medical Physics and Biomedical Engineering, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

[2] NMR and Molecular Imaging Laboratory, Department of General, Organic, and Biomedical Chemistry, University of Mons, Belgium.

The imaging of molecular markers associated with disease offers the possibility for earlier detection and improved treatment monitoring. The gastrin-releasing peptide receptor (GRP-r) is over-expressed in breast and prostate cancer and lymph node metastases. In this study, we develop two nanoprobe contains ^{68}Ga-NODA-GA-USPIO-BBN with two hydrodynamic different sizes (20 and 90nm) and we assess the binding affinities of two probes on the positive and negative cell lines. we also evaluate the blood clearance of each probe in normal mice. our in vitro results show that both nanoprobes have the same behaviour in terms of binding to the positive cell lines whereas in negative cell lines the smaller probe (20nm) had shown unspecific binding more than the 90nm probe.The in vivo results of this study confirm that also both nanoprobes had the same core size, same coating but due to the hydrodynamic size references the smaller nanoprobe had better blood half-life whereas the 90 nm nanoprobe taken up by the liver and cleared very fast from the blood. In conclusions, this study demonstrated that the^{68}Ga-NODA-GA-USPIO-BBN (with 20 nm hydrodynamic size) multifunctional system shows specific recognition for GRP-r and suitable properties to be used as a molecular imaging PET/MRI contrast agent.

[2] Correspondece to: lahootia@razi.tums.ac.ir