uptake in the tumours for a long time in the animal patients. The labeled nanosystem showed retained blood-background, liver, kidneys, urinary bladder and slight bone-marrow uptake was seen in the SPECT/CT scans. Uptakes by the lungs and thyroids were under the detectable range, which confirmed the stability of the nanoparticles in vivo.
Clinical trials verified that the new nanoparticles are able to detect folate-receptor-overexpressing tumours in animal models with enhanced contrast.
Conclusions: Our first veterinary clinical examinations verified that the rapid, simple and reproducible labeling and stability provided by the new biopolymer-based, folate targeting nanoparticles, together with their in vivo size stability and non-toxicity, make the new product suitable for relatively rapid manufacture and clinical use in early state tumor diagnosis.
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P8

IN VIVO BONE REGENERATION IMAGING WITH 99MTC-MDP IN A CRITICAL SIZE BONE DEFECT CANINE MODEL

Z. Pöstényi[1], V. Haász[1], A. Polyák[1], G. Dabasi[2], P.R. Jóba[2], L. Seres[3], G.A. Jánoki[4], G. Jánoki[5], L. Balogh[1]

[1]National Research Inst. for Radiobiology and Radiohygiene, Budapest, Hungary
[2]Dept. of Nuclear Medicine, Semmelweis University, Budapest, Hungary
[3]Mediso Ltd., Budapest, Hungary
[4]Medi-Radiopharma Ltd, Érd, Hungary
[5]Radiopharmacy Ltd, Budaörs, Hungary

Background: Bone scintigraphy is a very sensitive tool for detecting changes in bone metabolism. Phosphate analogues can be labelled with 99mTechnetium (99mTc) and used for bone imaging. Bisphosphonates attach to hydroxyapatite binding sites on bony surfaces which are undergoing active regeneration. Adipose tissue-derived mesenchymal stem cells (AD-MSCs) are a good source for tissue engineering and bone regeneration. Our aim was to apply the osteogenic differentiation potential of AD-MSCs to stimulate bone regeneration in a critical size bone defect animal model.
Material and methods: In three healthy Beagle dogs with large bone defect on the craniofacial region were followed the bone regeneration with single-photon-emission computed tomography (SPECT) and SPECT-CT scanning. During surgery a 10 mm × 20 mm bone section was removed from the dogs' nasal region from both left and right side. The left bone fragment was replaced immediately in all dogs. We created 3 models: in the first model the right side of the surgical region was closed around the bone defect without replacing the bone fragment, in the second model the bone graft was replaced after sterilisation without AD-MSCs, in the third model the bone graft was coated with the autologous AD-MSCs. Bone uptake of methylene diphosphonate (99mTc-MDP) was calculated as indicators of metabolic activity in the surgical sites. For semiquantitative analysis of the delayed static image, we set the region of interest (ROI) manually on the right bone defect area, and set a symmetrical ROI on the opposite area as control.
Results: The animals tolerated well the surgery and radiopharmaceutical applications; neither acute nor chronic side-effects were detected. The critical sized bone defect showed minimal osteogenic regeneration rather fibrous tissue expansion was observed in the first model. In the second model with sterile bone graft (without AD-MSCs) 99mTc-MDP showed minimal accumulation. In the third dog model where the bone matrix was coated with autologous AD-MSCs the 99mTc-MDP accumulation was significantly higher than in the uncoated bone graft.
Conclusion: Our preliminary studies suggest that the 99mTc-methylene diphosphonate scan may useful to follow-up the in vivo osteogenic regeneration mediated by adipose-derived MSCs. The autolougous AD-MSCs grown in the bone matrix seems to be a good source in the treatment of critical size bone defect in our Beagle model.
Scientific work was supported by several national (KMOP-1.1.1-08/ /1-2008-0017, KMOP-1.1.1-09/1-2009-0056, GOP-1.1.1.-09/1-2010-0107) and international projects (IAEA-CRPs, EMIL NoE).

P9

APPLICATION OF FAST CHROMATOGRAPHIC SEPARATION METHODS FOR THE FOLLOWING OF RADIOLABELLING REACTIONS WITH PET ISOTOPES

Szikra Dezső

University of Debrecen, Department of Nuclear Medicine, Debrecen, Hungary

Background: The speed of the methods used for the following of reactions has significant importance during the radiolabelling with short lived PET isotopes. Usually a few components has to be separated, but these are seldom simple separations. There are cases, when the retention properties of the molecule hinders the measurement (e.g.: Ga3+, FDG, [11C]methionine and its impurities). In other cases the abscence of UV-chromophore groups cause problems (e.g.: [18F]FDG, [11C]kolin, 68Ga-complexes).
The fast measurement is important in routine quality control, in order to minimalize losses during application of the produced radiopharmaceutical. In the case of production optimization experiments, the composition of several samples from the same isotope production has to be determined before its components decay under the quantitation limit.
Material and methods: I have used high pressure liquid chromatographic separation for the identification of the products of radiolabelling reactions and for the determination of labelling efficiency. I have used the following instruments: Waters LC Module Plus HPLC system, modular Jasco HPLC (gradient pump, autosampler, UV-detector), Waters Acquity H-class UPLC with PDA detector. The detection of radioisotopes was performed by home made scintillation detectors (plastic and caesium iodide) connected to the systems mentioned.
Results: The HPLC method, used for the quality control of [11C]methionine was shortened from 6 minutes to 1.5 minutes by the application of a shell type stationary phase (Kinetex XB-C18 50 × 4.6 mm 2.6 um) and an Acquity PDA detector. I have developed and validated a separation for the quality control of [11C]choline, using a cation exchanger column (Zorbax SCX300 50 × 4,6mm 5um) and indirect UV detection. I have determined the [11C]methyl-iodide content of product mixtures, produced in a microfluidic synthesis system, using 2 cm long Waters uBondapak precolumns.
I have applied a Kinetex C18 30 × 4.6 mm 2.6 um column for the on-line monitoring of the labelling of NOTA-RGD peptide with 68Ga.
Conclusions: The higher separation efficiency of fast chromatographic systems enables faster measurements. This can contribute to the better utilization of the produced radiopharmaceuticals and can give more information during the optimalization of radiolabelling.
The shell type stationary phases were proven to be well applicable for the examination of radiopharmaceuticals. Their favourable properties can be maximized by the application of low dead volume chromatographic system.