

Production and Quality Control of a Novel ^{153}Sm -Complex for Radiotherapy of Bone-Metastases

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Abstract : Bone metastases occur in many cases at an early stage of the tumour disease, however their symptoms are recognized rather late. The aim of this study was the preparation of ^{153}Sm -(4- $\{$ [bis-(phosphonomethyl)carbamoyl]methyl $\}$ -7,10-bis(carboxymethyl) 1,4,7,10-tetraazacyclododec-1-yl) acetic acid (BPAMD) for bone pain palliation therapy. ^{153}Sm was produced at Tehran research reactor via $^{152}\text{Sm}(n,\gamma)^{153}\text{Sm}$ reaction. 200 μl of 1mg/ml BPAMD solution was added to the vial containing 1 mCi ^{153}Sm and the mixture was heated up to 90 $^{\circ}\text{C}$ for 1 h. The radiochemical purity of the complex was measured by ITLC method. The final solution with radiochemical purity of more than 95% was injected to BALB mice and bio distribution was determined up to 48 h. SPECT images were acquired after 2 and 24 h post injection. While high bone uptake was confirmed by both the bio distribution studies and SPECT imaging, accumulation in other organs was approximately negligible. The results show that ^{153}Sm -BPAMD can be used as an excellent tracer for bone pain palliation therapy.

Keywords : bone metastases, BPAMD, ^{153}Sm , radiotherapy

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