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### **Labeling of hydroxyapatite particles with $\beta$ - emitting lanthanoids for radiosynovectomy: Formulation, quality control and bio-evaluation**

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Radiosynovectomy is used as an alternate to surgical synovectomy. The radionuclides used are essentially  $\beta$ -emitters tagged to particulate ligands. In this study hydroxyapatite particles (HA) are labeled with four  $\beta$ -emitting lanthanoids and evaluated them in animal models for joint leakages. Lu-177, Sm-153, Y-90, and Ho-166 were prepared from their precursors by (n,  $\gamma$ ) reaction and lanthanoids were finally obtained as XCl<sub>3</sub>. HA was prepared in-house and labeled separately with lanthanoids using procedure published elsewhere. Radiochemical quality control was performed and stabilities in room were determined. The final mixture was autoclaved and used for further studies. The in-vivo bio-evaluation studies of lanthanoid-labeled HA particles were carried out in two rabbit models for each lanthanoid. The radiolabeled agent was injected in the left knee cavities and sequential images of the knee joint were taken under gamma camera. The extra-articular leakage was assessed visually and quantitatively. Ninety five per cent of HA particles had size in the range of 0.6 to 6.1  $\mu$ m. Yields of labeled particles achieved were 97.4 $\pm$ 0.2% for Lu-177HA; 99.9 $\pm$ 0.0% for Sm-153HA; 99.5 $\pm$ 0.3% for Y-90HA; and 99.8 $\pm$ 0.2% of Ho-166 HA which remained stable at room temperature for 5 days. *In vivo*-bio-evaluation studies in rabbit knees showed no visual leakage of activity out of joint space. Average of cumulative leakages quantitatively on day-3 were 7.0%, 8.0%, 11.5%, and 3.0% while biological half-lives were found to be 140 days, 106 days, 211 days, and 149 days respectively. Lanthanoid labeled HA particles are suitable option for radiosynovectomy.

#### **Biography**

Muhammad Sohaib earned MS from Quaid-e-Azam University and 4-year clinical fellowship from College of Physicians and Surgeons Pakistan, both in the field of nuclear medicine. He is the faculty member of Department of Medical Sciences, PIEAS where he has supervised more than 15 research projects and has 13 research articles to his credit. He is also member of editorial board of several research journals.

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