

## Sn-117m colloid distribution and autoradiography in the normal canine elbow

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### *Abstract:*

**OBJECTIVES:** To determine the physical distribution and autoradiographic cellular distribution of a homogeneous Sn-117m colloid (HTC) injected into normal canine elbow joints.

**METHODS:** Sn-117m is considered to be a small sized joint radiosynoviorthesis (RSO) therapeutic with a conversion electron therapeutic energy of ~140 keV and a range of 300µm with a half-life of 14 days. A HTC was injected into the elbows of 5 normal dogs at the University of Missouri School of Veterinary Medicine. The joints were then collected after ~3 half-lives and shipped to Bolder BioPATH for sectioning and microscopic evaluation. Elbows from the 5 dogs were decalcified for 14 days, trimmed in along the sagittal plane, processed for paraffin embedding and sectioned. Half of the sections were prepared and stained with Toluidine Blue for assisting the evaluation of colloid distribution by autoradiography (AR). The remaining paired sections were dipped into KODAK Autoradiography Emulsion and air dried, placed into a light-tight box with drying agents in a refrigerator. Slides were then sequentially air dried at room temperature and submerged in KODAK Developer D-19, distilled water, KODAK fixer and again in distilled water. Toluidine Blue stained slides were then paired with their adjacent AR slides and examined.

**RESULTS:** Two of 5 elbow sections had mild and one of 5 had minimal, focal synovial and/or subsynovial macrophage infiltration in the anterior surface of the distal humerus opposite to the olecranon. The remainder of the synovium and subsynovial tissues were generally unremarkable and without inflammation, although a few small foci of macrophage accumulations were observed. There were no microscopic changes in articular cartilage or bone associated with the treatment. Based on AR results, the Sn-117m was present and most intense in macrophages that had migrated beneath the synovial lining in the subsynovial tissues mainly adjacent to the humerus in 3 of 5 elbows, and less commonly in a few other locations. It was also present within the normal type A (macrophage like) synovial lining cells in normal synovium in all elbows and occasionally noted in single cells (presumably macrophages) that were in the deeper connective tissues under the synovial lining. A few blood vessels contained AR positive cells. Sn-117m containing cells were generally absent in the cartilage, bone, and connective tissue although rare single cells could be seen that seemed to be resident in the tissue.

**CONCLUSION:** After ~3 half-lives the Sn-117m colloid was localized in synoviocytes throughout the joint in all 5 elbows. Macrophages were distributed in variable density in all layers of the synovium, and macrophages and synoviocytes contained the Sn-117m colloid. Retention of the HTC for ~3 half-lives and throughout the synovial layers in the elbow of the hounds suggests that Sn-117m is an appropriate RSO therapeutic isotope for small joints and possibly for intermediate and large joints.

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