

## PRECISION RADIONUCLIDE THERAPY FOR TREATING VETERINARY CANCEROUS TUMORS AND OSTEOARTHRITIS

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### Introduction

Precision Radionuclide Therapy is an emerging class of treatment for arthritis and cancer. This presentation describes two specific examples that are currently being implemented in veterinary science: IsoPet® for tumor therapy using Y-90 and Synovetin OA® for osteoarthritis using Sn-117m.

### Description of the Work or Project

Each therapy will be described in detail and example case studies presented.

#### IsoPet®

Injectable Y-90-IsoPet® comprises an insoluble Y-90-yttrium-phosphate radiation source mixed within an injectable, thermally reversible, temperature-sensitive polymer solution. After injection, the mixture gels within tumor extracellular spaces as it warms to body temperature to ensure that the Y-90 microparticles remain in tumors. Single-dose (300 to 400 Gy) treatment of tumors with high therapeutic ratio. Injection materials remain in the tumor and radioactivity is not excreted. IsoPet therapy has treated feline, canine and equine tumors. Three case studies will be reviewed.

#### Synovetin OA®

Synovetin OA® is a commercially available treatment in the USA for canine osteoarthritis. It is composed of insoluble Sn-117m hydroxide microparticles suspended in a saline solution. Intra-articular injection into the affected joint results in rapid assimilation into the inflamed tissue via phagocytosis by synovial macrophages. There is no leakage or systemic distribution away from the treated joints. Immediate release of dogs is achieved by owners conforming to straightforward handling restrictions based on the external radiation doses measured at release. Rat and canine trials [2] were undertaken in order to launch the veterinary medical device commercially. Sample case studies will be reviewed.

### Conclusions

Precision Radionuclide therapy is a new promising therapy class for treating arthritis and cancerous tumors in veterinary science. Commercial products are now emerging for use in this field.

### References

[1] Darrell R. Fisher, Radiation Safety for Yttrium-90-polymer Composites (RadioGel™) in Therapy of Solid Tumors, *Health Physics* 120(5):510-516; 2021.

[2] Lattimer J.C. *et al.*, Intraarticular injection of a Tin-117m radiosynoviorthesis agent in normal canine elbows causes no adverse effects, *Vet Radiol. Ultrasound*. 2019;60:567–574.