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**Rhenium-188 - Advantages and Clinical Potential for Use of a Readily Available, Cost Effective Therapeutic Radioisotope for Applications in Nuclear Medicine, Oncology and Interventional Cardiology**

F. F. (Russ) Knapp, Jr.

Nuclear Medicine Group, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN, USA

Carrier-free rhenium-188 (Re-188) is readily available from the alumina-based tungsten-188/rhenium-188 generator system and has many attractive properties for a wide variety of therapeutic applications. The 16.9 h half-life, emission of the 2.2 MeV beta particle and versatile chemistry make Re-188 an important candidate for applications where high radiation penetration is required. In addition, emission of a gamma photon (155 KeV, 15%) permits evaluation of biodistribution, pharmacokinetics and dosimetry estimates. The long physical half-life of the tungsten-188 (W-188) parent ( $t_{1/2}$  69 days) and consistent generator performance - with high Re-188 yields and low W-188 parent breakthrough - result in an indefinite shelf-life of several months, dependent on the levels of Re-188 required. Post generator elution in-growth of 62% of Re-188 after 24 hours in combination with high elution yields (75-85 %) result in 50% daily yields of the maximal Re-188 available. In addition to research being conducted for the development of a wide variety of new therapeutic radiopharmaceuticals and devices, Re-188 is also being evaluated in physician-sponsored clinical trials in over 15 countries, with applications in nuclear medicine, oncology and interventional cardiology. One major current clinical application involves post-angiographic treatment of arterial segments following PTCA using Re-188 perrhenate or MAG3 liquid-filled balloons as an effective and cost-effective approach for inhibition of the hyperplastic response to vessel damage, which delivers uniform dose to the vessel wall. Re-188-HEDP is being used for palliation of metastatic bone pain palliation. This agent is readily prepared from a simple "kit" and provides pain palliation as effective as other commercially available agents. The use of the Re-188-labeled Anti-NCA-95 antibody (BW 50/183; CD66 a,b,c,e) in conjunction with external beam irradiation and chemotherapy is an effective method for "conditioning" prior to stem cell rescue in leukemia patients. In addition to the development of the Re-188-P2045 peptide for the potential clinical treatment of lung tumors, a variety of other Re-188-labeled peptides and antibodies are being evaluated for tumor therapy, and Re-188-Lipiodol is being used for palliative therapy of hepatocellular carcinoma in IAEA-supported trials. Installation of the W-188/Re-188 generator in a centralized radiopharmacy would be expected to optimize the availability and costs of Re-188. This presentation will provide an overview of the current and expected broader role of Re-188 as an important therapeutic radioisotope.