



Rhenium-188 Labeled Radiopharmaceuticals: Current Clinical Applications in Oncology and Promising Perspectives

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Résumé en anglais	<p>Rhenium-188 (Re) is a high energy beta-emitting radioisotope with a short 16.9 h physical half-life, which has been shown to be a very attractive candidate for use in therapeutic nuclear medicine. The high beta emission has an average energy of 784 keV and a maximum energy of 2.12 MeV, sufficient to penetrate and destroy targeted abnormal tissues. In addition, the low-abundant gamma emission of 155 keV (15%) is efficient for imaging and for dosimetric calculations. These key characteristics identify Re as an important therapeutic radioisotope for routine clinical use. Moreover, the highly reproducible on-demand availability of Re from the W/Re generator system is an important feature and permits installation in hospital-based or central radiopharmacies for cost-effective availability of no-carrier-added (NCA) Re.</p> <p>Rhenium-188 and technetium-99 m exhibit similar chemical properties and represent a "theranostic pair." Thus, preparation and targeting of Re agents for therapy is similar to imaging agents prepared with Tc, the most commonly used diagnostic radionuclide. Over the last three decades, radiopharmaceuticals based on Re-labeled small molecules, including peptides, antibodies, Lipiodol and particulates have been reported. The successful application of these Re-labeled therapeutic radiopharmaceuticals has been reported in multiple early phase clinical trials for the management of various primary tumors, bone metastasis, rheumatoid arthritis, and endocoronary interventions. This article reviews the use of Re-radiopharmaceuticals which have been investigated in patients for cancer treatment, demonstrating that Re represents a cost effective alternative for routine clinical use in comparison to more expensive and/or less readily available therapeutic radioisotopes.</p>

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