

Applicability of short-lived radiometallic nuclide for high sensitivity two-site “sandwich” immunoradiometric assay: Human growth hormone assay

Kazuko HORIUCHI,* Lin H. LIN,** Yasuhisa FUJIBAYASHI,* Vania C. BORGHI**
and Akira YOKOYAMA*

*Department of Radiopharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Kyoto University, Japan

**Institute of Energy and Nuclear Research, National Commission for Nuclear Energy, Sao Paulo, Brazil

The sensitivity of the IRMA method is limited by the specific activity (SA) of the conventionally employed radioisotopic label and high sensitivity radioimmunoassay should theoretically be attained by the use of short-lived radiometallic nuclides. Our group have achieved radiolabeling of high SA IgG by using the radiometal, gallium-67 (^{67}Ga) with a short half-life ($T_{1/2} = 78$ h) and deferoxamine (DF), a bifunctional chelating agent bound through a multispacer (dialdehyde starch, DAS) as the linker (*J Nucl Med* 32: 825, 1991). In the present work, the application of the approach is attempted by employing a two-site IRMA for human growth hormone (hGH); the monoclonal antibody to hGH (MAB2) is bound to DF via DAS and the coupled DF-DAS-MAB2 is radiolabeled with ^{67}Ga . The ^{67}Ga -DF-DAS-MAB2 of high SA (4,884 MBq/mg versus 370–518 MBq/mg calculated for radioiodinated MAB2) was thus used for the two site ‘sandwich’ ^{67}Ga -IRMA. Excellent correlation with the ^{125}I -IRMA was registered, and higher detection capability obtained by using ^{67}Ga over the ^{125}I in the hGH IRMA offered a good basis for the exploitation of short-lived radio-nuclides in the IRMA system.

Key words: high specific activity radiolabeled antibody, short half-life radiometal nuclide IRMA, ^{67}Ga -IRMA, high sensitivity hGH assay, radioactive waste disposal