Radiopharmaceuticals based on ((R) -1- ((6- hydrazinylnicotinoyl)-D-alanyl)pyrrolidin-2-yl)boronic acid (HYNIC-iFAP) for detection of fibroblast activation protein overexpression

ABSTRACT

This invention relates to new fibroblast activation protein (iFAP) inhibitory radiopharmaceuticals based on the molecule ((R)-1-((6-hydrazinylnicotinoyl)-D-alanyl)pyrrolidin-2-yl)boronic acid (HYNIC-iFAP), where the hydrazine nitrogens of HYNIC act as favorable chemical groups for the interaction of the HYNIC-iFAP molecule with phenylalanine (Phe-350 and Phe-351), glutamic acid (Glu-203 and Glu-204) and with serine (Ser-624) in the active center of fibroblast activation protein (FAP), coupled with the conventional use of HYNIC as a chelating agent for the radiometal ^{99m}Tc, where ethylenediamine diacetic acid (EDDA) is used to complete the coordination sphere of the radiometal. The new radiopharmaceutical from ^{99m}Tc-EDDA/HYNIC-iFAP (^{99m}Tc-HYNIC-iFAP) detects, with high affinity *in vivo*, FAP expressed in the microenvironment of malignant tumors of epithelial origin using nuclear medicine SPECT molecular imaging techniques.

The object of this invention is to provide a new SPECT-specific radiopharmaceutical with high sensitivity for the detection of FAP protein expression in the tumor microenvironment, based on boronPro-type inhibitors (molecular target radiopharmaceutical).

[No suitable figure]