SPECT IMAGING NANOPROBE FOR THE DETECTION OF MATRIX METALLOPROTEINASE (MMP) ACTIVITY

Achilefu, Samuel, Black, Kvar

Dahl, Lisa

T-014635

This invention is the formulation of a SPECT nanoparticle probe for the detection of MMP activity. The surface of a 10 nm-sized gold nanoparticle is functionalized through a thiol anchor with a peptide that is cleaved in the presence of MMP9. The surface is also functionalized with methoxy polyethylene glycol (mPEG) to increase colloidal stability. The DTPA is radiolabeled with In-111, and Tyrosine is radiolabeled with I-125. MMP activity can be detected by tracking the two radionuclides independently, where after the peptide is cleaved, the radiometal is released from the nanoparticle. Detection of MMP activity is relevant to a number of biological processes and diseases, including cancer and acute lung injury.