Multifunctional Fe₃O₄ nanoparticles for targeted bi-modal imaging of pancreatic cancer

Cristina I. Olariu, Humphrey H. P. Yiu, Laurent Bouffier, Taoufik Nedjadi, Eithne Costello, Steve R. Williams, Christopher M. Halloran and Matthew J. Rosseinsky

a Department of Chemistry, University of Liverpool, Crown St, Liverpool, L69 7ZD, United Kingdom. Fax: +44-151-794-3589; Tel: +44-151-794-3711; E-mail: m.j.rosseinsky@liverpool.ac.uk

b current address: Chemical Engineering, School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, EH14 4AS, United Kingdom.

c current address: Université Bordeaux, ISM, ENSCBP, 33607 Pessac, France.

d Department of Molecular and Clinical Cancer Medicine, 5th Floor UCD Building, Royal Liverpool University Hospital, Daulby St, Liverpool, L69 3GA, United Kingdom. Fax: +44-151-706-5798; Tel: +44-151-706-2585; E-mail: halloran@liverpool.ac.uk

e Imaging, Proteomics and Genomics Research Group, University of Manchester, Oxford Road, Manchester, M13 9PT, United Kingdom.

Address correspondence to: m.j.rosseinsky@liverpool.ac.uk or halloran@liverpool.ac.uk

Figure S1. TGA thermograms of Fe₃O₄-NH₂ (solid line) and Fe₃O₄-NH₂-COOH (dotted line) nanoparticles. The corresponding weight losses are 2.03% in Fe₃O₄-NH₂ against 3.08% in Fe₃O₄-NH₂-COOH.
**Figure S2.** TEM images of (a) Fe₃O₄ nanoparticles and (b) Fe₃O₄-NH₂/COOH nanoparticles. Scale bar represents 200 nm. Inset shows the corresponding size distribution of 25 ± 5 nm (Fe₃O₄) and 24 ± 4 nm (Fe₃O₄-NH₂/COOH) calculated from 400 nanoparticles. Hydrodynamic size obtained from DLS for (c) Fe₃O₄ nanoparticles; (d) Fe₃O₄-NH₂/COOH and (e) Fe₃O₄-NH-RITC/COOH. The average hydrodynamic size is 164 ± 6 nm for Fe₃O₄, 142 ± 8 nm for Fe₃O₄-NH₂/COOH and 154 ± 6 nm for Fe₃O₄-NH-RITC/COOH.
Figure S3. Schematic comparison on the size of RITC molecules and the distance between amine groups on the surface of bifunctionalized Fe₃O₄-NH₂/COOH nanoparticles.

Figure S4. Bright field and fluorescence images showing the examination of EPCAM expression on Panc-1 cells by immunofluorescence labeling. The cell nuclei were stained with DAPI (blue) and the expression of the EPCAM receptors was labeled by rabbit anti-mouse IgG Cy3 conjugate.
Figure S5. Antibody concentration measured by Bradford assay and matched to the calibration curve. The curve does not pass through zero because the assay solution is colored and absorbs at 595 nm.