ELECTRONIC SUPPLEMENTARY INFORMATION.

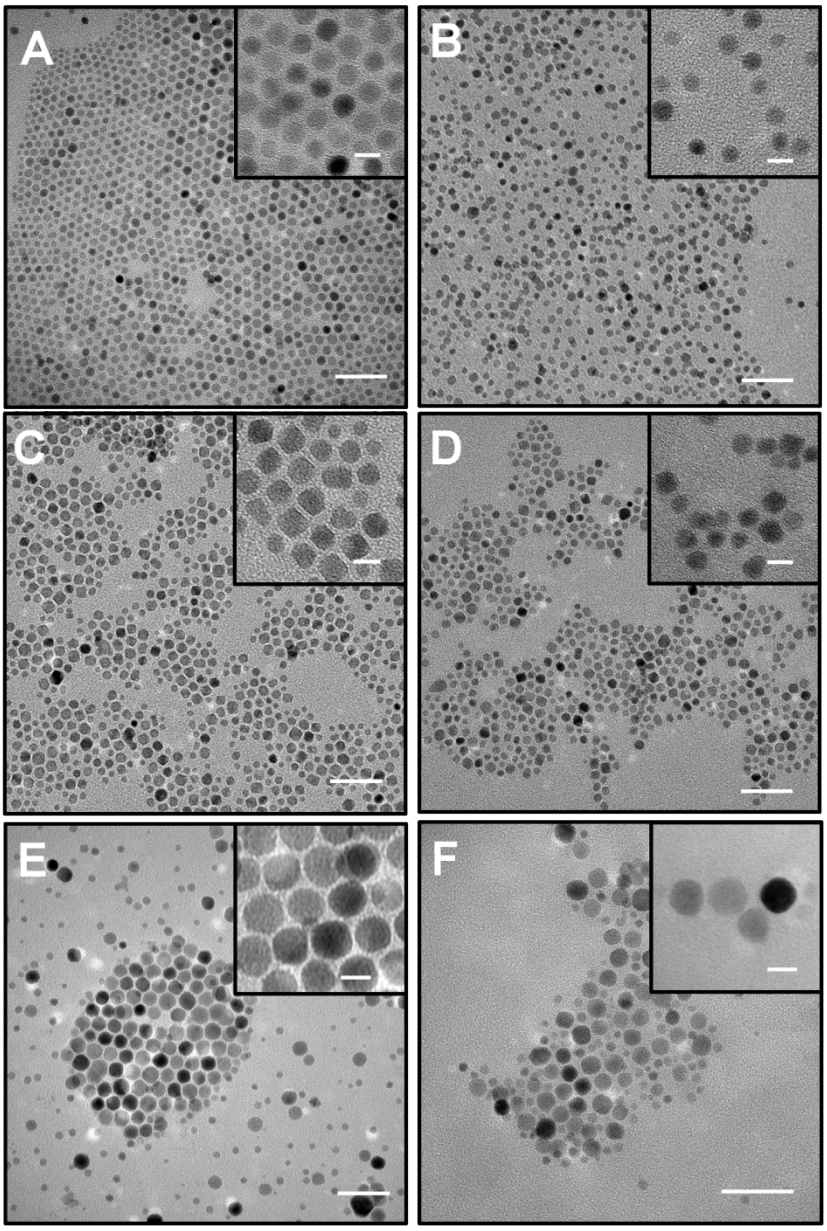

Fig. S1. Representative TEM images at low magnification of 7.5, 9 y 12 nm magnetic nanoparticles capped with oleic acid (left panel: A, C, E) and capped with 3kDa PEGylated gallol anchor (right panel: B, D and F). Insets correspond to high magnification TEM images of nanoparticles. Scale bars correspond to 50 nm for TEM images at low magnification, and 10 nm for high magnification images.

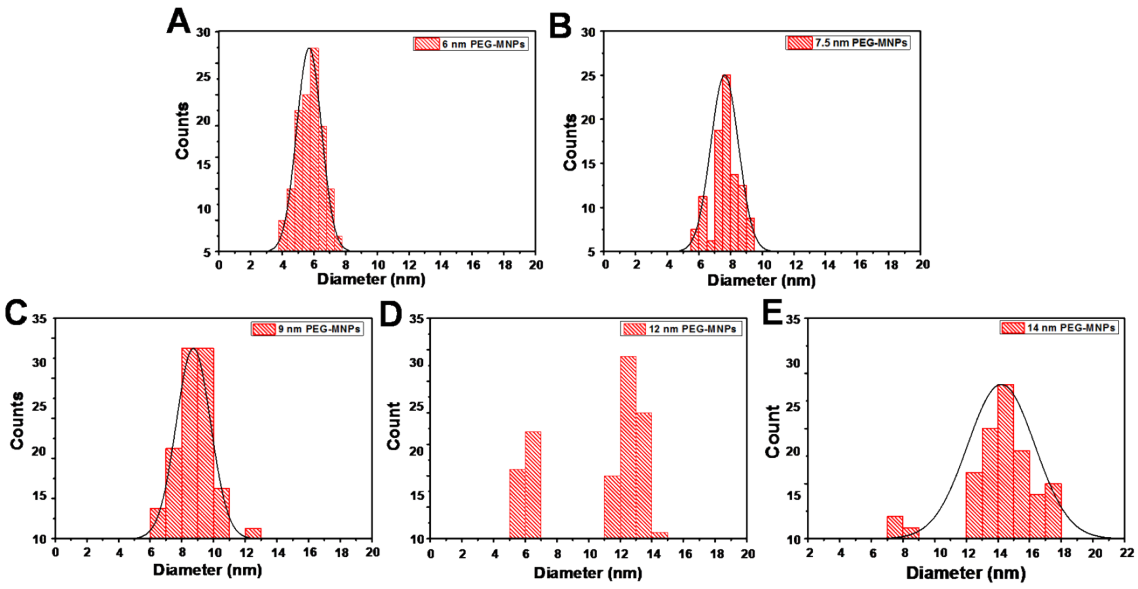

Fig. S2. Statistics on the TEM sizes of A) 6 nm, B) 7.5 nm, C) 9 nm, D) 12 nm and E) 14 nm PEGylated manganese ferrite nanoparticles.

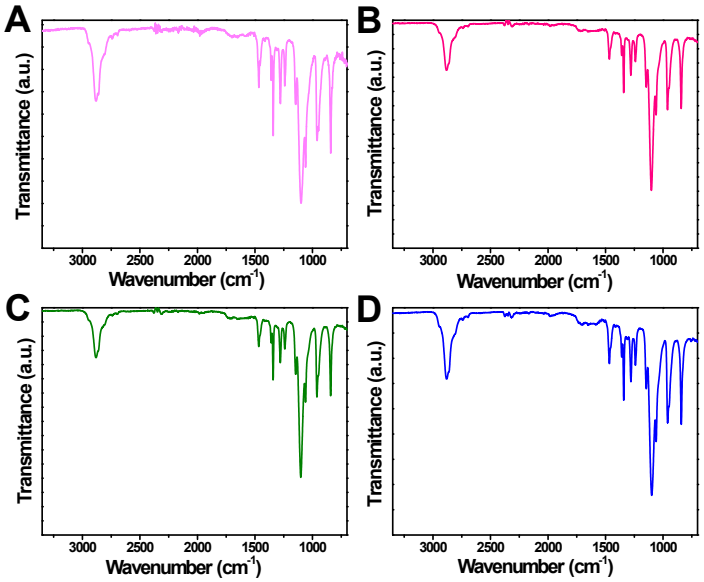

Fig. S3. FTIR spectra of A) 6 nm, B) 7.5 nm, C) 9 nm, D) 12 nm and E) 14 nm PEGylated manganese ferrite nanoparticles

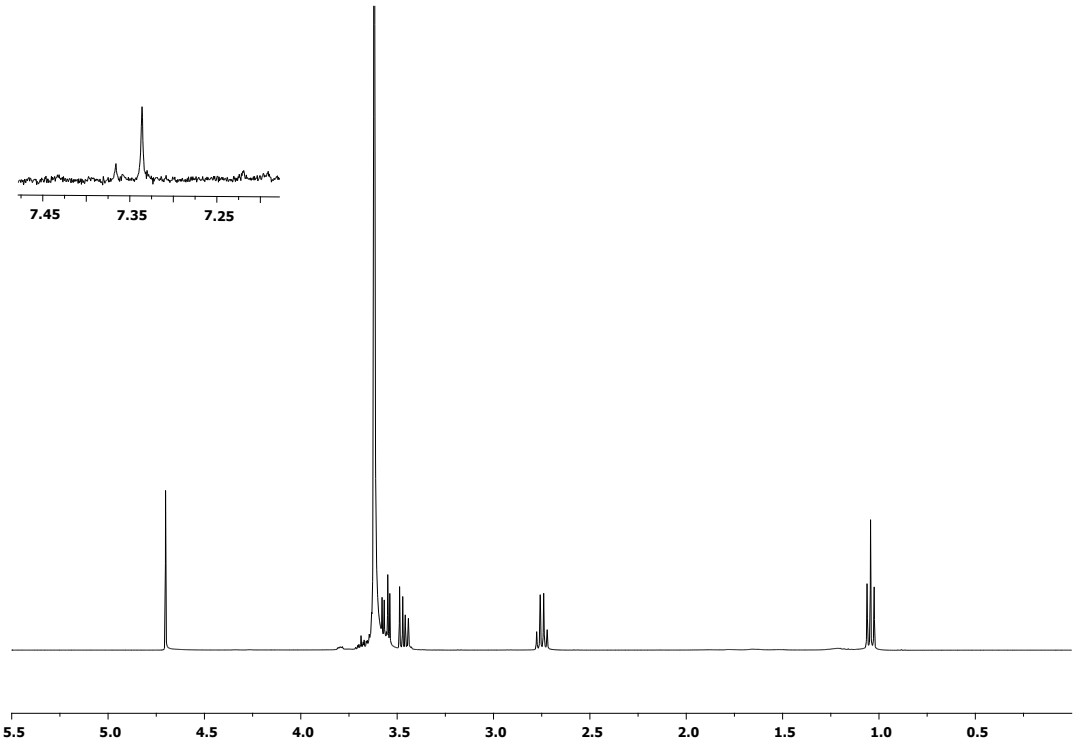

Fig. S4. ^{1}H NMR (400 MHz, D_2O) of the filtrate solution from the centrifuge filter device (cutoff: 100 kDa) during the purification process of the PEGylated MNPs. The filtrate solutions was free-dried and re-suspended in D2O. The spectrum ^{1}H 400 MHz NMR shows the characteristic peaks of the gallol-derived PEG, δ (ppm): 7.32 (Gallol-derived), 3.7-3.4 (PEG), and the presence of triethylamine δ (ppm): 2.7 (CH2), 1.0 (CH3).

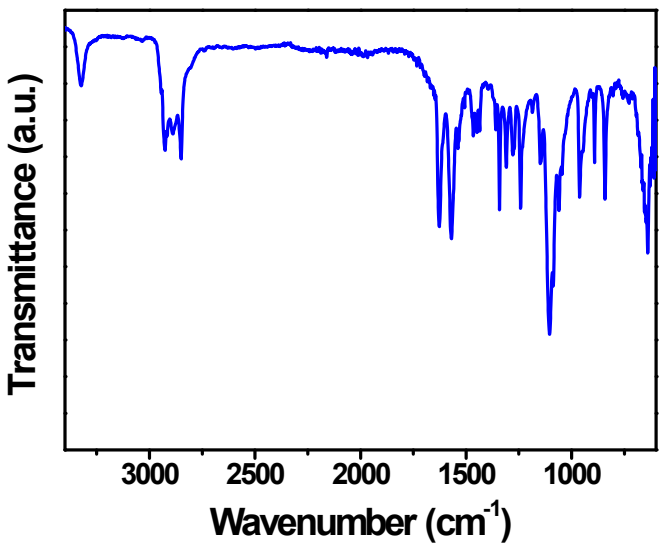

Fig. S5. FTIR spectrum of the filtrate solution from the centrifuge filter device (cutoff: 100 kDa) during the purification process of the PEGylated MNPs. The filtrate solution

dried on a glass slide, showing the characteristic peaks of the Gallol-PEG-OH with the presence of the peaks of the base triethylamine.

MNP	molecules/nm^2
6 nm	1.1
7.5 nm	1.0
9 nm	1.4
12 nm	2.3
14 nm	2.8

Table S1. Dispersant packing density on magnetic nanoparticles.

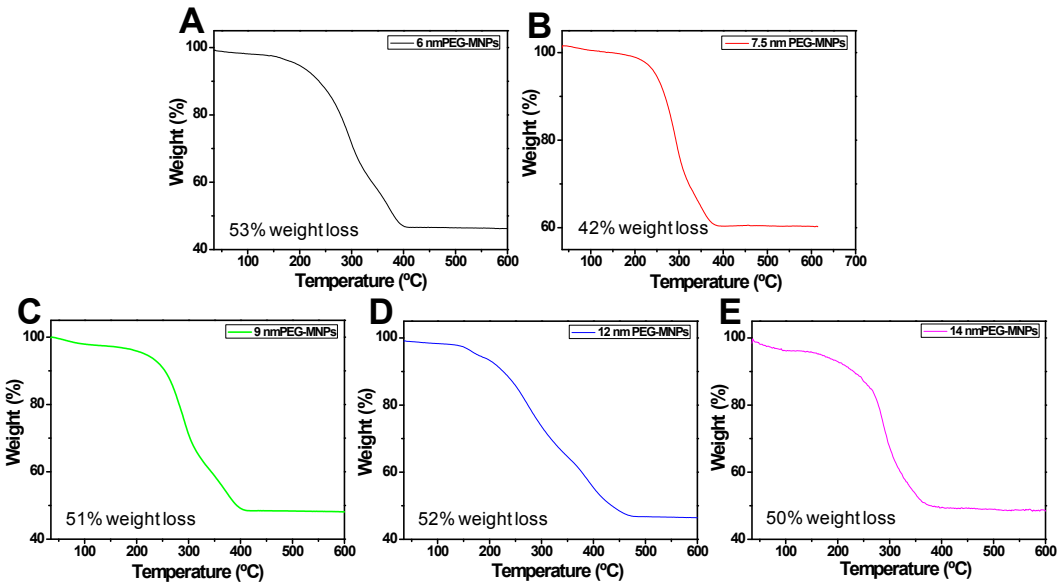

Fig. S6. Thermogravimetric analysis of A) 6 nm, B) 7.5 nm, C) 9 nm, D) 12 nm and E) 14 nm PEGylated manganese ferrite nanoparticles.

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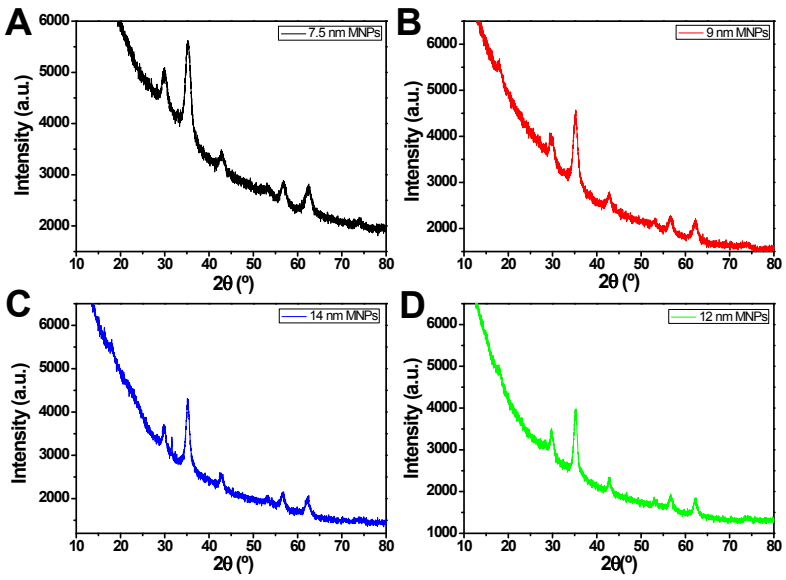

Fig. S7. XRD patterns of A) 7.5 nm, B) 9 nm, C) 12 nm and D) 14 nm oleic acid capped manganese ferrite nanoparticles.

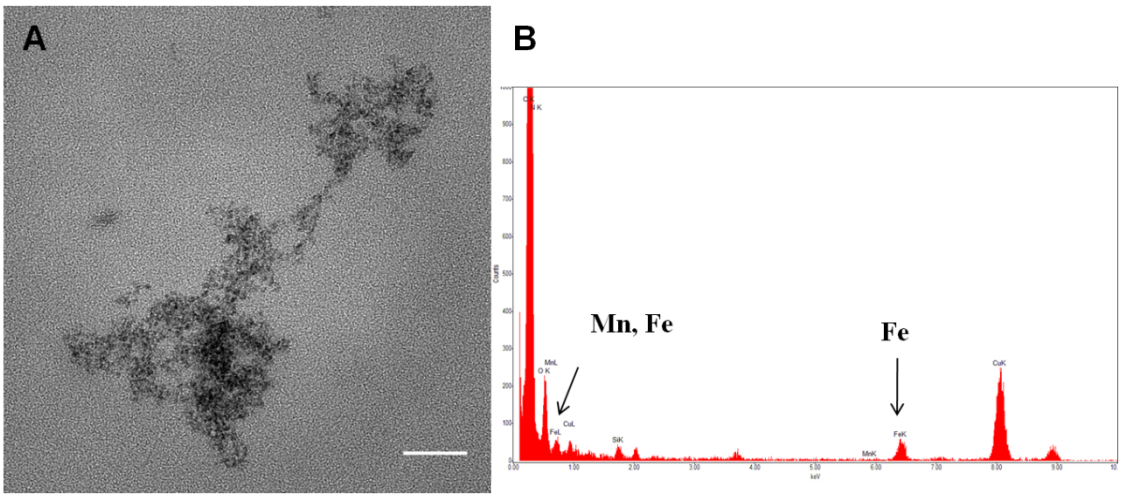

Fig. S8. A) TEM image of excreted 6 nm MNP through the urine after purification and concentration by centrifugal PALL filter (MWCO: 100 kDa). Scale bars correspond to 50 nm. B) EDX spectrum of excreted 6 nm MNPs.