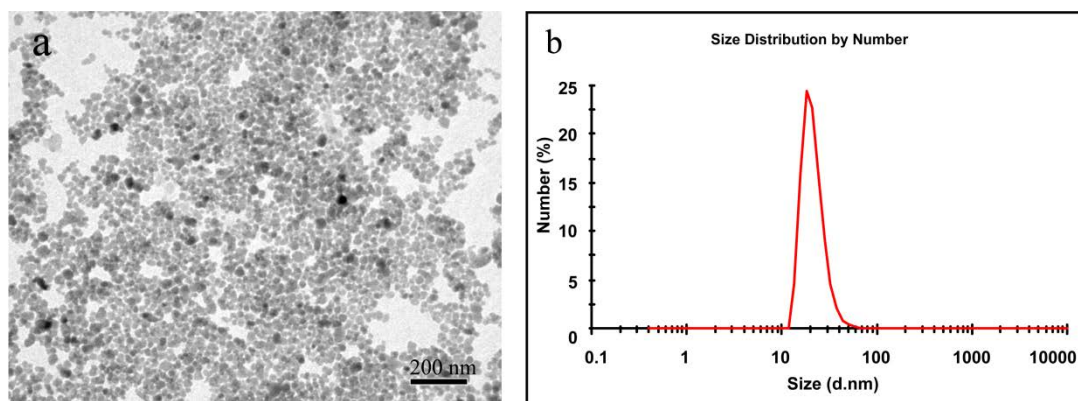
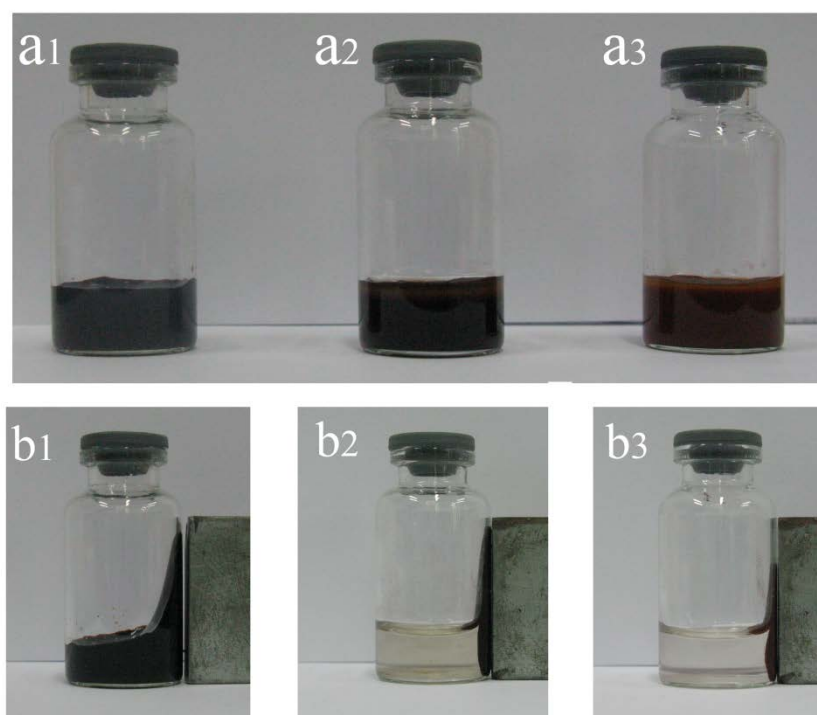


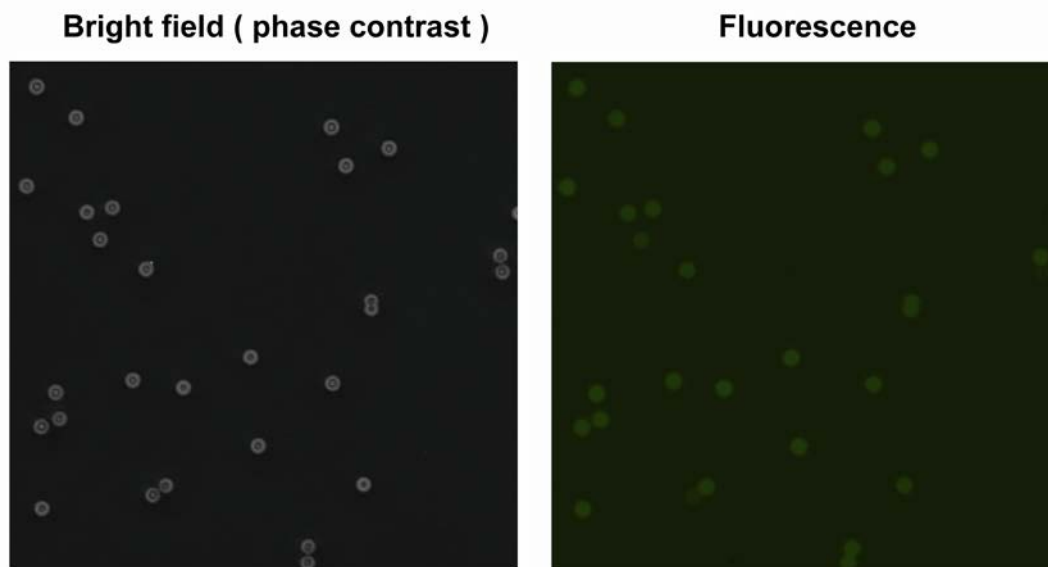
## Supporting information



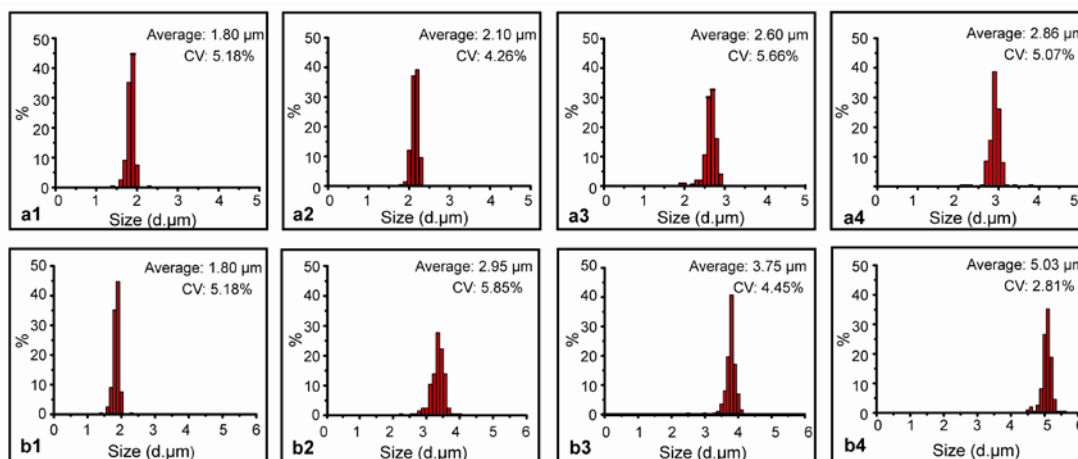
**Fig. S1** TEM images (a) and the size distribution curve (b) of the  $\text{Fe}_3\text{O}_4$  nanoparticles dispersed in ferrofluids.



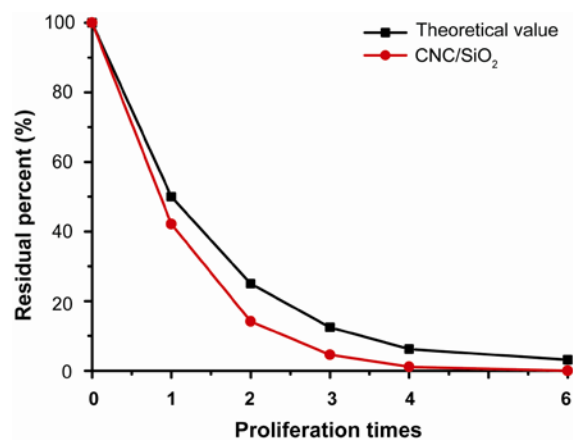
**Fig. S2** Photographs of the ferrofluids (a1, b1), CNC-UF microspheres (a2, b2) and CNC/silica microspheres (a3, b3) dispersed in water: b1, b2, b3 under an external magnetic field.



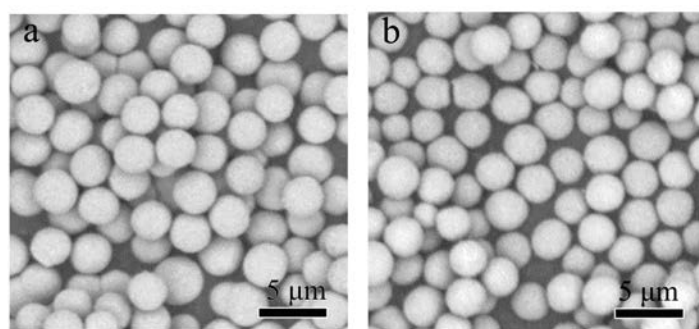
**Fig. S3** Phase contrast photomicrograph and fluorescent photograph of the FITC-BSA conjugated CNC/silica microspheres with 488 nm excitation.



**Fig. S4** Size distribution of the CNC-UF microspheres in Figure 1.



**Fig. S5** Relationship between the theoretical (without exocytosis) and practical intracellular iron concentration variations as the cell proliferation times.



**Fig. S6** SEM images of CNC-UF/silica microspheres (a) before calcination, (b) after calcination.