Iron oxide ferromagnetic nanoparticles functionalized with mPEG-CN and L-Lysine bind efficiently to cells *in vitro*.

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Iron oxide nanoparticles were synthesized using an alkaline coprecipitation protocol under N2 atmosphere in order to produce cell-adherent ferromagnetic particles (CAFP). To promote functionalization and biocompatibility, methoxypolyethylene glycol activated with cyanuric chloride was added to nanoparticle suspensions and stirred for one hour at room temperature. mPEG-CN is a polymer which adheres to surface of nanoparticles, improving biocompatibility. In addition, it reacts predominantly with amine groups such as found on L-lysine, forming a biocompatible shell. L-Lysine is well-know aminoacid whose positive (in physiologic pH) charge will bind to cell surfaces. mPEG-CN coated particles were washed with ethanol to remove excess and further washed three times in sterile deionized water. L-Lysine solution (1mg/mL) was added (1:50, v/v) in five steps of five minutes each to NP and kept under sonication. Subsequently this particle suspension was added (100µL in a 25cm^2 culture flask) to a human melanoma cells (SK-MEL-37) culture and incubated for 24 hours at 37°C (5% CO_2). The nanoparticles were characterized by FTIR, x-ray diffraction and zeta potential. By optical microscopy it was possible to verify that the nanoparticles adhered to the cell membrane and no changes in cell morphology were observed. mPEG-CN and L-Lysine functionalization was shown to be useful to produce CAFP. Further studies will use this protocol to perform magnetic levitation cell cultures.