Supporting Information

Flow-Mediated Stem Cell Labeling with Superparamagnetic Iron Oxide Nanoparticle Clusters

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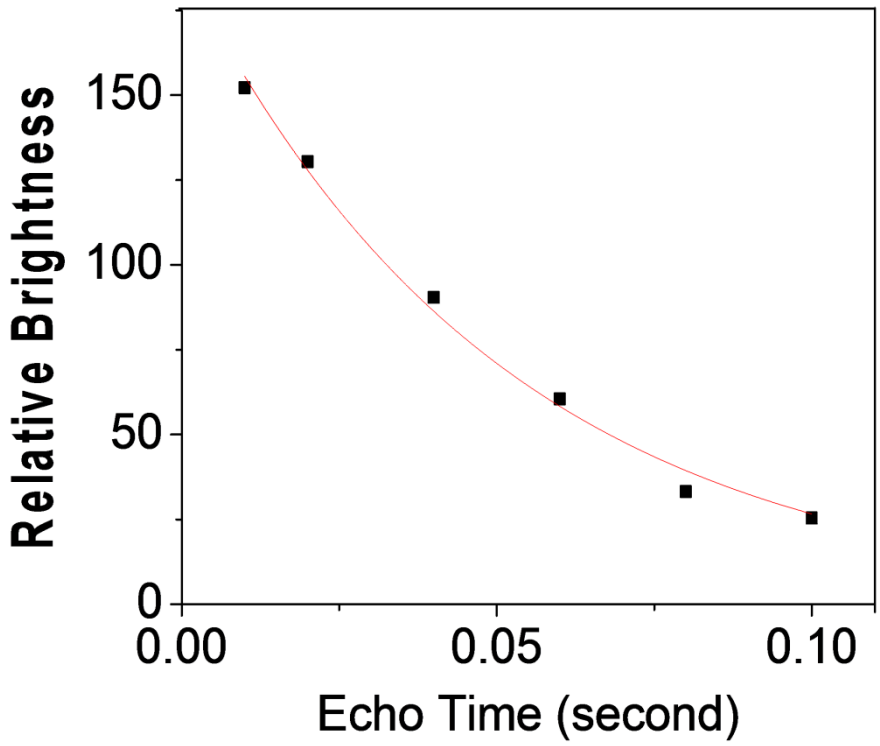

Figure S1. Example plot of hypointensity changes versus echo time. Exponential fit was used to calculate $1/T_2$.

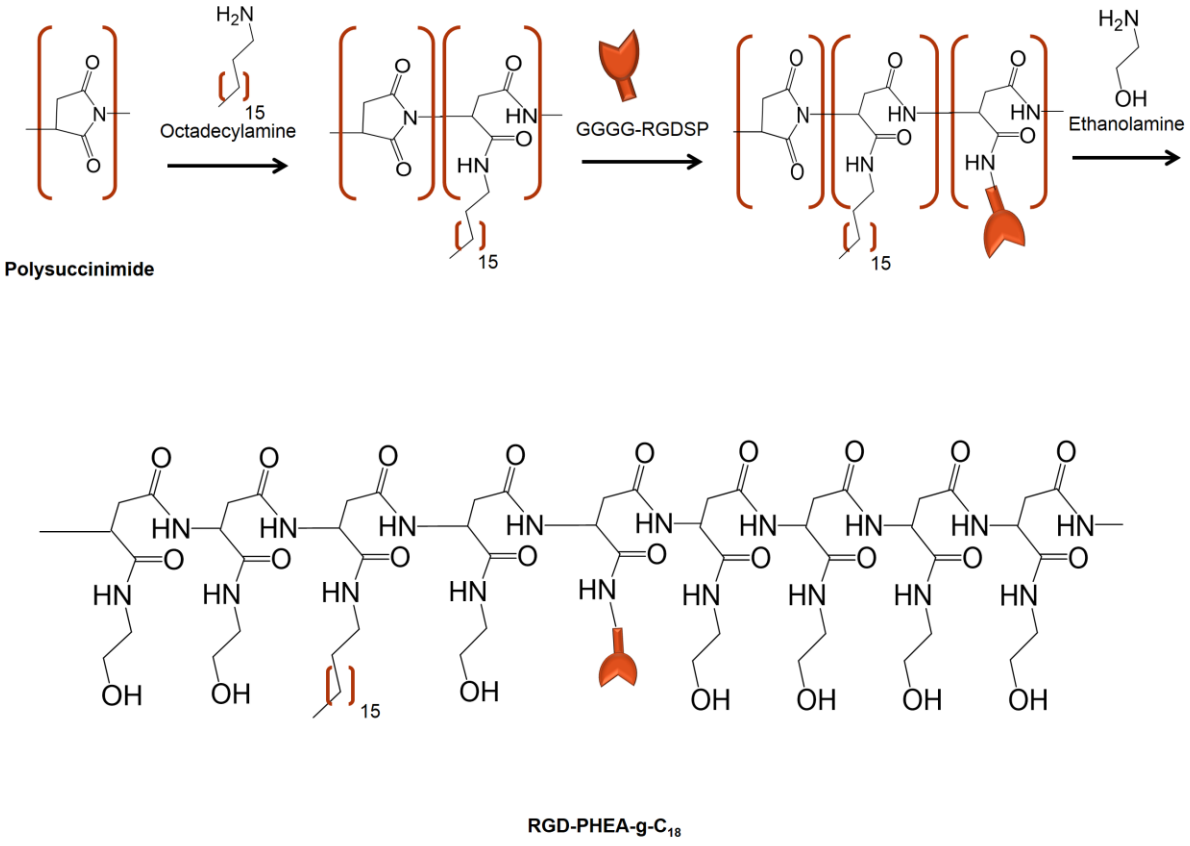

Figure S2. Scheme for synthesizing RGD-PHEA-g-C_{18}.

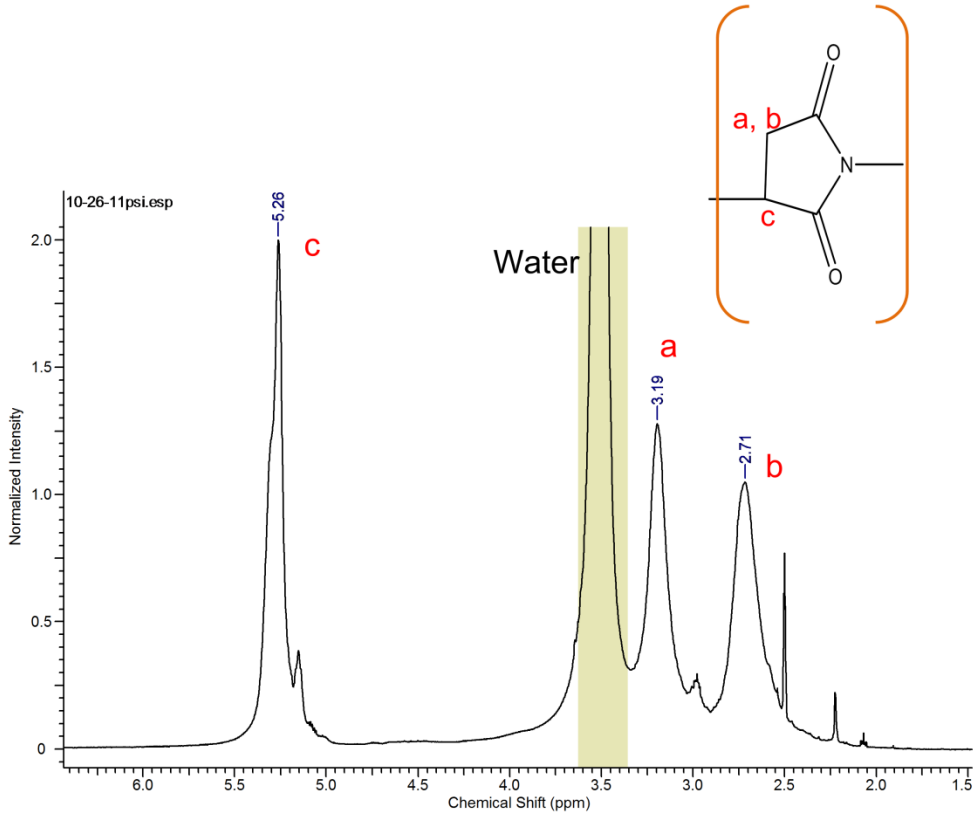

Figure S3. ^{1}H-NMR spectrum for polysuccinimide.

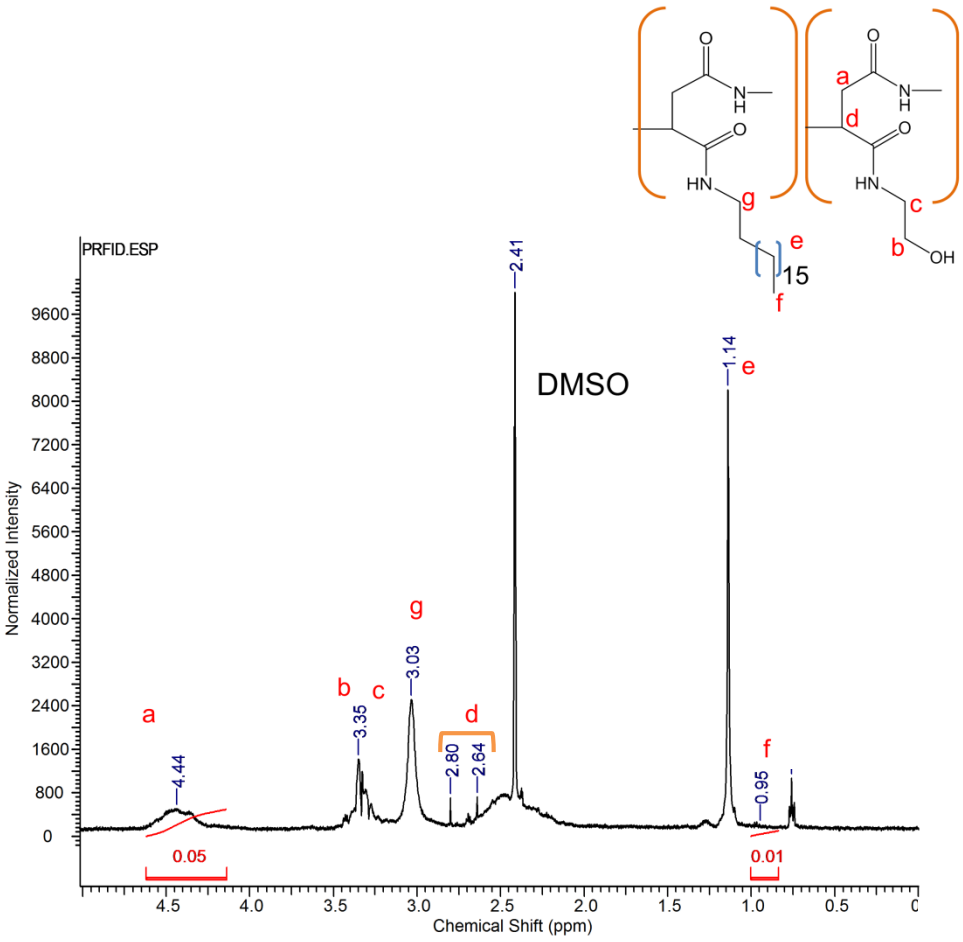

Figure S4. ^{1}H-NMR spectrum for PHEA-g-C_{18}.

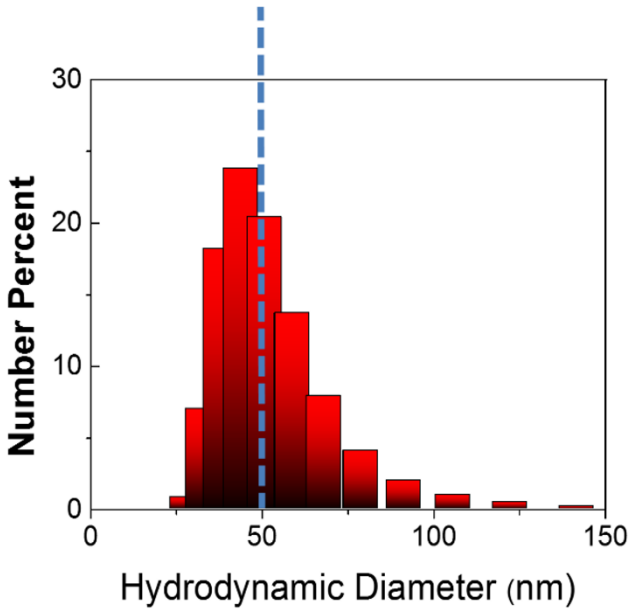

Figure S5. Size distribution for RGD-SPIO clusters as characterized by DLS. A blue dotted line is noted at 50 nm, which is considered the upper limit for receptor-mediated endocytosis.

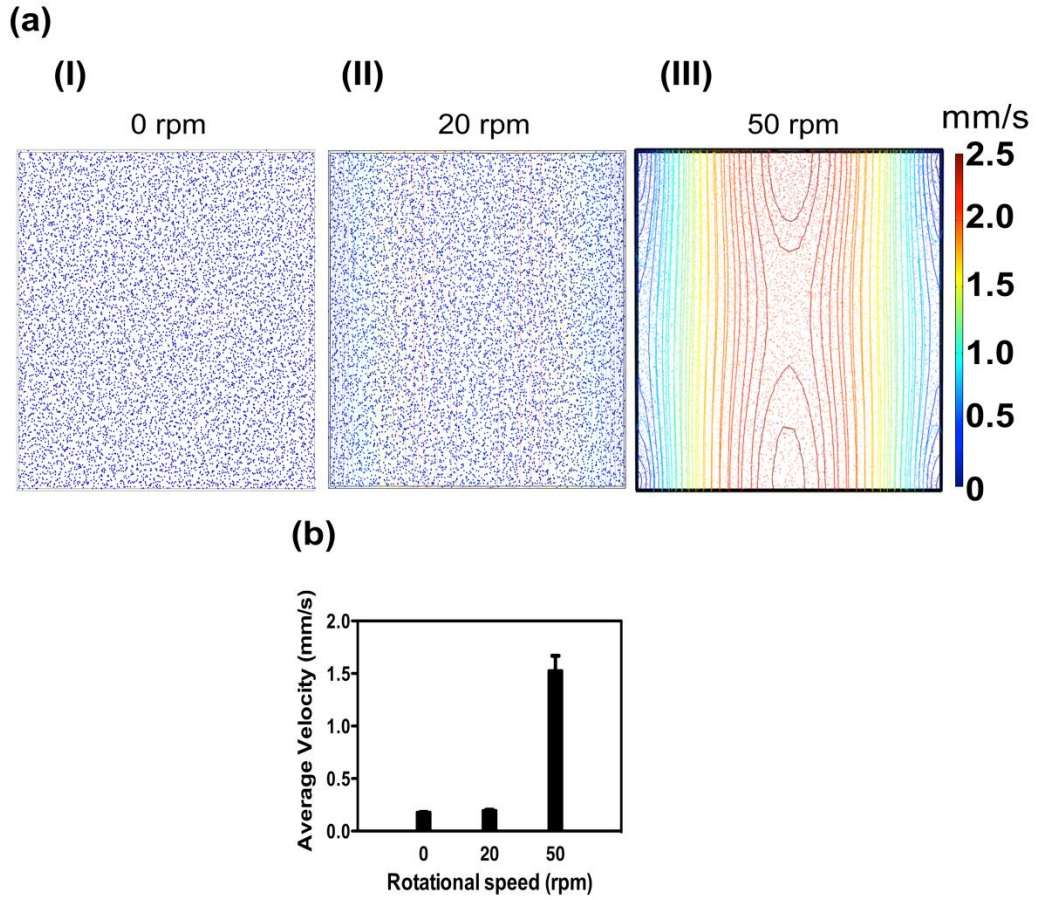

Figure S6. Computational analysis of particle movement in T25 culture flask. (a) Simulated particle velocity magnitude in culture plate with orbital shaking at 0 (I), 20 (II), and 50 (III) rpm, respectively. (b) Average particle velocity with different rotational speeds.

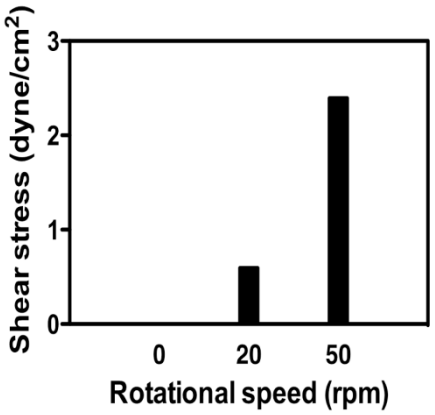

Figure S7. Maximum shear stress at the bottom of a T25 flask with rotational speeds.

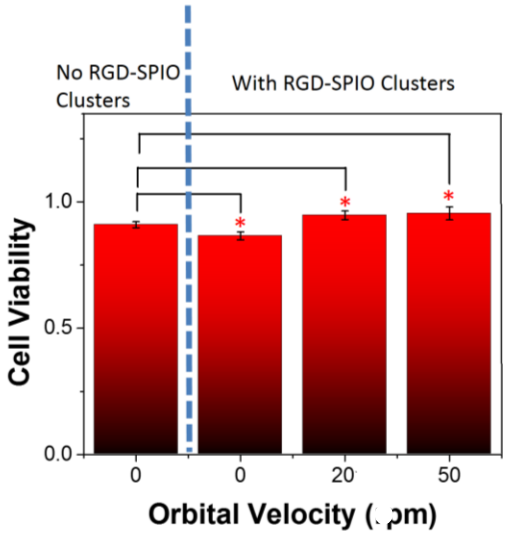

Figure S8. Cell viability under different orbital velocities, as quantified through Trypan Blue assay. RGD-SPIO cluster concentration was kept constant at 0.32 mM Fe. * corresponds to $p > 0.05$.

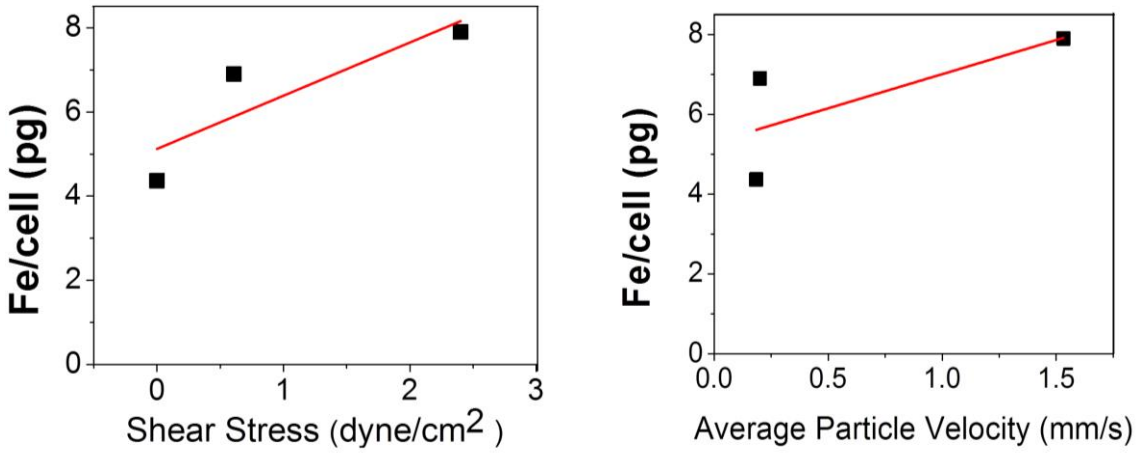

Figure S9. Iron content per cell correlates linearly with shear stress (R^2 =0.75). In contrast, the iron content per cell was not linearly correlated with average RGD-SPIO cluster velocity (R^2= 0.52).

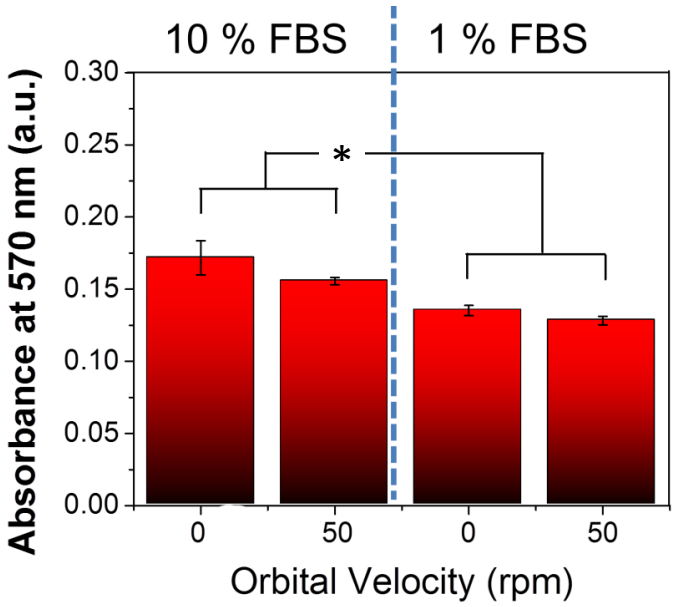

Figure S10. Changes in cell proliferation for different orbital velocities and FBS concentrations. Here, greater absorbance values correspond to a greater degree of metabolic activity. The difference of values between conditions is statistically significant (*$p < 0.05$).