Supporting information

An Experimental Single-Platform Approach to Enhance Functionalization of Magnetically Targetable Cells

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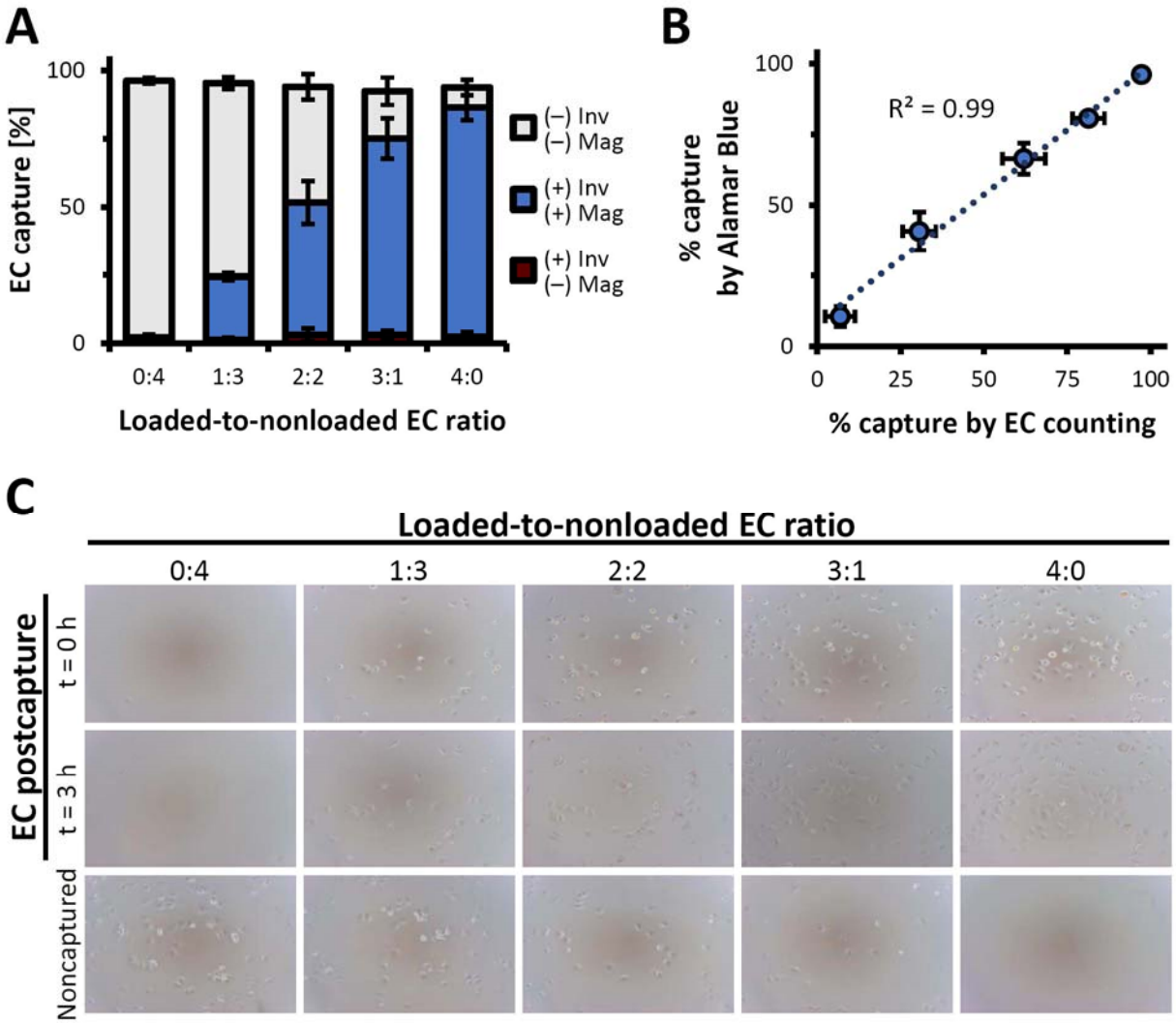
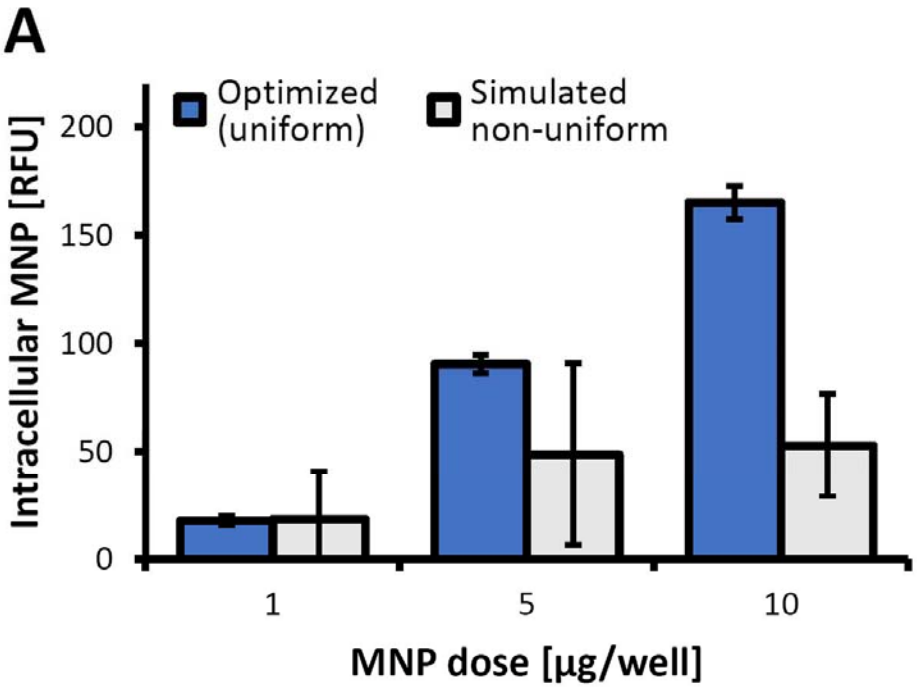


Figure S1. Validation of performance and specificity of the inverted-plate assay for the characterization of cells functionalized with MNP for magnetic guidance. (**A**) EC capture from binary suspensions comprised of MNP-loaded and non-loaded EC admixed at various ratios, with or without plate inversion (+/- Inv) or exposure to the magnetic field (+/- Mag) for 30 min. **(B**) Quantification of captured EC by the Alamar Blue assay vs. manual cell counting. (**C**) Representative micrographs of captured EC taken 0 and 3 hr after a 30-min exposure to the magnetic field, showing stable cell attachment and spreading. Non-captured EC remaining in suspension after exposure to the magnetic field were plated and imaged 30 min later.



B

	1 µg/well			5 µg/well			10 µg/well		
Optimized (uniform)	18.4 ± 0.7	19.0 ± 0.8	20.5 ± 0.9	88.8 ± 4.1	91.8 ± 3.6	89.5 ± 1.8	170.9 ± 3.8	169.6 ± 4.8	162.9 ± 5.1
	19.0 ± 0.9	18.7 ± 0.8	19.2 ± 0.3	92.6 ± 3.3	95.1 ± 3.1	91.7 ± 1.5	169.7 ± 3.2	173.3 ± 6.2	164.7 ± 6.4
	14.8 ± 0.9	14.9 ± 0.8	15.7 ± 0.5	89.7 ± 1.2	89.5 ± 1.8	85.9 ± 2.3	159.4 ± 4.7	159.9 ± 6.3	156.0 ± 5.3
Simulated non-uniform	-0.5 ± 0.8	6.3 ± 0.7	36.4 ± 0.3	1.0 ± 6.1	5.2 ± 7.1	27.6 ± 7.9	19.1 ± 21.0	39.5 ± 17.7	52.3 ± 19.6
	1.1 ± 4.1	22.3 ± 5.8	66.7 ± 4.1	20.2 ± 11.8	77.9 ± 15.2	97.2 ± 16.0	83.7 ± 10.8	71.1 ± 14.4	36.9 ± 13.4
	-1.3 ± 4.4	5.3 ± 5.7	29.8 ± 3.5	22.7 ± 11.7	86.6 ± 33.6	100.0 ± 39.8	29.9 ± 7.1	64.3 ± 7.0	78.7 ± 6.2

Figure S2. Detailed fluorimetric analysis of the uniformity of cell loading with MNP. (**A**) Intracellular MNP-associated fluorescent signal averaged from nine fluorimetric measurements throughout the well. (**B**) Local fluorescence intensities comparatively showing distribution of MNP throughout the well for cells loaded using the uniform *vs*. non-uniform processes. The color intensity corresponds to the fluorescent signal.

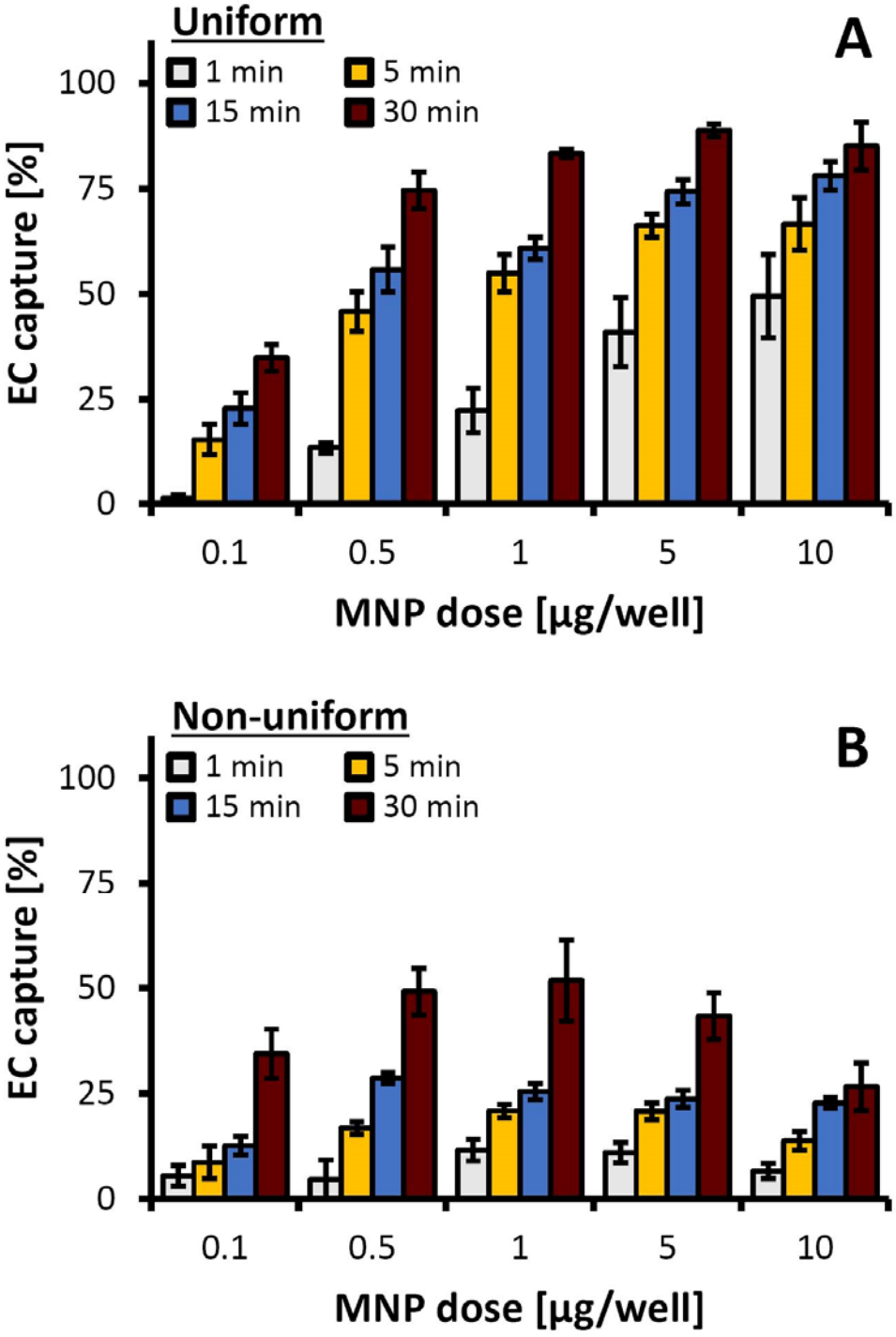


Figure S3. EC capture *via* the inverted-plate assay for EC loaded using (top) the optimized (uniform) procedure and (bottom) the simulated, non-uniform procedure as a function of MNP dose and exposure duration.

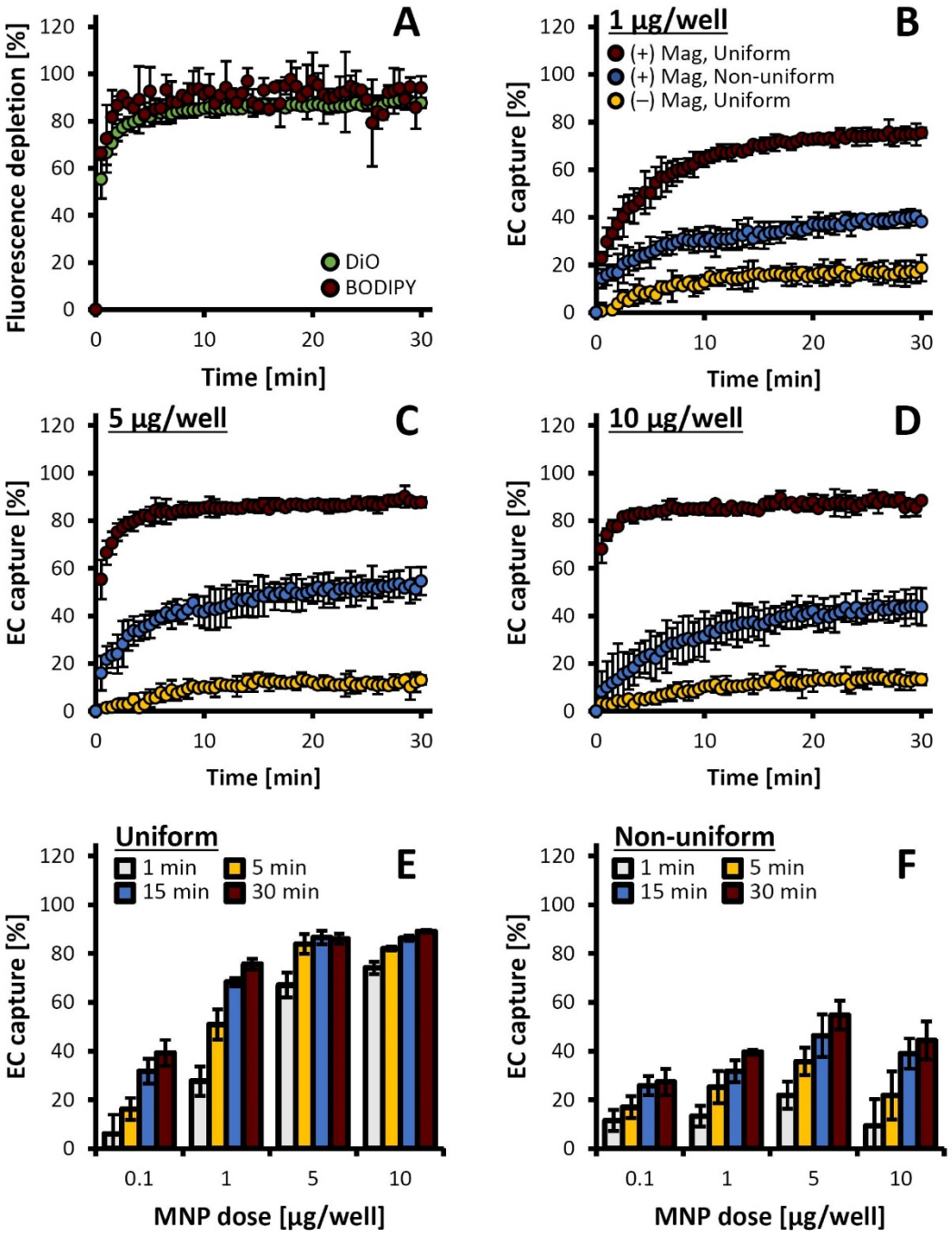


Figure S4. Magnetic responsiveness of MNP-loaded EC characterized using the depletion-based magnetophoresis assay. (**A**) The fluorescence of intracellular MNP labeled with $BODIPY_{558/568}$ and of EC labeled with DiO were monitored simultaneously. EC were loaded uniformly using 5 µg of $BODIPY_{558/568}$-labeled MNP per well. Data are presented as percent decrease of the initial fluorescence intensity. (**B-D**) Capture kinetics within and without the magnetic field exposure of EC loaded with (B) 1 µg MNP/well, (C) 5 µg MNP/well, and (D) 10 µg MNP/well using the two cell loading procedures. (**E-F**) Cell capture efficiencies of EC shown as a function of MNP dose (0.1-10 µg/well) and magnetic exposure duration (1-30 min) are shown for EC loaded using the (E) optimized (uniform), and the (F) simulated, non-uniform loading procedures.