

Supporting Information

Label-Free Magnetic Field-Assisted Assembly of Layer-on-Layer Cellular Structures

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1.

Table S1. Comparison of cell assembly techniques

Method	Advantages	Disadvantages
Hanging drop	<ul style="list-style-type: none">• Relatively inexpensive• Simple to perform• Uniform aggregate size	<ul style="list-style-type: none">• Time-consuming (24 - 48 h for aggregates to form)• Long-term culture difficult• Medium exchange difficult• Difficult to image
Spinner flasks	<ul style="list-style-type: none">• Simple to perform• Suited to long-term culture	<ul style="list-style-type: none">• No control on the uniformity of aggregates• Difficult to image• Aggregates exposed to high shear stress
AggreWell	<ul style="list-style-type: none">• Simple to perform• High yield• Control on aggregate size	<ul style="list-style-type: none">• Time-consuming (24 - 48 h for aggregates to form)• Difficult to isolate single aggregates for high throughput tests and assays
Label-free magnetic manipulation	<ul style="list-style-type: none">• Simple to perform• Rapid formation• Control on cell organization• Suited for high throughput tests and assays	<ul style="list-style-type: none">• Concentration dependent cytotoxicity of the paramagnetic agent

2.

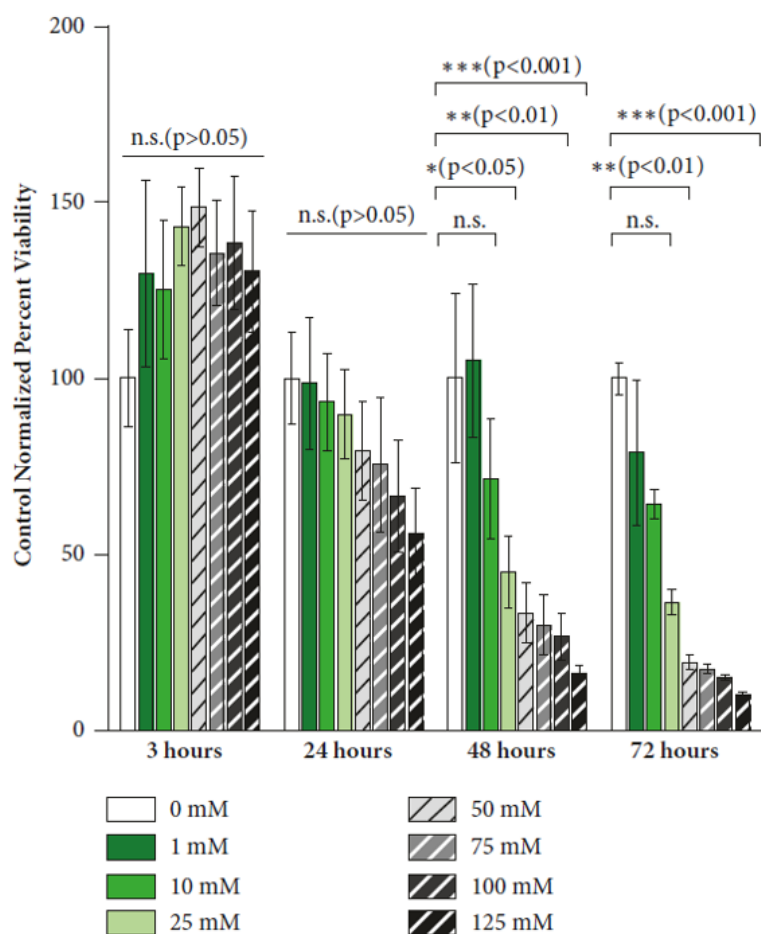


Figure S1. Effect of Gd-DTPA on the MCF-7 cell viability. The metabolism of cells exposed to different Gd-DTPA concentrations is measured by MTT assay at 3, 24, 48 and 72 h. The absorbance values (assumed to be directly proportional to the number of viable cells) are expressed as a percentage of the control (cells incubated in Gd-DTPA-free medium). A two-way ANOVA with Bonferroni post-test is used to evaluate the relative differences in viability for each concentration of Gd-DTPA. A $p < 0.05$ is considered to be statistically significant. Reprinted with permission from ref. 30 Copyright 2019 Research.

3.

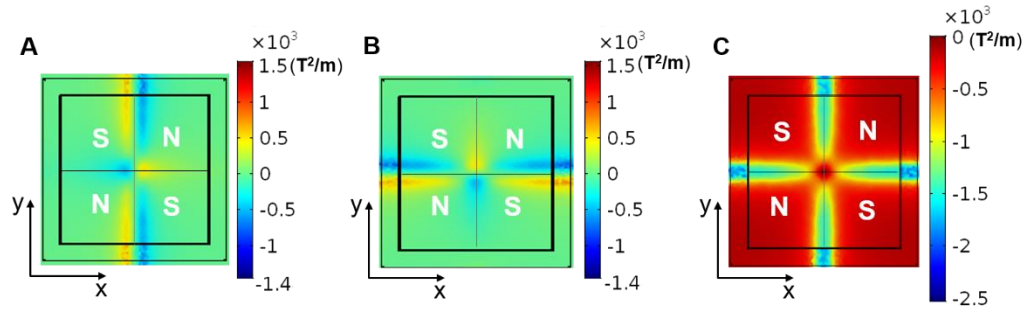


Figure S2. The spatial distribution of A) x, B) y and C) z components of the $(\mathbf{B} \cdot \nabla)\mathbf{B}$ term of the magnetic force in the x-y plane along the surface of a well.

4.

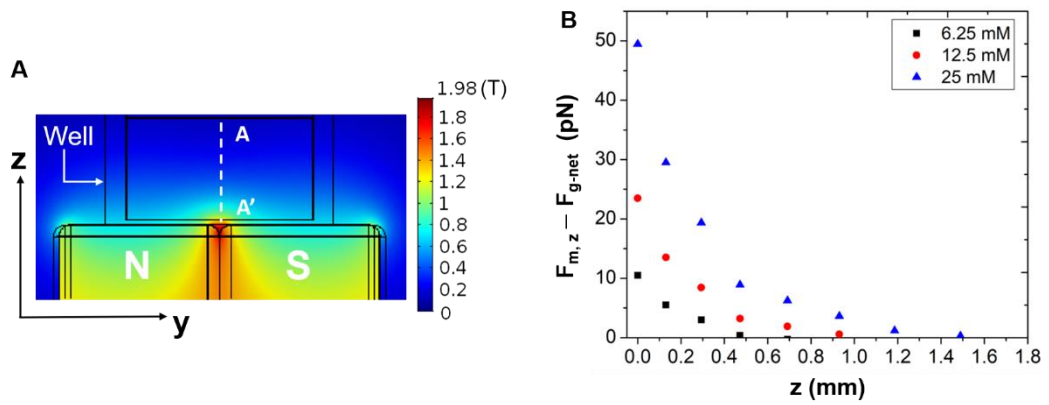


Figure S3. A) Magnetic flux density distribution in the z-y plane at the boundary of a well. B) The variation in $F_{m,z} - F_{g-net}$ along the axis AA' for 6.25, 12.5 and 25 mM Gd-DTPA solution. The levitation height for each concentration is given by the respective z-intercept.