# Direct Cell Surface Modification with DNA for the Capture of Primary Cells and the Investigation of Myotube Formation on Defined Patterns

*Sonny C. Hsiao,[a] Betty J. Shum,[a] Hiroaki Onoe,[a] Erik S. Douglas,[b] Zev J. Gartner,[a] Richard A. Mathies,[a] Carolyn R. Bertozzi[a,c,d,e] and Matthew B. Francis[a,e*]*

*[a]Department of Chemistry, [b]UCSF/UC Berkeley Joint Graduate Group in Bioengineering, [c]Department of Molecular and Cell Biology, [d]Howard Hughes Medical Institute, University of California, Berkeley, and [e]Materials Sciences Division, Lawrence Berkeley National Labs, Berkeley, California 94720-1460.*

francis@cchem.berkeley.edu

**Supporting Information**

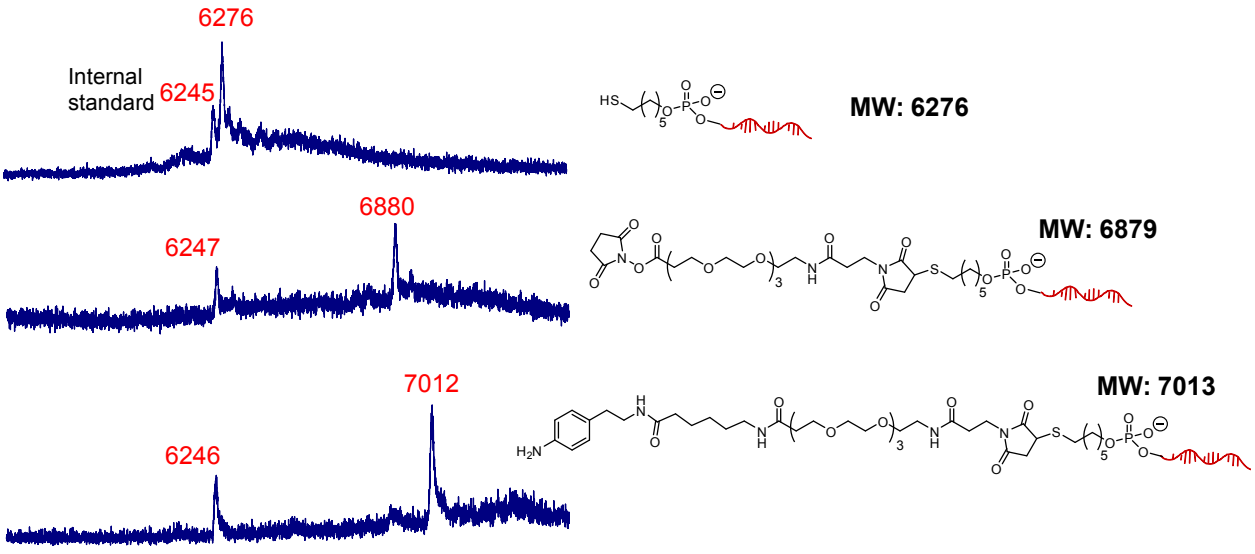


**Figure S1.** Matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) mass spectrometry of DNA modification reactions. A model amine compound was found to react with the NHS ester, verifying the formation of amides on the cell surfaces.

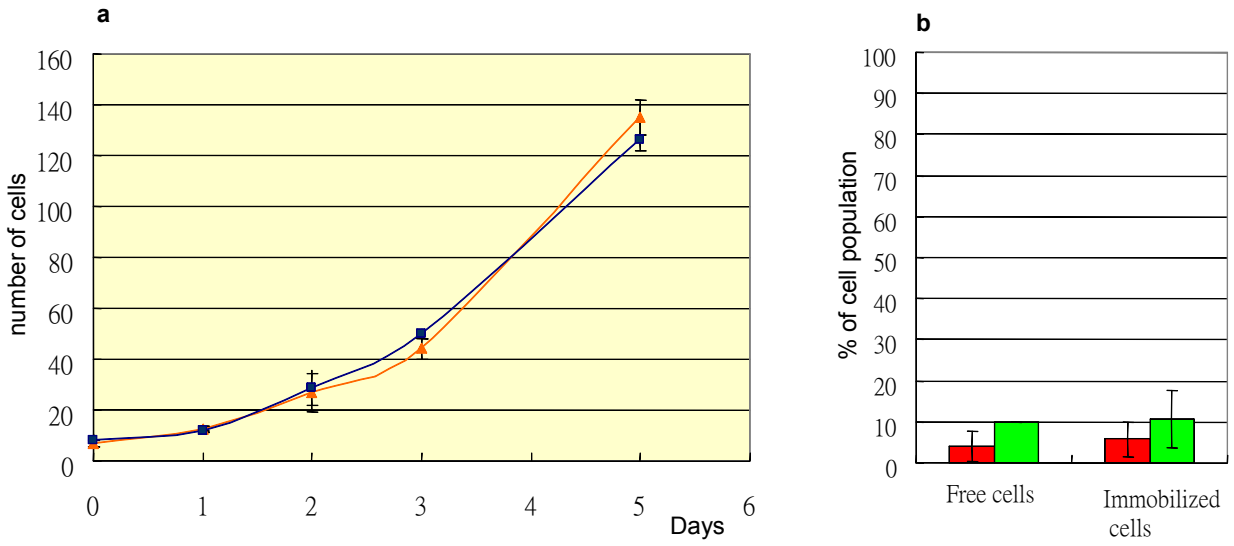


**Figure S2.** Viability of Jurkat cells modified with NHS-DNA. **a)** A sample of cells bearing 20-nucleotide DNA sequences was combined with the complementary strands in solution. At various time points the total number of cells was counted visually (blue curve). The control sample (orange curve) consisted of unmodified Jurkat cells grown in the absence of added DNA. **b)** To evaluate viability after attachment, DNA-modified cells were immobilized on glass slides bearing the strand complement. After immobilization for 24 h and 48 h, the cells was incubated with a solution of annexin V-FITC (green bars) and PI (red bars). The cells were evaluated within 1 h using fluorescence microscopy. Free cells were control samples that lacked surface DNA and were not bound to the slides.

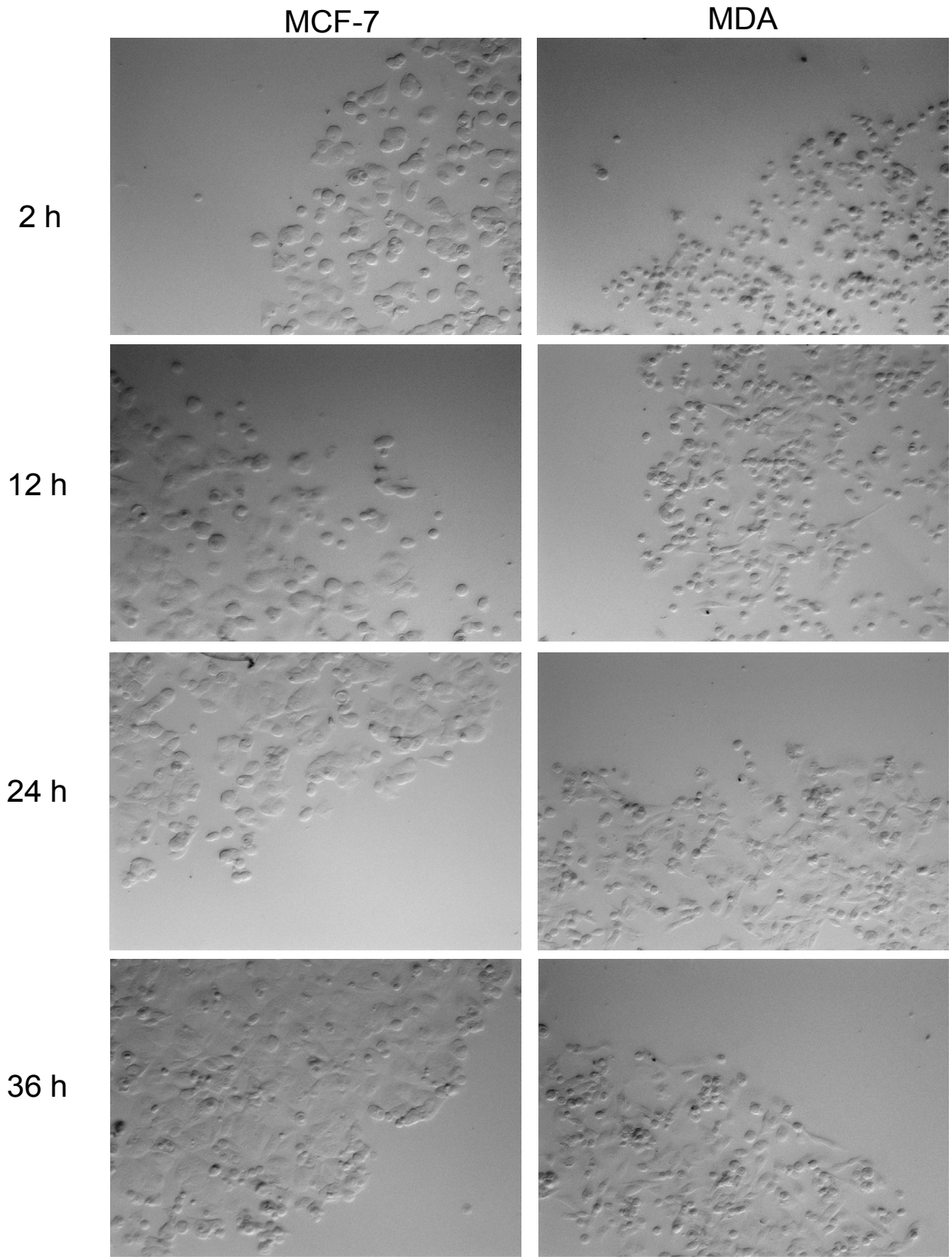


**Figure S3.** DNA-immobilized MCF-7 and MDA cells imaged after 2, 12, 24, 36 hours.

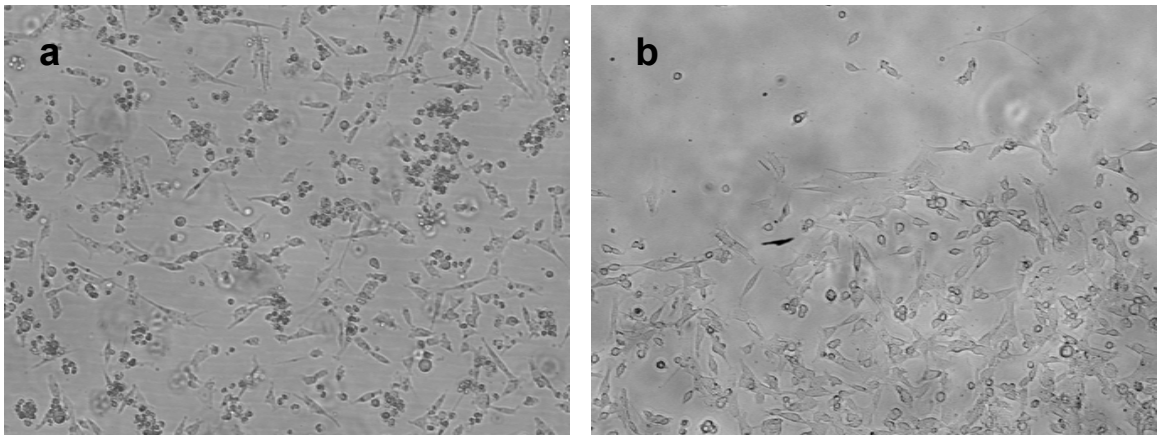


**Figure S4.** Myoblasts were incubated in growth media for 3 days, and then **(a)** seeded on collagen coated dishes, or **(b)** reacted with NHS-DNA and bound to the surface bearing the complementary oligonucleotide.

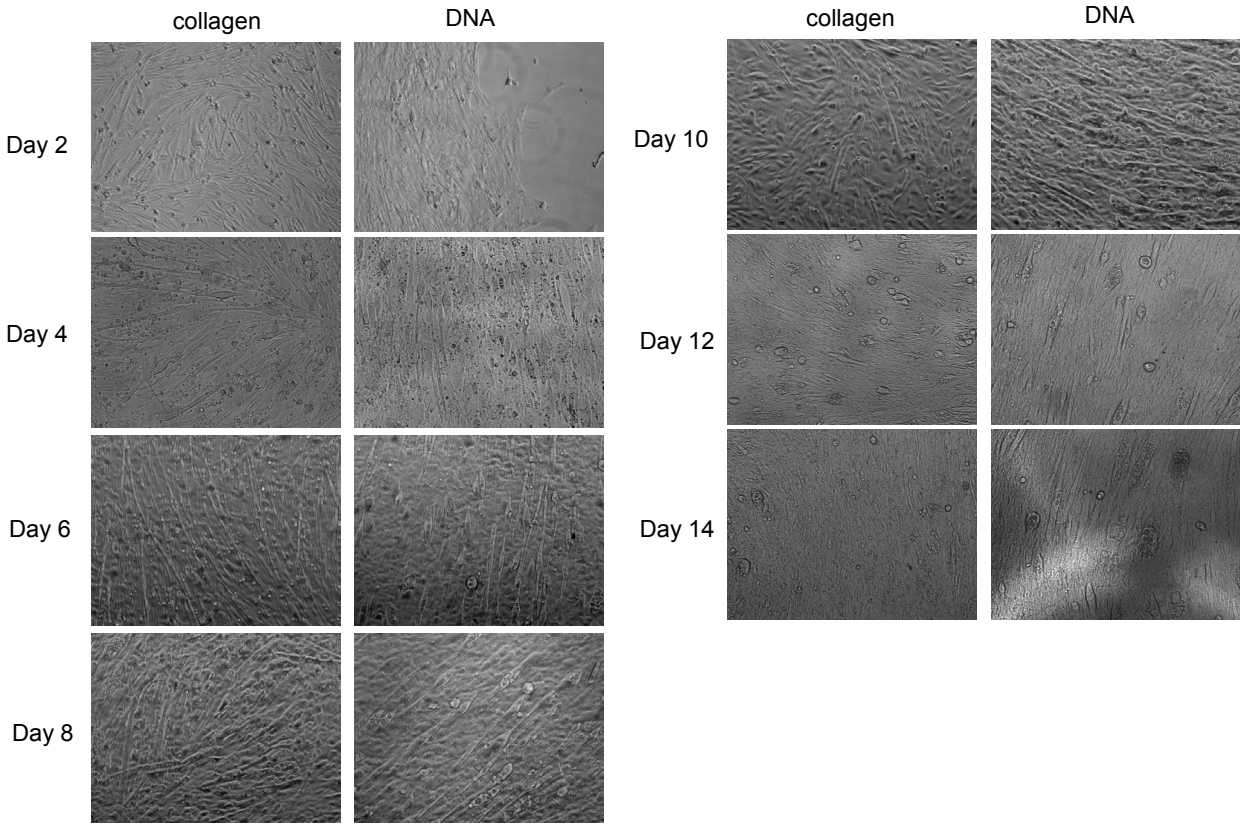


**Figure S5.** Myoblasts were seeded on collagen-coated dishes or modified with NHS-DNA and bound to surfaces bearing the strand complement. Fusion media was added, and the cells were visualized after 2, 4, 6, 8, 10, 12, 14 days.

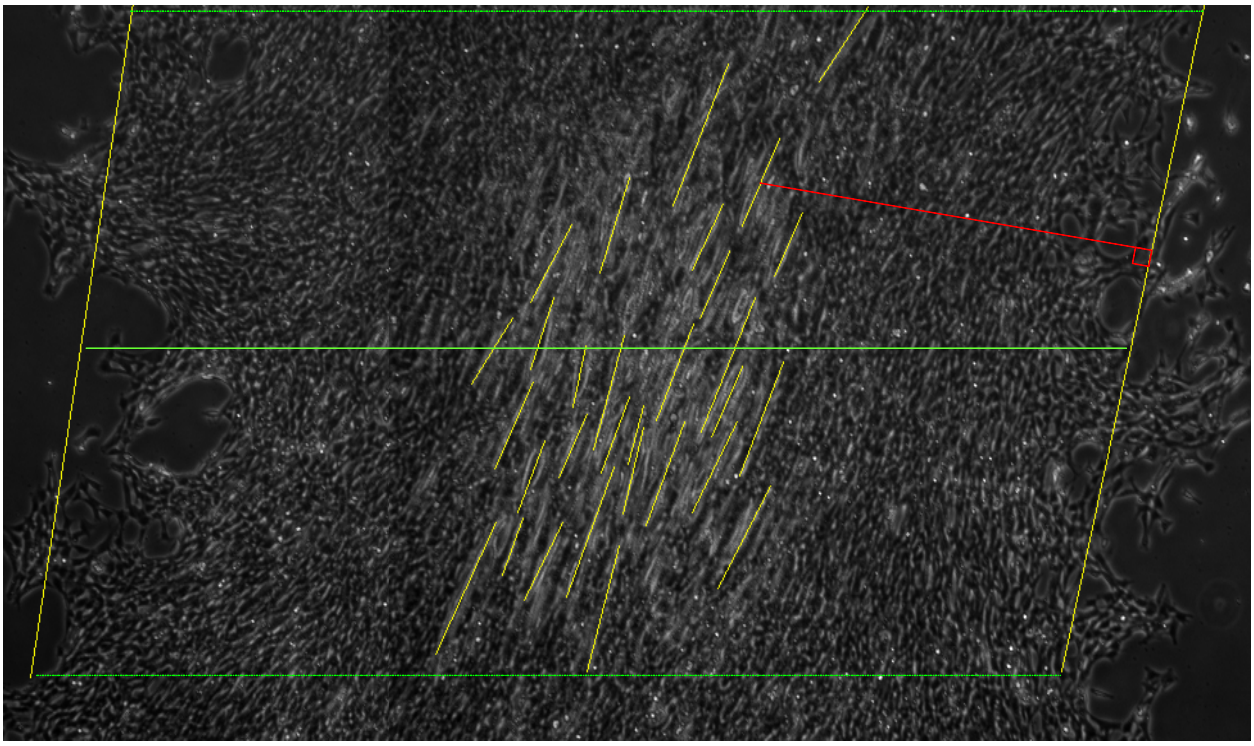

**Figure S6.** Analysis of myotube alignment on a defined pattern. The distance (red line) and angles were measured between the myotubes and the nearest edge. All distance measurements were made from the midpoint of the tubes. The full distance between the pattern edges is indicated by the green line.