DNA-Encoded Antibody Libraries:
A Unified Platform for Multiplexed Cell Sorting and Detection of Genes and Proteins

SUPPORTING ONLINE INFORMATION

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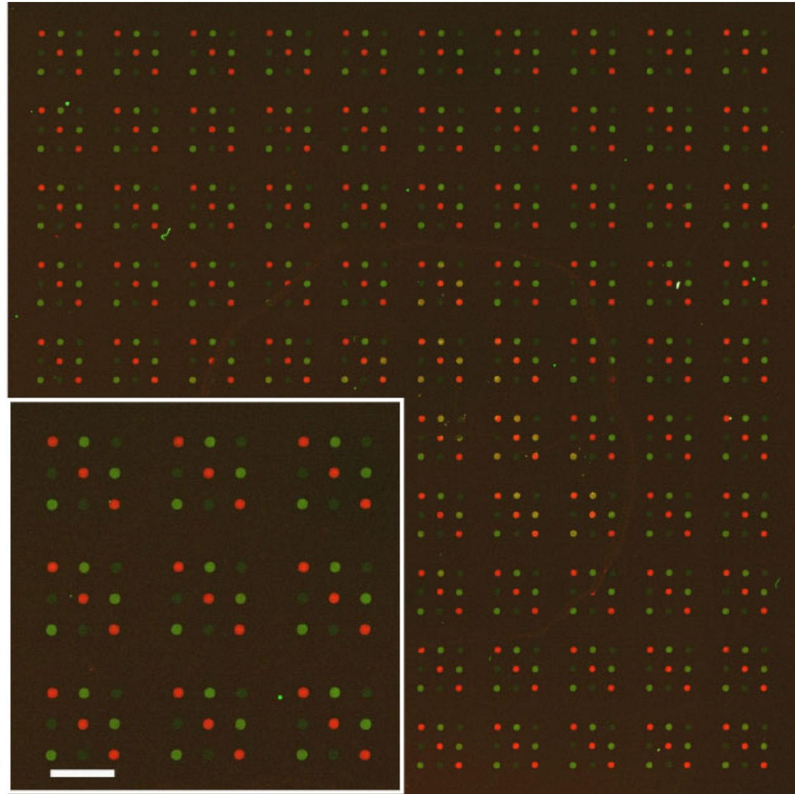
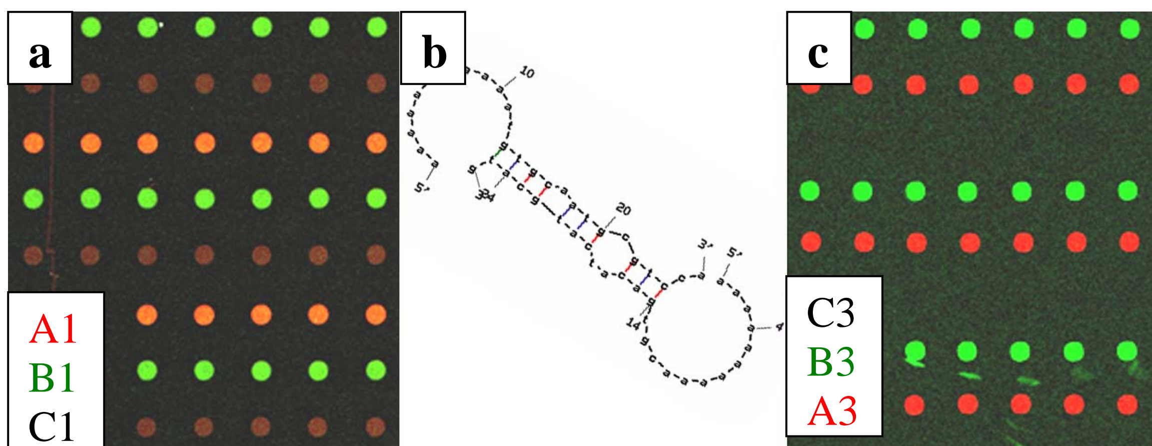
IgG AF488 – A1′
IgG AF594 – B1′
IgG AF647 – C1′

C1	B1	A1
A1	C1	B1
B1	A1	C1



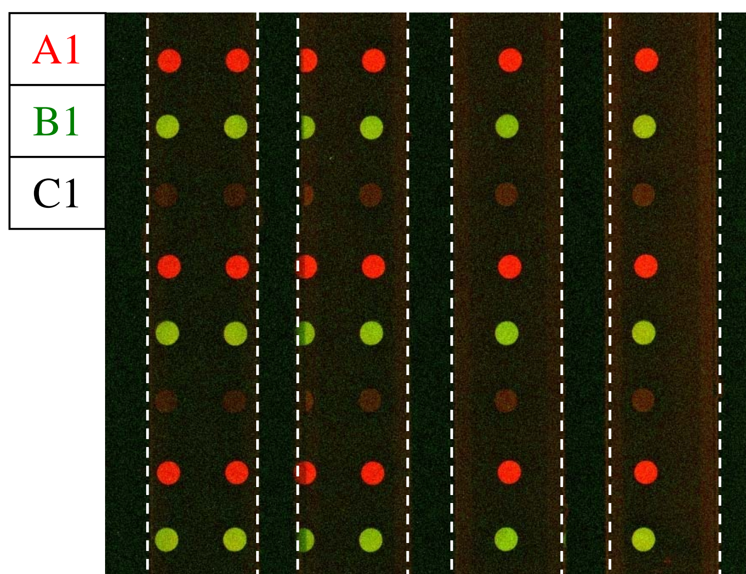
Supplementary Figure 1 Spatially encoded protein array. Three biochemically identical goat α-human IgG (labeled with Alexa488, Alexa594, or Alexa 647 dyes) were tagged with oligos A1', B1' and C1' respectively. After a 2 hour incubation, antibody/DNA conjugates were localized to specific sites dictated by the underlying DNA microarray. Scale bar corresponds to 1 mm.



d

	Sequence	Complement
A3	AAAAAAAAAAATCCTGGAGCTAAGTCCGTA	AAAAAAAAAATACGGACTTAGCTCCAGGAT
B3	AAAAAAAAAAGCCTCATTGAATCATGCCTA	AAAAAAAAAATAGGCATGATTCAATGAGGC
C3	AAAAAAAAAAGCACTCGTCTACTATCGCTA	AAAAAAAAAATAGCGATAGTAGACGAGTGC
D3	AAAAAAAAAAATGGTCGAGATGTCAGAGTA	AAAAAAAAAATACTCTGACATCTCGACCAT
E3	AAAAAAAAAAATGTGAAGTGGCAGTATCTA	AAAAAAAAAATAGATACTGCCACTTCACAT
F3	AAAAAAAAAAATCAGGTAAGGTTCACGGTA	AAAAAAAAAATACCGTGAACCTTACCTGAT

Supplementary Figure 2 *In silico* orthogonalization of DNA oligomers minimizes noise. (a). Sequences A1, B1, C1 and their corresponding complements were randomly generated. DEAL conjugates were made with α-human IgG-Alexa647 and α-human IgG-Alexa546 tagged with A1' and B1' respectively. These conjugates were exposed to a glass slide printed with A1, B1, and C1 strands. While DEAL conjugates encoded to A1 and B1 were clearly localized, the resulting hybridization pattern reveals there is appreciable amount of cross talk between A1' and C1 (the contrast of both images has been significantly enhanced to amplify this affect). (b). The DNA sequences A1' and C1 were hybridized *in silico* using mFold (http://www.bioinfo.rpi.edu/applications/hybrid/twostate.php). The corresponding secondary structure, which was calculated to have a melting temperature of 20°C, is shown. (c). A list of new DNA sequences were generated *in silico*, with the constraints that each strand be orthogonal with each other and with their corresponding complements. Strands A3, B3, and C3 were tested in similar fashion as in (a). The results show no appreciable noise in the system. (d). A set of 6 orthogonal sequences, listed 5' to 3' end.



Supplementary Figure 3 Protein array assembled in microfluidics in 10 minutes. Two goat α-human IgG (labeled with Alexa594 or Alexa 647) were tagged with oligos A1' and B1' respectively and introduced into a microfluidic device bonded on top of a DNA microarray with corresponding complementary strands A1 and B1 along with non-complementary strand C1. No DEAL conjugate encoded to spot C1 was added. After flowing at ~0.5 μl/min for 10 minutes, the microfluidic PDMS slab was removed and the glass slide imaged. The dashed lines delineate separate microfluidic channels of 600 μm width.