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34 nm Charge Transport through DNA[1] JASON SLINKER, The University of Texas at Dallas, NATALIE MUREN, SARA RENFREW, JACQUELINE BARTON, California Institute of Technology — Long-range charge transport through DNA has broad-reaching implications due to its inherent biological recognition capabilities and unmatched capacity to be patterned into precise, nanoscale shapes. We have observed charge transport through 34 nm DNA monolayers (100 base pairs) using DNA-mediated electrochemistry. Cyclic voltammetry of multiplexed gold electrodes modified with 100mer DNAs reveal sizable peaks from distally-bound Nile Blue redox probes for well matched duplexes but highly attenuated redox peaks from 100mer monolayers containing a single base pair mismatch, demonstrating that the charge transfer is DNA-mediated. The 100mers on the gold surface are efficiently cleaved by the restriction enzyme RsaI. The 100mers in the DNA film thus adopt conformations that are readily accessible to protein binding and restriction. The ability to assemble well-characterized DNA films with these 100mers permits the demonstration of charge transport over distances surpassing most reports of molecular wires.

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