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Controlled enzymatic cutting of DNA molecules adsorbed on surfaces using soft lithography[1] ALYSSA AUERBACH, Yeshiva University High School for Girls, Holliswood, NY, JULIA BUDASSI, Stony Brook University, Stony Brook, NY, EMILY SHEA, Williams College, Williamstown, MA, KE ZHU, JONATHAN SOKOLOV, Stony Brook University, Stony Brook, NY — The enzyme DNase I was applied to adsorbed and aligned DNA molecules (Lamda, 48.5 kilobase pairs (kbp), and T4, 165.6 kbp), stretched linearly on a surface, by stamping with a polydimethylsiloxane (PDMS) grating. The DNAs were cut by the enzyme into separated, micron-sized segments along the length of the molecules at positions determined by the grating dimensions (3-20 microns). Ozone-treated PDMS stamps were coated with DNase I solutions and placed in contact with surface-adsorbed DNA molecules deposited on a 750 polymethylmethacrylate (PMMA) film spun-cast onto a silicon substrate. The stamps were applied under pressure for times up to 15 minutes at 37 C. The cutting was observed by fluorescence microscopy imaging of DNA labeled with YOYO dye. Cutting was found to be efficient despite the steric hindrance due to surface attachment of the molecules. Methods for detaching and separating the cut segments for sequencing applications will be discussed.

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