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Single Protein Structural Analysis with a Solid-state Nanopore Sensor JIALI LI, University of Arkansas, JENE GOLOVCHENKO, Harvard University, DAVID MCNABB, BRIAN THOMAS, BRAD LEDDEN, University of Arkansas, DAVID MCNABB COLLABORATION — We report on the use of solid-state nanopore sensors to detect single polypeptides. These solid-state nanopores are fabricated in thin membranes of silicon nitride by ion beam sculpting...[1]. When an electrically biased nanopore is exposed to denatured proteins in ionic solution, discrete transient electronic signals: current blockages are observed. We demonstrate examples of such transient electronic signals for Bovine Serum Albumin (BSA) and human placental laminin M proteins in Guanidine hydrochloride solution, which suggest that these polypeptides are individually translocating through the nanopore during the detecting process. The amplitude of the current blockages is proportional to the bias voltage. No transient current blockages are observed when proteins are not present in the solution. To probe protein-folding state, pH and temperature dependence experiments are performed. The results demonstrate a solid-state nanopore sensor can be used to detect and analyze single polypeptide chains. Similarities and differences with signals obtained from double stranded DNA in a solid-state nanopore and single stranded DNA in a biological nanopore are discussed. [.1] Li, J., D. Stein, C. McMullan, D. Branton, M.J. Aziz, and J.A. Golovchenko, *Ion-beam sculpting at nanometre length scales.* Nature, 2001. **412**(12 July): p. 166-169.

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