

The Nanopore Mass Spectrometer

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We are developing a technique to sequence proteins at the single molecule level. Our approach merges the ability of nanopores to force polymers to translocate in a linear fashion with the ability of mass spectrometry to identify individual amino acids. The nanopore in our setup takes the form of a capillary that has been pulled into a needle-like tip with an opening on the 10 - 100 nm scale. Amino acids are drawn out of solution and into the mass spectrometer by the application of strong electric fields through a process known as electrospray ionization. A single molecule approach could drastically increase the speed and reduce the cost of protein sequencing, which remains slow and expensive, especially in comparison with DNA sequencing. It would also alleviate the usual requirements for large samples and allow for the possibility of collecting sample from a single cell and measuring relative protein abundances.