

Electro-Osmotic Capture and Ionic Discrimination of Peptide and Protein Biomarkers with FraC Nanopores

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Biological nanopores are nano-scale sensors employed for high-throughput, low-cost and long read-length DNA sequencing applications. The analysis and sequencing of proteins, however, is complicated by the folded structure and non-uniform charge of proteins. Here we show that an electro-osmotic flow through Fragaceatoxin C (FraC) nanopores¹ can be engineered to allow the entry of polypeptides at a fixed potential regardless of the charge composition of the polypeptide. We further use the nanopore currents to discriminate peptide and protein biomarkers from 25 kDa down to 1.2 kDa including polypeptides differing by one amino acid. On the road to nanopore proteomics, our findings represent a rationale for amino acid analysis of folded and unfolded polypeptides with nanopores.

References

[1]. Wloka C, Mutter NL, Soskine M, Maglia G. Alpha-Helical Fragaceatoxin C Nanopore Engineered for Double-Stranded and Single-Stranded Nucleic Acid Analysis. *Angew Chem Int Ed Engl* **55**, 12494-12498 (2016).