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Interaction of DNA and Proteins with Single Nanopores¹

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The bacterial toxins *Staphylococcus aureus* alpha-hemolysin and *Bacillus anthracis* protective antigen kill cells in part by forming ion channels in target membranes. We are using electrophysiology, molecular biology/protein biochemistry and computer modeling to study how biopolymers (e.g., single-stranded DNA and proteins) bind to and transport through these nanometer-scale pores. The results provide insight into the mechanism by which these toxins work and are the basis for several potential nanobiotechnology applications including ultra-rapid DNA sequencing, the sensitive and selective detection of a wide range of analytes and high throughput screening of therapeutic agents against several anthrax toxins.

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