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### Biophysics

## Research on biophysics described by scientists at Syracuse University

2008 SEP 15 -- According to recent research from the United States, "Despite its fundamental and critical importance in molecular biology and practical medical biotechnology, how a polypeptide interacts with a transmembrane protein pore is not yet comprehensively understood. Here, we employed single-channel electrical recordings to reveal the interactions of short polypeptides and small folded proteins with a robust beta-barrel protein pore."

"The short polypeptides were similar to 25 residues in length, resembling positively charged targeting presequences involved in protein import. The proteins were consisted of positively charged pre-cytochrome b(2) fragments (pb(2)) fused to the small ribonuclease barnase (similar to 110 residues, Ba). Single-molecule experiments exploring the interaction of a folded pb(2)-Ba protein with a single beta-barrel pore, which contained negatively charged electrostatic traps, revealed the complexity of a network of intermolecular forces, including driving and electrostatic ones. In addition, the interaction was dependent on other factors, such as the hydrophobic content of the interacting polypeptide, the location of the electrostatic trap, the length of the pb(2) presequence and temperature. This single-molecule approach together with protein design of either the interacting polypeptide or the pore lumen opens new opportunities for the exploration of the polypeptide-pore interaction at high temporal resolution," wrote M.M. Mohammad and colleagues, Syracuse University.

The researchers concluded: "Such future studies are also expected to unravel the advantages and limitations of the nanopore technique for the detection and exploration of individual polypeptides."

Mohammad and colleagues published their study in *European Biophysics Journal with Biophysics Letters* (Excursion of a single polypeptide into a protein pore: simple physics, but complicated biology. *European Biophysics Journal with Biophysics Letters*, 2008;37(6):913-925).

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This article was prepared by Proteomics Weekly editors from staff and other reports. Copyright 2008, Proteomics Weekly via NewsRx.com. *Proteomics Weekly*, September 15, 2008, page 99