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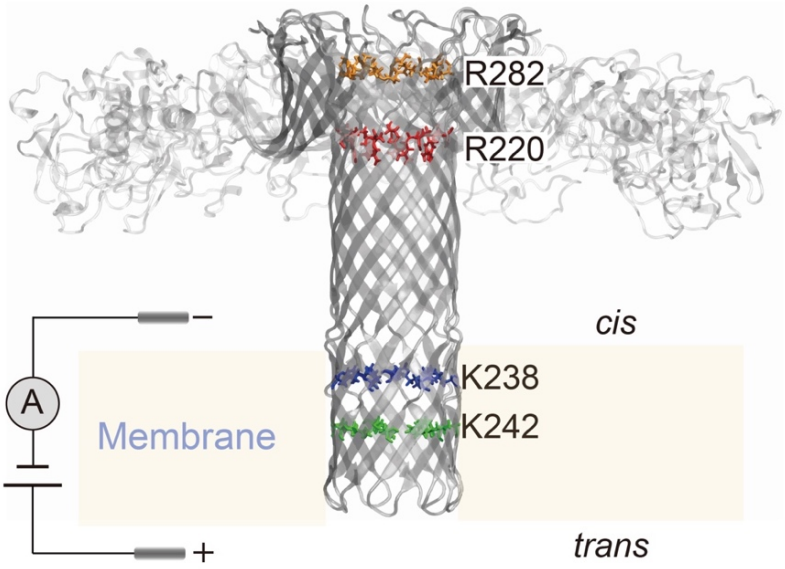
Licensing Opportunity

TTO – Technology Transfer Office

Mutant Aerolysin for nanopore sensing



Structural model of an Aerolysin nanopore. Highlighted amino acids correspond to the major sites of sequence substitutions.

Ref. Nr

6.1663

Keywords

Nanopore sensing
nucleotide sequencing
single-molecule proteomics

Intellectual Property

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Publication

Cao et al. Nature Communications 2019
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Description

The use of biological nanopores for biomolecules sensing and DNA sequencing is arousing growing interest. In this respect, we propose rationally designed aerolysin pore mutants characterized by an enhanced interaction with different analytes : ssDNA, and negatively or positively charged peptides. Mutant pores were evaluated *in silico* by molecular simulations and reconstituted *in vitro* in lipid bilayers to find the optimal modifications. Two different pore regions were targeted in order to obtain the proper electrostatic properties and steric hindrance leading to improved translocation control and molecule selectivity.

Advantages

- Mutant nanopores display dwell times increased up to one order of magnitude, allowing a more accurate blockade current evaluation and making aerolysin a fine-tuned single-molecule sensing device.
- Some mutants show ssDNA capture ability even when applied voltage is under +20mV. Pore mutants are developed to specifically capture and detect positively and negatively charged peptides.
- Nanopore DNA sequencing has the potential to provide real-time results and does not require additional molecular adaptor or processing enzymes.

Applications

- Development of novel single-molecule proteomic strategies
- DNA sequencing