**Biological Nanopores: A tool for single molecule protein sensing and sequencing.**

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Biological nanopores are membrane proteins that spontaneously integrate into a lipid bilayer, creating a water-filled nanometric channel. When a voltage is applied, a current of ions is generated, which is used to assess the analytes entering the channel. Typically, the signal is produced when the analyte passes near the identification point, often a constriction in the channel. Since their discovery, biological nanopores have been used as stochastic sensors for small molecules and have gained popularity in third-generation DNA sequencing[1,2]. This technology allows for the sequencing of long strands of DNA with high throughput and low-cost methods.

Biological nanopores have also faced challenges in identifying peptides and proteins, presenting significant hurdles. Unlike oligonucleotides, these biomolecules have more complex structures and non-homogeneous charge distributions, which makes their electrophoretic capture in a nanopore less powerful[3,4]. In recent years, substantial efforts and key results from the research community have laid the foundation to overcome these issued paving the way for using biological nanopores as new sensing and sequencing tools to identify proteins[5,6,].

This tutorial/lesson will introduce the basic concepts of biological nanopores and how they can be used as nanoconfined spaces to observe biomolecules at the single-molecule level[7]. Additionally, it will provide an overview of the applications of these methods, ranging from sensing and sequencing of DNA to proteins[8].

References:

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