# Pore size alone does not matter when biological nanopores act as sugar chain biosensors

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Protein nanopores are present in cell membranes and act as biological gateways. This means that they can also be used for the detection of specific bioactive molecular chains, like sugar chains, such as molecules from the glycosaminoglycan family. The latter are responsible for key interactions at the cellular level. They typically mediate interactions with cell surfaces or with proteins, resulting in the activiation of physiological and pathological effects in embryonic development, cell growth and differentiation, inflammatory response, tumour growth and microbial infection. The use of such nanopores as biosensors requires to fully understand the intricate mechanisms occurring as sugar chains pass through them.

In a new study published in *EPJ E*, Aziz Fennouri from Paris-Saclay University in Evry, France, and colleagues outline the key criteria determining the effectiveness of two types of nanopores in the detection of sugar chains.

Specifically, the authors study how two 10 nanometre-wide protein nanopores—namely α-hemolysin (α-HL) from Staphylococcus aureus and aerolysin (AeL) from Aeromonas hydrophila—impact the ability of sugar chain components of large biomolecules, such as hyaluronic acid to pass through the nanopores.

The authors find that, when the sugar chains enter from the broad end of

the funnel constituting each pore, AeL can be used to detect short sugar chains. By contrast, α-HL fails to detect such short chains because they cross the nanopore too quickly. The opposite happens when sugar chains are placed at the thin end of the funnel-shaped pore.

These results show that the choice of the nanopore used to carry out biosensing experiments is essential. Criteria other than the inner diameter of the pore need to be considered when devising biosensors to make then suited for detection. Other parameters to consider include the charge repartition within the pore, possible interactions occurring on the inner wall of the pore channel, and the geometry of the pore channel.

**More information:** Aziz Fennouri et al, Comparative biosensing of glycosaminoglycan hyaluronic acid oligo- and polysaccharides using aerolysin and $ alpha$α-hemolysin nanopores⋆, *The European Physical Journal E* (2018). DOI: 10.1140/epje/i2018-11733-5

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