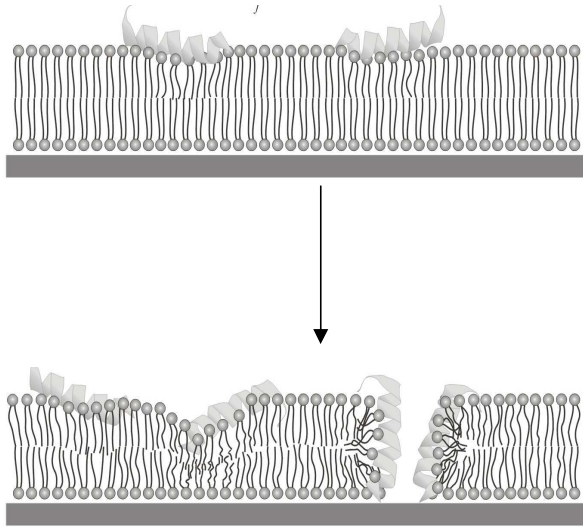
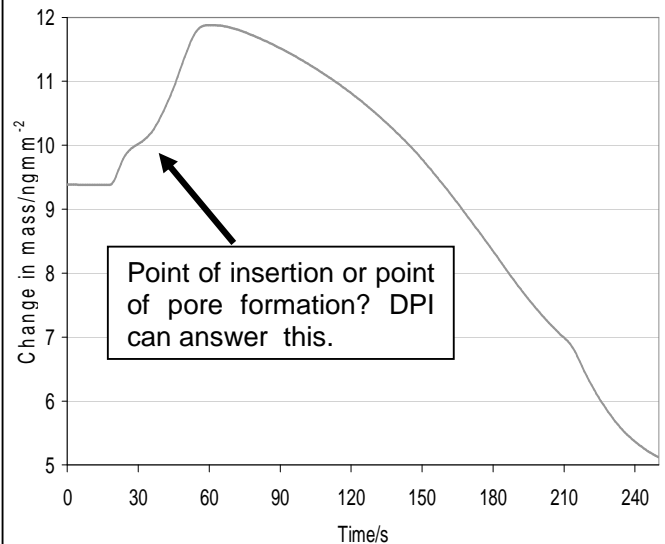


Deconstructing Peptide Lipid Interactions with Dual Polarisation Interferometry (DPI) - why bee stings hurt!

1. Cell lysing agents like melittin from honey bee venom induce cell disruption and disintegration by attaching to the outside of cells then inducing holes in the membrane, destroying the cell.

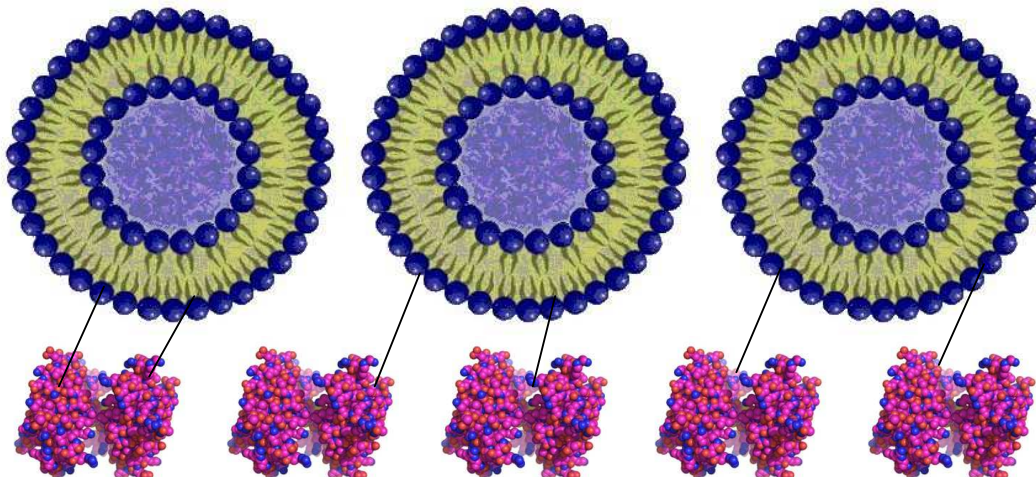


2. This binding to, and subsequently inserting into cell membranes gives the following typical mass response using surface based techniques.

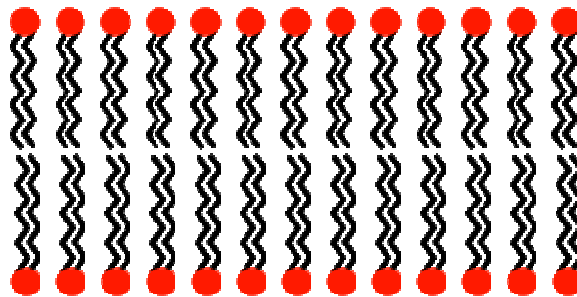


3. Uniquely, for studying lipid peptide interactions, DPI can

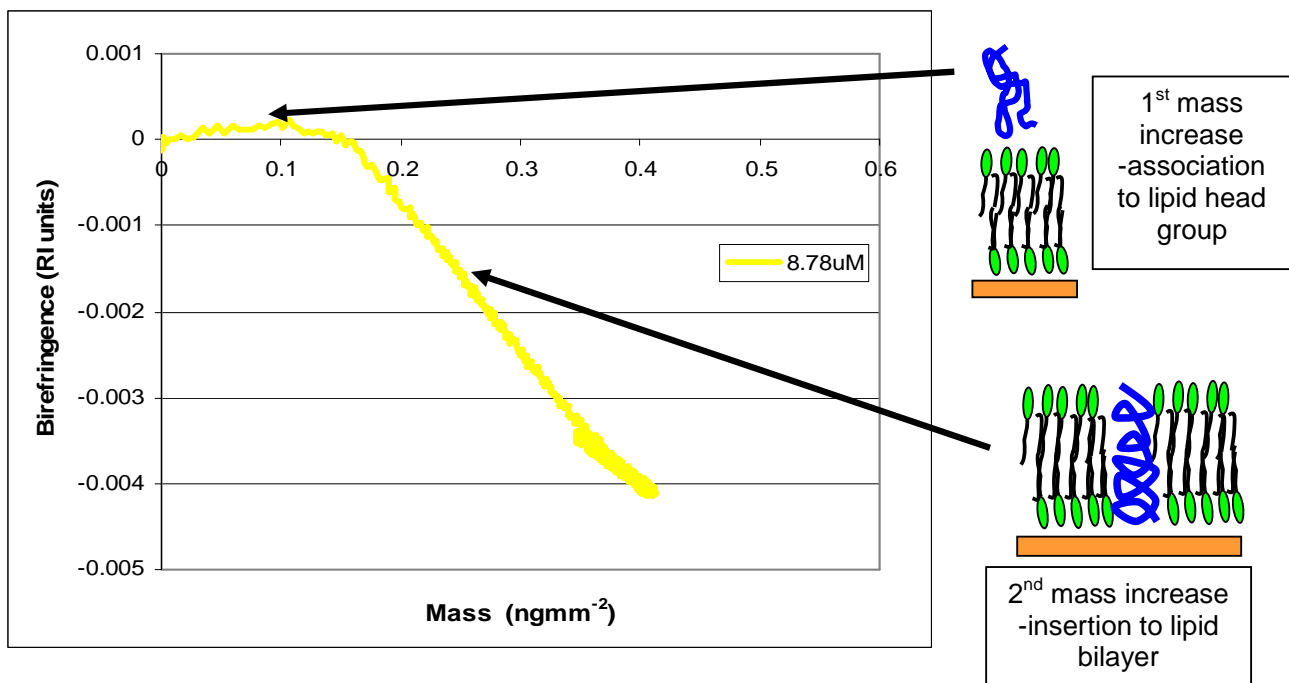
- tether a quantified and characterised monolayer of liposomes for challenge with known or candidate antimicrobials. No need to infer structure of liposome layer from mass response alone as DPI can directly measure thickness, density and mass.
- Immobilise liposome layer with quantified low degree of surface deformation,
- measure binding kinetics using thickness and RI to quantify mass even if dimensions are changing,
- determine when pores have formed, using dimensional changes to corroborate mechanism.



4. DPI can follow similar processes on the different format of lipid bilayers to build complete understanding



- Quantify the formation of lipid bilayers formed by the fusion of liposomes onto a solid substrate.
- The mass changes and alignment of the lipid bilayer can be measured in real time, allowing any disruption of bilayer order by insertion of peptide to be quantified.
- Thus, from a change in the alignment (birefringence), it is easy to assign a change mass to either a surface binding event or a membrane disruptive event².



References

- 1, Benachir T, Lafleur M. Study of vesicle leakage induced by melittin. *Biochim Biophys Acta*. 1995;1235(2):452–460
- 2, L. Yu, L. Guo, J.L. Ding, B, Ho, S.S, Feng, J, Popplewell, M, Swann, T, Wohland, "Interaction of an artificial antimicrobial peptide with lipid membranes", *BBA Biomembranes* 1788 (2009) 333-344.

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