Contribution ID : **189** Type : **Poster**

Fusion Peptide Interactions with the Lipidic Cubic Phase

Thursday, 25 November 2021 17:34 (1)

Despite the fact that membrane fusion is a key step in many biological processes, the underlying mechanism still remains elusive. The bicontinuous cubic phases are a perfect medium for the delivery of therapeutic proteins owing to their enhanced solubility, sustained release and reduced toxicity. It has been suggested that the fusion event of viruses is tightly regulated by specialized fusion proteins which are responsible for protein-lipid interactions or protein-protein interactions. The fusion components of enveloped viral fusion involve viral proteins that insert hydrophobic sequences into the target membrane and refold to drive merging of the lipid bilayers which can be utilized to enhance drug delivery. By using high throughput methodology to prepare and characterize viral fusion peptide interactions based on lipid composition, our study has revealed that the N-terminal charge of the viral fusion peptide has a significant effect on lattice parameter of the cubic phases. Induced curvature depends on peptide concentration but the mechanism was observed to be viral dependent. We investigated the phase behaviour which represents its fusion function and bilayer destabilizing effect, upon encapsulation in bicontinuous cubic phases with and without phospholipid using synchrotron SAXS. We also used TOF-SANS and contrast-matching of the lipid membrane to investigate the phase behaviour of the mixed lipid systems. This is crucial for better understanding of the fundamental physiochemical parameters of the lipid mesophase in response to peptide encapsulation and dependency of the peptide structural conformation.

Level of Expertise

Student

Presenter Gender

Woman

Pronouns

She/Her

Which facility did you use for your research

Australian Centre for Neutron Scattering

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

Yes

Condition of submission

Yes

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Session Classification : Poster Session

Track Classification : Chemistry, Soft Matter & Crystallography