

A Membrane Fusion Intermediate State

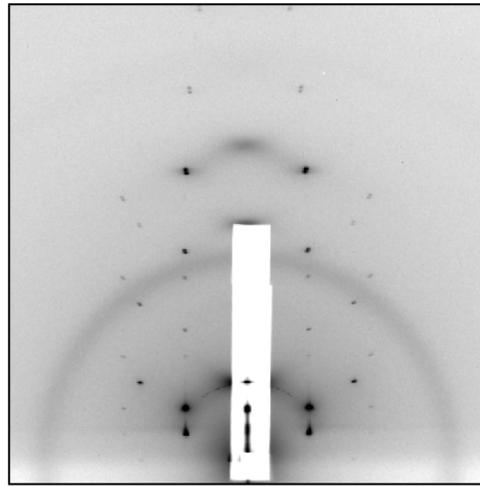
Beamline: X21

Technique:
X-Ray Diffraction

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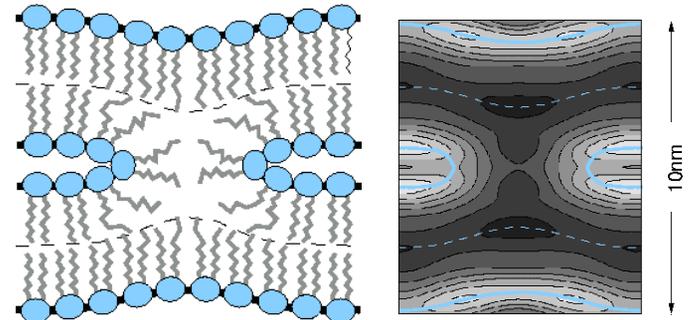
Publication:
“Observation of a
Membrane Fusion
Intermediate Structure”
Science **297**, 1877 (2002).

Motivation: Use lipid bilayers as a model to study the fusion of biological membranes and develop x-ray scattering methods to elucidate the structural rearrangements of lipid layers during fusion.



Diffraction pattern from an aligned lipid multilayers containing stalks

The molecular model of the stalk, as compared to the electron density distribution constructed from the diffraction pattern shown on the left. In the electron density map, the peaks correspond to the lipid heads and the valleys correspond to the hydrocarbon tails.



Results: The diffraction pattern indicates the formation of a 3-dimensional periodic lattice. The electron density distribution was constructed from the diffraction pattern and showed that each unit cell of this lattice contained a stalk-like structure formed between adjacent lipid bilayers. Stalk formation is a key intermediate step during biomembrane fusion.