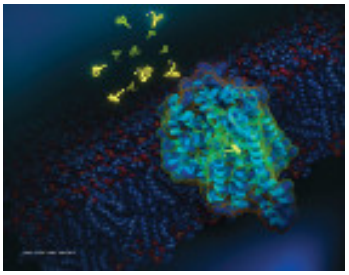

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Contr. Talk 1 - Structure and Composition of Native Membrane Derived Polymer-Supported Lipid Bilayers

Wednesday 12 September 2018 13:55 (20 minutes)

Native membrane derived polymer-supported lipid bilayers (nSLBs) are poised to bridge the gap between live cell experiments and traditional model membrane architectures that by offering a combination of accessibility by surface sensitive analytical instrumentation and a composition which more closely resembles cellular membranes by displaying a diversity of endogenous membrane proteins, lipids, and carbohydrates. With the increasing popularity of nSLB systems there is a growing need for a standardized workflow to accurately characterize their quality, composition, and structure to aid in their development and expand their utility.
We recently developed a generic method for producing polymer-supported lipid bilayers directly from cell-derived native membrane vesicles (NMVs). Due to the lack of detergent solubilization and reconstitution steps, the nSLBs created using this approach contain essentially all of the native lipids, as well as the membrane-associated proteins and carbohydrates from the donor membrane. This new approach has been shown to preserve mobility and enzymatic activity of transmembrane proteins in the resulting nSLB. As cell membranes are both dynamic and compositionally complex, replicating these aspects in a model membrane are essential. A combination of fluorescence microscopy, neutron reflectometry, and time-of-flight secondary-ion mass spectrometry data will be presented which characterizes the structure and composition of this new supported lipid bilayer category. The methodology presented allows the amount of native membrane material in the nSLB to be precisely controlled and display a uniform lateral distribution. Insights into the nSLBs z-dimensional structure are also discussed. The methodology presented is meant to guide future researchers in producing nSLBs from their cellular membrane of choice, as well as how to investigate their quality and composition.

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Session Classification: Biointerfaces: Afternoon sessions