# Gramicidin A Induced Membrane Thickness Change of Unilamellar Vesicles in Solution Determined by Small Angle X-ray Scattering at NSRRC

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The change of bilayer structure induced by peptides interacting with membrane has long been an interesting issue in life science. Various techniques, including X-ray diffraction, small-angle X-ray scattering (SAXS) and nuclear magnetic resonance (NMR), have often been introduced in revealing peptide-membrane interaction under various temperatures and solution conditions, such as PH values and ion concentration. The ion channel peptide, Gramicidin A, is known to change membrane thickness by inserting into bilayer. In our study, Gramicidin A was used to interact with different lipid vesicles in solution and SAXS was used to measure the scattering curve. Cmbining model fitting and SAXS data, the membrane thickness of vesicles with and without Gramicidin A had been determined. The membrane thickness change induced by Gramicidin A will be discussed.

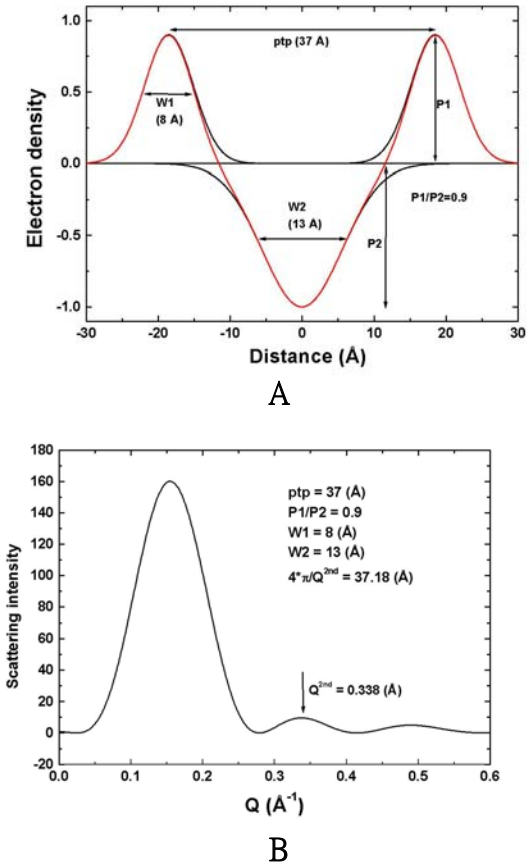


**Figure 1**. A Model of the lipid bilayer electron density. The ptp shows peak-to-peak (it is phosphate-to-phosphate for phospholipids bilayer) distance of the pattern. Figure 1B shows scattering curve by the fourier transform of electron density pattern in figure 1A. The result indicates that membrane thickness, i.e. ptp, can be determined by formula $ptp=4\pi/Q^{2nd}$ (eq. 1), where $Q^{2nd}$ is Q value of the second peak of the scattering curve.

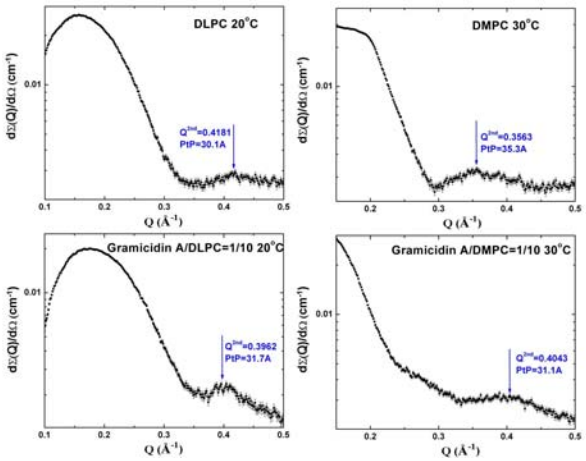


**Figure 2**. DLPC and DMPC membrane thickness change induced by Gramicidin A.