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**Structure of fully hydrated fluid phase DMPC and DLPC lipid bilayers using X-ray scattering from oriented multilamellar arrays and from large unilamellar vesicles**

**Norbert Kučerka**<sup>1</sup>, Yufeng Liu<sup>1</sup>, Nanjun Chu<sup>1</sup>, Horia I. Petrache<sup>2</sup>, Stephanie Tristram-Nagle<sup>1</sup>, John F. Nagle<sup>1</sup>.

<sup>1</sup>Carnegie Mellon University, Pittsburgh, PA, USA, <sup>2</sup>National Institutes of Health, Bethesda, MD, USA.

Highly resolved structures of the fully hydrated fluid phases of dimyristoylphosphatidylcholine (DMPC) and dilauroylphosphatidylcholine (DLPC) are obtained at 30°C by X-ray scattering. Data from oriented bilayers at the D-1 station of the CHESS synchrotron provide relative form factors  $F(q_z)$  for  $0.2 < q_z < 0.8 \text{ \AA}^{-1}$ , data from large unilamellar vesicles provide relative form factors for  $0.1 < q_z < 0.4 \text{ \AA}^{-1}$ , and volumetric data provide the value of  $F(0)$ . We use hybrid models of lipid bilayers to place these form factors and the corresponding electron density profiles  $\rho(z)$  on an absolute scale. Comparison of these electron density profiles with that of gel phase DMPC provides areas per lipid  $A$ , hydrophobic thickness  $2D_C$ , steric thickness  $2D_B'$  and number of water molecules per lipid  $n_w$ . Area results geometrically corrected for undulations are  $61.0 \pm 0.5 \text{ \AA}^2$  for DMPC and  $63.7 \pm 0.5 \text{ \AA}^2$  for DLPC.

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