INFLUENCE OF PALMITIC ACID ON MOLECULAR ORGANIZATION OF DIPALMITOYLPHOSPHATIDYLCHOLINE MONOLAYERS AT THE AIR-WATER INTERFACE: A VIBRATIONAL SUM FREQUENCY GENERATION (VSFG) SPECTROSCOPY STUDY

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Lung surfactant is a complex mixture of lipids and proteins that forms a monolayer at the air-alveolus interface. A molecular-level understanding of the relationships between lung surfactant components is essential for understanding the physics and physiology of lung surfactants. Langmuir monolayer of dipalmitoylphosphatidylcholine (DPPC) is a widely used model for studies of lung surfactant. In this work the molecular organization of DPPC under the influence of palmitic acid (PA) in mixed DPPC-d62-PA monolayers at the air-water interface is probed by vibrational sum frequency generation (VSFG) spectroscopy under different surface pressures using a Langmuir trough. PA induced changes of conformation and orientation of DPPC aliphatic chains are revealed by the vibrational signature of C-D stretches. Headgroup orientation and hydration of DPPC modulated by PA are revealed by the vibrational signature of the PO_2^- stretch.