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Probing interaction of antimicrobial peptide duramycin with lipid monolayers IZABELA I. RZEZNICKA, Riken, Advanced Science Institute, Wako-shi, Japan, MARIA SOVAGO, MISCHA BONN, Amolf, Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands, TOSHIHIDE KOBAYASHI, TARO YAMADA, Riken, Advanced Science Institute, Wako-shi, Japan, MAKI KAWAI, Riken, Advanced Science Institute, Wako-shi, Japan; Department of Advanced Materials Science, The University of Tokyo, Japan — Antimicrobial peptides are group of peptides which disrupt the microbial cell membrane through hydrophobic insertion into the outer lipid layer. Duramycin is a small tetracyclic peptide antibiotic, which has recently been shown to bind specifically to phosphatidylethanolamine (PE) lipids. We report the interaction of duramycin with phospholipid monolayers at air-water interface, studied using vibrational sum-frequency generation spectroscopy (VSFG) and fluorescence microscopy (FM). For monolayers containing PE lipids, VSFG reveals binding of duramycin to the monolayer through the appearance of a vibrational peak at 3045 cm^{-1}, corresponding to the C-H stretching vibration of phenylalanine amino acid. In addition, the amide I vibrational region shows that peptide has a β-sheet conformation. Similar experiments performed on phosphatidylcholine (PC) monolayers show the interaction is specific with PE.

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