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Lipid Bilayers and Titanium: Controlling Surface Adsorption LINDA S. HIRST, MARTECH, Dept. of Physics, Florida State University, EMILY PARKER, NOEL C. MACDONALD, Dept of Mechnical & Environmental Engineering, University of California, Santa Barbara, CYRUS R. SAFINYA, Materials Dept. University of California, Santa Barbara — Used extensively for implants, titanium is relatively inert in the body, and considered a biocompatible metal. We have investigated the interactions of cationic lipid mixtures with a highly polished bulk TiO_2 surface and report the observation of an interesting cationic lipid tubule phase stabilized in 2D on the TiO_2 surface. This phase is distinct from the bulk tubule phase observed in some mixtures as the tubules form a network with small mesh size and appear to be more flexible. Cationic lipid vesicles were formed under various salt conditions and deposited on the TiO_2 surface via vesicle absorption, then observed with fluorescence microscopy. In certain mixtures, bulk tubule phases were observed. When deposited on glass the bulk tubule phase became unstable and bilayers gradually formed on the glass surface. However, deposition of the same cationic mixtures on TiO_2 resulted in the formation of a 2D network of lipid tubules on the surface. The network, although pinned to the surface remained fluid in nature, as confirmed by FRAP experiments. The tubules appear to be only weakly attracted to the TiO_2 and this may explain their stability on the surface.

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