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Microstructural Phase Changes of DPPC-Ergosterol Supported Membranes Stressed by Ethanol[1] JUAN VANEGAS, DAVID BLOCK, ROLAND FALLER, MARJORIE LONGO, University of California, Davis — Microstructure of DPPC-Ergosterol supported lipid bilayers (SLBs) stressed by ethanol is examined at the nanoscopic level using atomic force microscopy (AFM). Alcohols such as ethanol are known to cause changes in the phase behavior of phospholipids as well as inducing the formation of an interdigitated phase of reduced thickness, where the hydrophobic tails of the top and bottom lipids intercalate causing an increase in the area per lipid as well as the solvent exposed surface of the headgroups. SLBs composed of 75-100 mole % 1,2-Dipalmitoyl-sn-Glycero-3-Phosphocholine (DPPC) and 0-25 mole % ergosterol were deposited on mica through the vesicle deposition method. In order to observe the ethanol-induced phase changes that can be observed in free bilayers, the vesicles must be prepared in buffer solution containing ethanol. The presence of salt is required to reduce the effect of the strong interaction between the bilayers and the support, which in the absence of ethanol and salt induces the formation of a tilted phase similar to the interdigitated phase in DPPC bilayers deposited above the melting temperature. As previously observer by other groups, ethanol-induced changes in SLBs often require heating above the transition temperature after addition of ethanol, or sample preparation in the presence of the alcohol. The later method was used as it produces more consistent results and the observations agree well with the previously reported phase diagram of DPPC-Ergosterol with ethanol.

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