Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Stretching the limits of membrane charge density using Dendrimer Lipids - New Highly Transfecting Hexagonal Phases for Gene Delivery KAI EWERT, ALEXANDRA ZIDOVSKA, HEATHER M. EVANS, CYRUS R. SAFINYA, Materials, Physics, and Molecular, Cellular and Developmental Biology Departments, UCSB, Santa Barbara, CA 93106 — Newly designed multivalent lipids ranging in head group charge from 4+ to 16+ have been synthesized and investigated as DNA delivery vectors. These dendritic lipids (DLs) allow a controlled study of the relationship between membrane charge density (σ) and transfection efficiency (TE). An earlier report from our group described that TE of different cationic lipids of charge 1+ to 5+ follows a common, bell shaped curve as a function of membrane charge density [1]. To further probe this universal behavior, the dendritic lipids with higher valence were designed in order to reach higher values of σ. Structural studies using x-ray diffraction reveal new phases, where cylindrical micelles of DLs form a hexagonal lattice which holds together a continuous DNA network, described as H_I^C [2]. The new hexagonal phase is highly transfecting in the regime where the TE of lamellar complexes follows a decrease in the bell curve. Small angle x-ray scattering studies have revealed a rich phase diagram of micelles made from DL/DOPC mixtures. Funding provided by NIH GM-59288 and NSF DMR-0503347. [1] A. Ahmad et al., *J. Gene Med.,* 2005, V7:739-748. [2] K. Ewert et al., *J. Am. Chem. Soc., (submitted).*

Cyrus R
Materials, Physics, and Molecular, Cellular and Developmental Biology Departments, UCSB, Santa Barbara, C

Date submitted: 07 Dec 2005 Electronic form version 1.4