Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Immune cell activation from multivalent interactions with liquid-crystalline polycation-DNA complexes NATHAN SCHMIDT, Bioengineering Department, UCLA, FAN JIN, Polymer Science and Engineering Department, USTC China, ROBERTO LANDE, Dermatology Department, Lausanne University Hospital, Switzerland, TINE CURK, Chemistry Department, University of Cambridge, UK, WUJING XIAN, Bioengineering Department, UCLA, LOREDANA FRASCA, Dermatology Department, Lausanne University Hospital, Switzerland, JURE DOBNIKAR, DAAN FRENKEL, Chemistry Department, University of Cambridge, UK, MICHEL GILLIET, Dermatology Department, Lausanne University Hospital, Switzerland, GERARD WONG, Bioengineering Department, UCLA — Microbial DNA can trigger type I interferon (IFN) production in plasmacytoid cells (pDCs) by binding to endosomal toll-like receptor 9 (TLR9). TLR9 in pDCs do not normally respond to self-DNA, but in certain autoimmune diseases self-DNA can complex with the polycationic antimicrobial peptide LL37 into condensed structures which allow DNA to access endosomal compartments and stimulate TLR9 in pDCs. We use x-ray studies and cell measurements of IFN secretion by pDCs to show that a broad range of polycation-DNA complexes stimulate pDCs and elucidate the criterion for high IFN production. Furthermore, we show via experiments and computer simulations that the distinguishing factor for why certain complexes activate pDCs while others do not is the self-assembled structure of the liquid-crystalline polycation-DNA complex.

Nathan Schmidt
UCLA Bioengineering Department

Date submitted: 15 Nov 2013 Electronic form version 1.4