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Electrostatic self-assembly between biological polymers & macroions: Interactions of F-actin & DNA with lysozyme LORI K. SANDERS[1], THOMAS E. ANGELINI[2], WUJING XIAN[3], University of Illinois at Urbana-Champaign, BRIAN W. MATTHEWS[4], Institute of Molecular Biology, GERARD C.L. WONG[5], University of Illinois at Urbana-Champaign — The pathological self-assembly of polyelectrolytes such as DNA and F-actin with cationic antimicrobial proteins such as lysozyme may have significant clinical consequences in Cystic Fibrosis (CF) lung infections. Wild-type lysozyme is a compact, cationic, globular protein which carries a net charge of +9e at neutral pH. Our Small Angle X-ray Scattering (SAXS) experiments on F-actin-lysozyme complexes indicate that the wild-type lysozyme close packs into 1-D columns between hexagonally organized F-actin filaments. We will present SAXS results of the interactions of F-actin and DNA with genetically engineered lysozyme mutants that carry a reduced charge of +5e. We have also used fluorescence microscopy to investigate the morphologies and sizes of such bundles induced with divalent cations, wild-type lysozyme, and mutant lysozymes.

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