Abstract Submitted for the MAR17 Meeting of The American Physical Society

Membrane-Mediated Self-Assemblies of Spherical Nanoparticles ERIC J. SPANGLER, Dept. of Biomedical Engineering, University of Memphis, P.B. SUNIL KUMAR, Dept. of Physics, Indian Institute of Technology Madras, India, MOHAMED LARADJI, Dept. of Physics and materials Science, University of Memphis — The understanding of membrane-mediated interactions between nanoparticles and their resulting aggregation is important to the use of nanomaterials in biomedical applications, their potential nanotoxic effects, and possibly for the use of biomembranes as a two-dimensional medium for the self-assembly of nanoparticles into structures that might be difficult to achieve otherwise. Using coarsegrained molecular dynamics simulations, we investigated the self-assembly of spherical nanoparticles on tensionless lipid membranes [1,2]. We found that the nanoparticles aggregate into a variety of structures that depend strongly on the nanoparticlelipid adhesion interaction, nanoparticle diameter, and size of nanoparticles aggregates. The sequence of structures observed, with increasing the nanoparticle-lipid interaction strength, corresponds to linear chains, trenches, rings, and tubes. We also found that decreasing the number of particles depresses clustering of the nanoparticles, an indication the nature of membrane-mediated aggregation of nanoparticles is highly cooperative. [1] M. Laradji, P.B. Sunil Kumar, and E.J. Spangler, J. Phys. D: Appl. Phys. 49, 293001 (2016) [2] E.J. Spangler, S. Upreti, and M. Laradji, J. Chem. Phys. **144**, 044901 (2016)

> Mohamed Laradji Univ of Memphis

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