Supporting Information: Non-Close-Packed Hexagonal Self-Assembly of Janus Nanoparticles on Planar Membranes

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SI. JANUS NANOPARTICLE MODEL

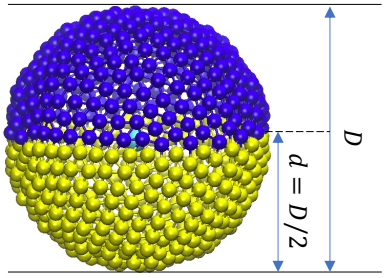

FIG. S1. Configuration of an equilibrated spherical Janus NP with $D = 20$ nm. a beads are yellow, and tend to adhere to the lipid membrane, b beads are blue and interact repulsively with the lipid beads. The cyan c-bead, at the center of NP, and is connected to all other beads by harmonic bonds (not shown for clarity) to maintain a spherical shape of the Janus NP. In this case, the Janusity $J = d/D = 0.5$, where d is the height of the spherical cap that interacts attractively with the lipid head beads.

SII. RELATIONSHIP BETWEEN ξ AND $\mathcal{E}$

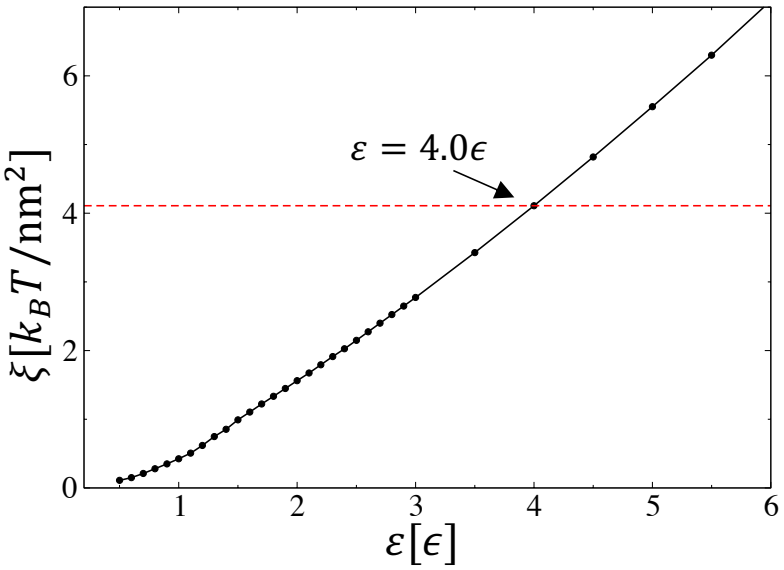

FIG. S2. The adhesion energy density, ξ, versus the interaction strength, $\mathcal{E}$, between a NP n_a-bead and a lipid h-bead. The red line indicates that the energy density $\xi = 4.11 k_B T/\text{nm}^2$ corresponds to $\mathcal{E} = 4.0\epsilon$.

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SIII. RADIAL DISTRIBUTION FUNCTION AT DIFFERENT VALUES OF THE ADHESION STRENGTH

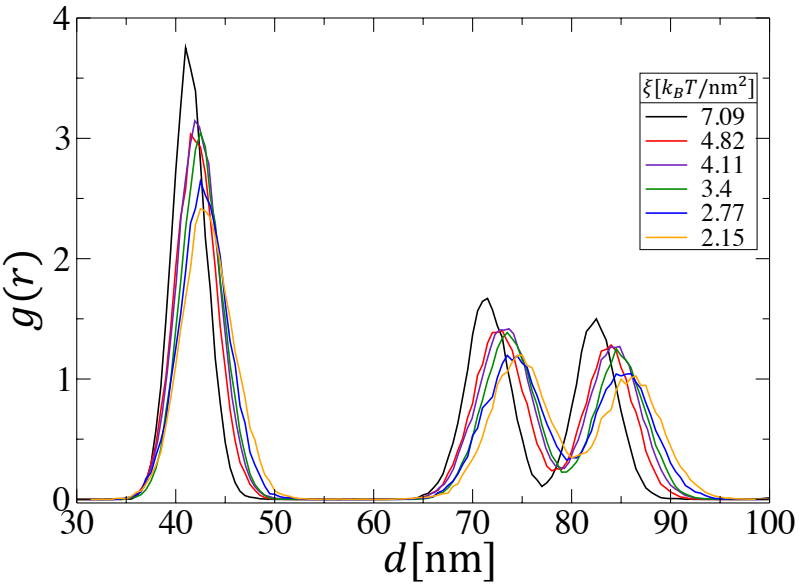

FIG. S3. Radial distribution function of the JNPs' centers at different values of ξ. This figure demonstrates that at high values of ξ, the effect of adhesion strength on the hexagonal order of the JNPs is weak.

SIV. ENDOCYTOSIS AND SELF-ASSEMBLY OF THE JNPS AT HIGH DENSITIES

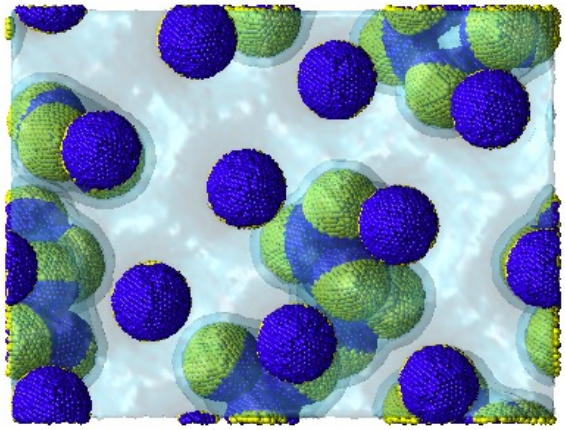

FIG. S4. An equilibrium snapshot in the case of an initial high density of the JNPs on the membrane, corresponding to $\rho = 5.91 \times 10^{-4}\,\mathrm{nm}^{-2}$. Some of the JNPs cluster then endocytosis. The remaining JNPs are self-assembled into a triangular lattice. Here $\xi = 4.11\,k_BT/\mathrm{nm}^2$.