How Tubular Aggregates Interact with Biomembranes: Wrapping, Fusion and Pearling

Electronic Supplementary Information

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The on-line electronic supplementary information (ESI) includes three videos and five figures:

Video S1: Full wrapping dynamics of cylindrical tube by membrane under strong tube-membrane adhesion strength.

Video S2: Pearling transition of tube on membrane surface under increased tube inner water pressure and weak tube-membrane adhesion.

Video S3: Wrapping dynamics of one pearled tube under increased tube-membrane adhesion.

Figure S1: Typical snapshots illustrating the evolution of membrane monolayer protrusion which wraps the tube from the top side.

Figure S2: Five independent DPD simulations confirming the heterogeneous wrapping dynamics along tube axial direction.

Figure S3: Promoted tube pearling by weak tube-membrane adhesion.

Figure S4: Restrained tube pearling by increasing tube-membrane adhesion strength.

Figure S5: Membrane wrapping of one pearled tube



Fig. S1 Typical snapshots illustrating the evolution of membrane monolayer protrusion which wraps the tube from the top side.



Fig. S2 Five independent DPD simulations confirming the heterogeneous wrapping dynamics along tube axial direction.



Fig. S3 Spontaneous pearling transition of tube by weak tube-membrane adhesion. A shows typical snapshots of tube pearling, B shows time evolution of tube surface area. The tube-membrane interaction parameter $a_{H_TH_M}$ and lipid density ρ_{LNPA} are set to 10.0 and 1.2, respectively.



Fig. S4 Restrained tube pearling by increasing tube-membrane adhesion strength. The lipid density representing the membrane tension is set to $\rho_{LNPA} = 1.4$. The tube-membrane interaction parameters $a_{H_TH_M}$ are set to 10.0 (A), 8.0 (B) and 0.0 (C), respectively.



Fig. S5 Membrane wrapping of one pearled tube. The lipid density ρ_{LNPA} and tubemembrane interaction parameter $a_{H_TH_M}$ are set to 1.5 and 0.0, respectively. The lower figure shows full wrapping of a longer pearled tube which is connected by four shorter tubes.