Electronic Supplementary Material (ESI) for Soft Matter.

Supplementary Information for "Sidewall contact regulating the nanorod packing inside vesicles with relative volumes"

Zeming Wu,[†] Hongyan Yuan,[‡] Xinyun Zhang[†], and Xin Yi[†*,]

[†] *Department of Mechanics and Engineering Science, College of Engineering, Peking University, Beijing 100871, China, and* [‡] *Department of Mechanical, Industrial and Systems, Engineering, University of Rhode Island, Kingston, Rhode Island 02881, United States*

E-mail: xyi@pku.edu.cn

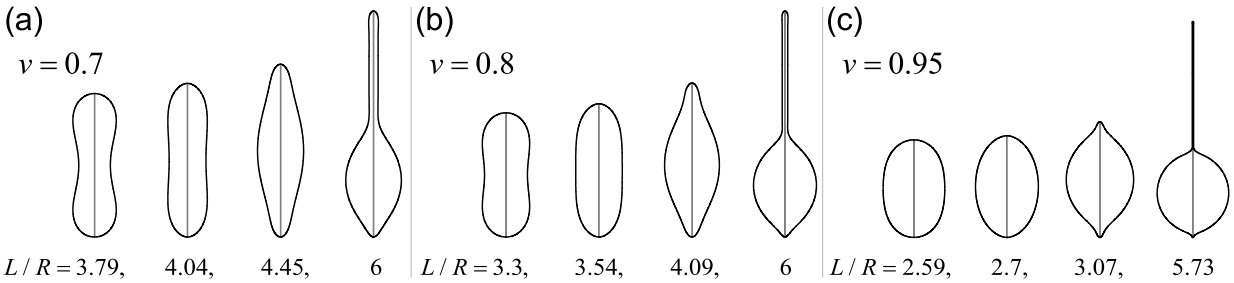

Fig. S1 Selected vesicle morphologies induced by the encapsulated cylindrical rigid nanorod of radius $a/R = 0.01$ at $v = 0.7$, 0.8 and 0.95.

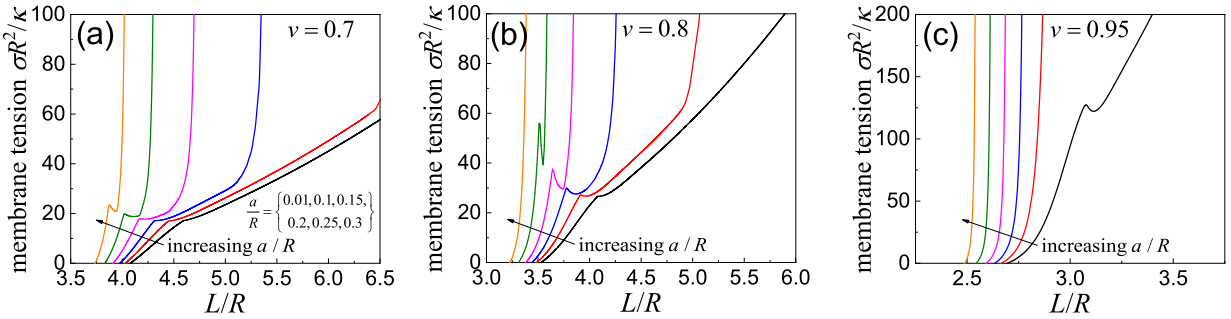

Fig. S2 Normalized effective membrane tension $\sigma R^2/\kappa$ as a function of the normalized length L/R of an encapsulated cylindrical nanorod at different reduced volumes $v = 0.7$, 0.8 and 0.95.

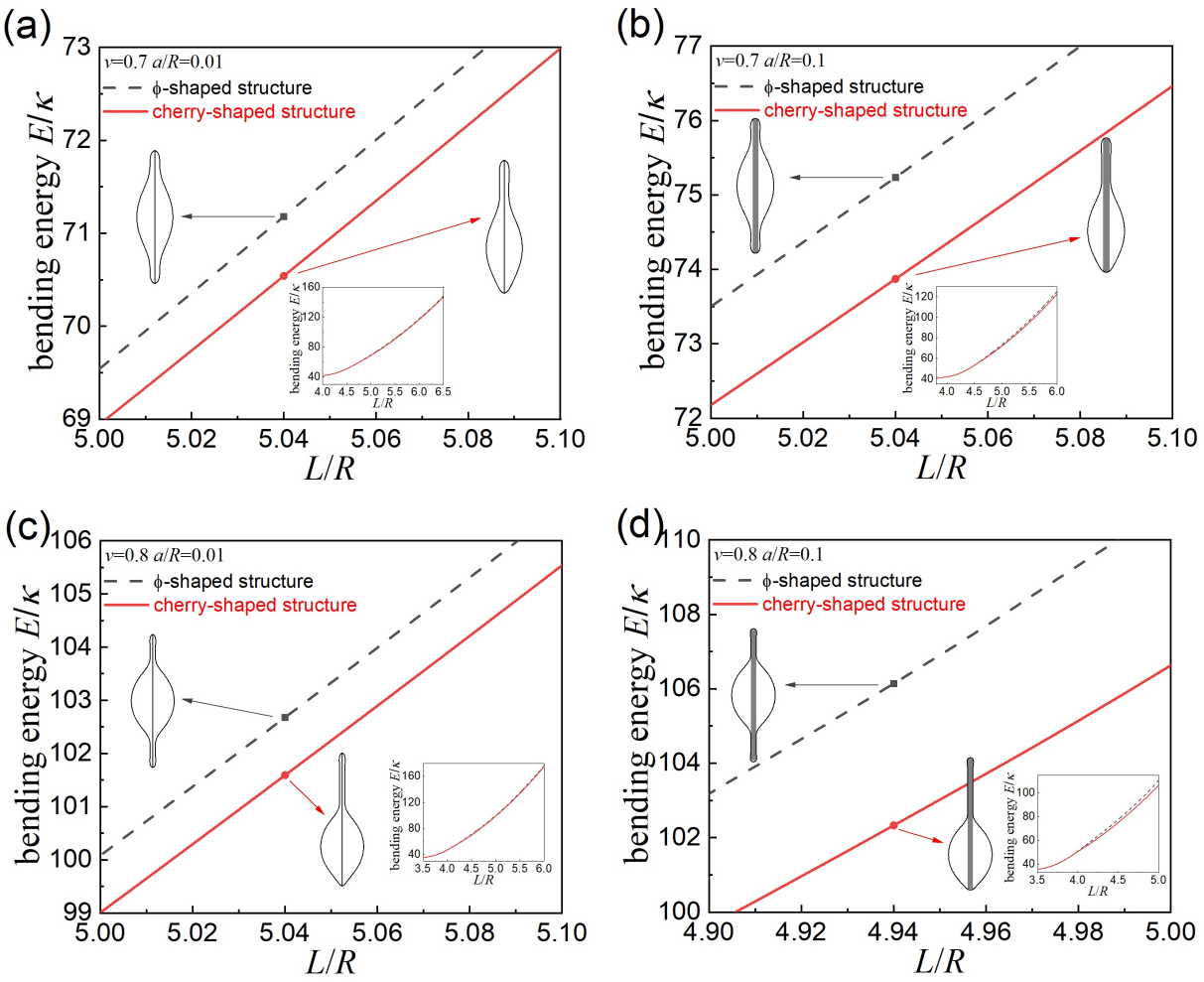

Fig. S3 The normalized deformation energy E/κ of the ϕ-shaped and cherry-shaped vesicle morphologies at $v = 0.7$ and 0.8 for cylindrical rigid nanorod of radius $a/R = 0.01$ and 0.1. Insets show the energy profiles in larger ranges of L/R.

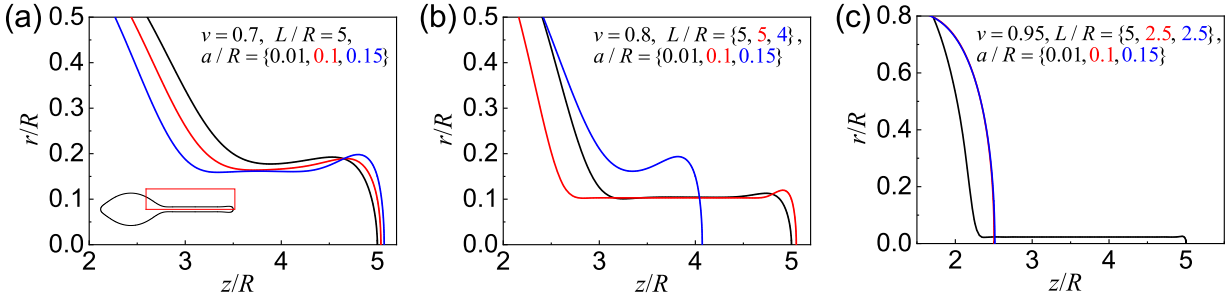

Fig. S4 Vesicle profiles magnified in the radial direction at different L/R and v. The profiles represent the zoomed-in vesicle portion in the red rectangle as illustrated in the inset in (a). The encapsulated nanorod is not shown here for clarity.

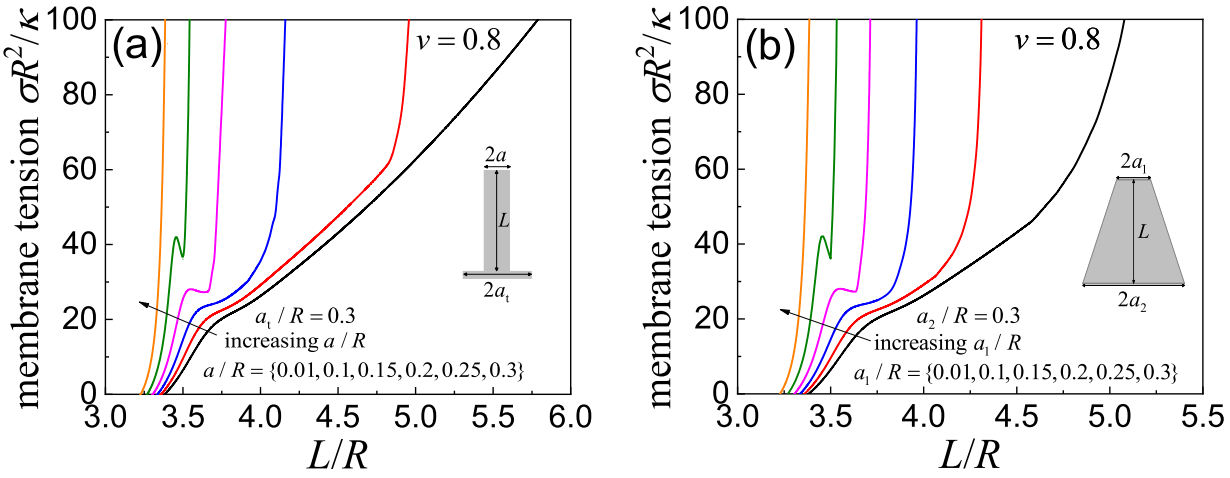

Fig. S5 The membrane tension $\sigma R^2/\kappa$ as a function of L/R for an encapsulated cylindrical nanorod with one widened tip (a) and a cone-shaped nanorod (b) at $v = 0.8$. Here a and a_t in (a) represent the radii of the rod wall and tip, respectively; a_1 and a_2 in (b) represent radii of the top and bottom ends of the cone-shaped nanorod, respectively. Insets illustrate the nanorod geometry.

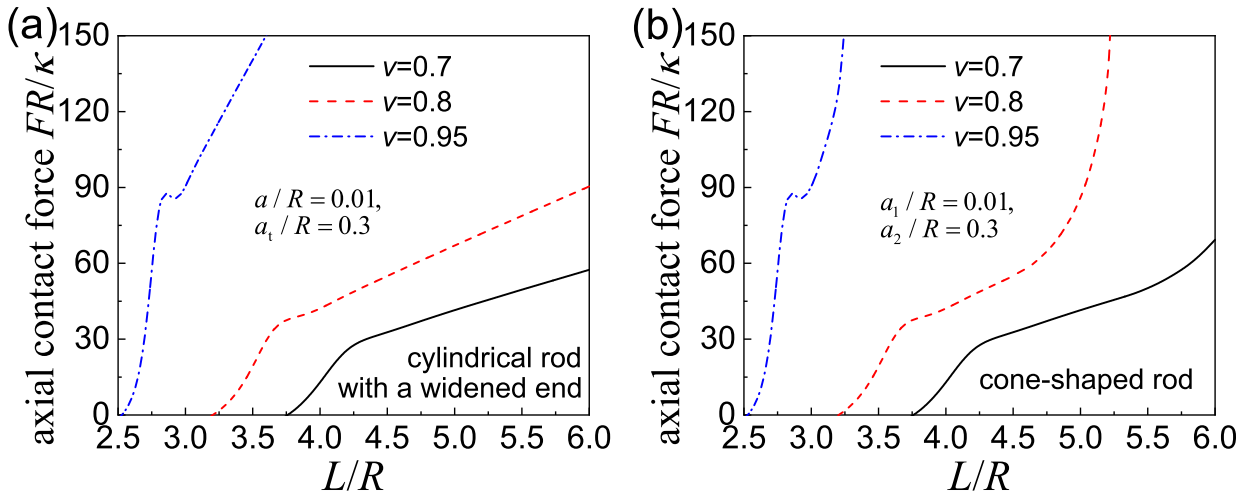

Fig. S6 Normalized axial contact force FR/κ as a function of L/R at different v for a cylindrical nanorod with one widened end (a) and a cone-shaped nanorod (b).