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Transition from Unilamellar to Bilamellar Vesicles Induced by an Amphiphilic Biopolymer SRINIVASA RAGHAVAN, JAE-HO LEE, Department of Chemical and Biomolecular Engineering, College Park, MD 20742, GREGORY PAYNE, Center for Biosystems Research, University of Maryland Biotechnology Institute, College Park, MD 20742, VIVEK AGARWAL, ARIJIT BOSE, Department of Chemical Engineering, University of Rhode Island, Kingston, RI 02881 — We report some unusual structural transitions upon the addition of an amphiphilic biopolymer to unilamellar surfactant vesicles. The polymer is a hydrophobically modified chitosan and it embeds its hydrophobes in vesicle bilayers. We study vesicle-polymer mixtures using small-angle neutron scattering (SANS) and cryo-transmission electron microscopy (cryo-TEM). When low amounts of the polymer are added to unilamellar vesicles of *ca.* 120 nm diameter, the vesicle size decreases by about 50%. Upon further addition of polymer, lamellar peaks are observed in the SANS spectra at high scattering vectors. Using a model developed by Nallet *et al.*, we show that the SANS data corresponds to a co-existence of unilamellar vesicles and bilamellar vesicles (i.e., vesicles with two bilayers). The transition to bilamellar vesicles as well as the changes in unilamellar vesicle size are further confirmed by cryo-TEM. A mechanism for the polymer-induced transition from uni- to bilamellar vesicles is proposed.

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