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### **Fusion, Fission, and Membrane Microdomains**

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In biology, curvature of intracellular membranes plays a key role in defining compartments to organize the interior of a cell and in creating the optimal shapes of organelles for function. We have studied how membrane curvature plays a crucial role in determining the energetics of membrane fusion in a number of systems. How the proteins that catalyze membrane fusion in cellular secretion and in viral fusion will be discussed in detail. Newer work on the role of proteins in the budding of viruses during assembly will be presented. The assembly of viruses also requires a concentration of viral protein components in the membrane. Recent experiments on cells expressing the influenza hemagglutinin show a clustering of proteins at many length scales. The dependence on cell cholesterol of this clustering (microdomain formation) will also be discussed.