

Physical Chemistry Student Seminar

“Characterization of Viral Capsid Protein Self-Assembly Around Short Single-Stranded RNA”

The packaging of single-stranded RNA (ss-RNA) viral genome is unequivocally coupled with capsid assembly. This process is spontaneous, driven by capsid protein-capsid protein (CP) and CP-RNA interactions. Some ss-RNA viruses have evolved to split their genome into two or more RNA molecules (multipartite viruses). In fact, among multipartite ssRNA viruses, co-packaging of two or more RNA molecules is a very common strategy. However, to date there are no conclusive studies on the mechanism(s) that lead to multiple RNAs being packaged in a single capsid, mainly because during the course of an infection it is almost impossible to uncouple RNA replication from capsid assembly. In the present study we focus on RNA co-packaging in vitro by using cowpea chlorotic mottle virus (CCMV) CP and a 500-nt long RNA. Using biophysical and single-molecule techniques our goal is to understand, the simplest scenarios for how short equal-length RNAs can be co-packaged by capsid proteins as a consequence of generic CP-RNA interactions.

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