

# Characterization and Control of Surfactant-Mediated Norovirus Interactions

## **Supplementary Information**

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The SI provides additional information and raw light scattering data. Fig. S1 includes the correlation data for representative conditions of the data shown in Figs. 1-4 of the main article. These curves demonstrate the quality of DLS data included in the article. Figs. S2 and S3 show VLP behavior in solutions of varying concentrations of CTAB and SDS at pH 7.4 as well as pH values near and below the isoelectric point. In each of these measurements, pH adjustments were made after the addition of surfactant. For further analysis of the combined effects of pH and surfactant type and concentration on VLP behavior, the order of pH adjustment, surfactant addition, and VLP addition are very important. Also, the CMC of each surfactant and micelle size and shape at varying pH values need careful consideration.





**Fig. S1** Raw correlation data used in fitting the DLS size data for VLPs at selected conditions shown in Figs. 1-4. DLS data fit show a single peak for VLPs in buffer at pH 5.4, pH 7.4, and pH 7.4 with 0.01% CTAB. The correlation data for these conditions show a sharp decline in correlation coefficient at different times, indicating a good fit for a monomodal distribution. DLS data fits have multiple peaks for VLPs in buffer at pH 7.4 with 0.05% SDS and 0.5% Tween 20. The correlation data for the SDS condition shows a gradual decline in correlation coefficient over time, indicating the presence of a broad distribution of particle size. The correlation data for 0.5% Tween 20 show a sharp decline followed by gradual leveling in correlation coefficient over time, indicating the presence of multiple particle size peaks.





**Fig. S2** Intensity distributions from DLS experiment of Norovirus VLPs in PBS at varying pH containing 0.01%, 0.05%, 0.1%, and 0.5% CTAB. pH adjustments were made after surfactant addition to VLPs. Differences in VLP behavior at low pH from VLP behavior at pH 7.4 exist mainly at 0.05% and 0.1% CTAB. VLPs at low pH are less likely to be dispersed at these CTAB concentrations probably due to approaching or passing through the isoelectric point after surfactant addition. At pH values below the isoelectric point, peaks appear less broad probably due to pH-induced aggregation after passing through the isoelectric point.





**Fig. S3** Intensity distributions from DLS experiment of Norovirus VLPs in PBS at varying pH containing 0.01%, 0.05%, 0.1%, and 0.5% SDS. pH Adjustments were made after surfactant addition to VLPs. Major differences in VLP behavior at low pH and VLP behavior at pH 7.4 exist at 0.01% and 0.05% SDS. VLPs are more aggregated at these concentrations, probably due to approaching or passing through the isoelectric point after surfactant addition. At 0.05% SDS, the smallest diameter peak at low pH is larger than in other conditions possibly due to larger portions of the capsid or different sized micelles.