Size Characterization of Plasma Membrane Vesicles, Virus Particles, and Microvesicles

CNF Project Number: 2575-17

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Primary Source of Research Funding: National Science Foundation

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Primary CNF Tools Used: Nanosight

Abstract:

Nanosight was used to determine the concentration and size distribution of various biologically relevant particles, including viruses and plasma membrane vesicles.

Summary of Research:

Our research investigates interactions of biologically relevant particles (viruses, microvesicles, plasma membrane vesicles) on a supported lipid bilayer. Most of the particles used are generated in-house and as such, it is important to characterize them (diameter, size distribution, concentration of particles) to ensure that we are using the similar quality and concentration of particles across various experiments for consistency. The concentration is especially important as too much or too little of the plasma membrane vesicles used to form the supported lipid bilayer will influence the bilayer's diffusivity and patchiness. Typical sizes of viruses and plasma membrane vesicles that we use range from 100-200 nm and typical values of concentration are on the order of 10^8 particles/mL (for plasma membrane particles) and 10^{10} particles/mL for viruses.

After characterizing the particles, they are most often used to study the particle interaction on a supported lipid bilayer under total internal reflection fluorescence microscopy (TIRFM). TIRFM only excites fluorophores within 100 nm so we can distinguish between particles that are interacting with the bilayer versus particles that are in the bulk solution.

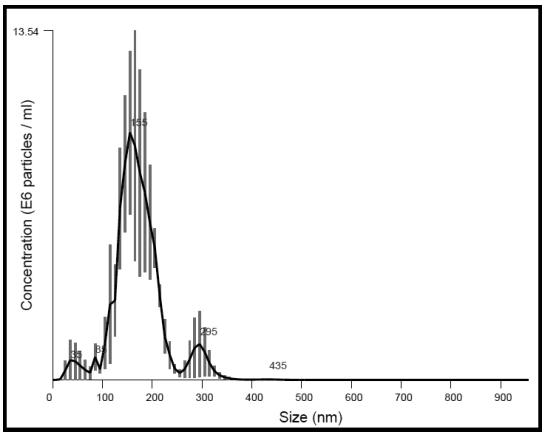

Figure 1: Concentration vs. size (nm) distribution plot for pseudotyped virus particles.

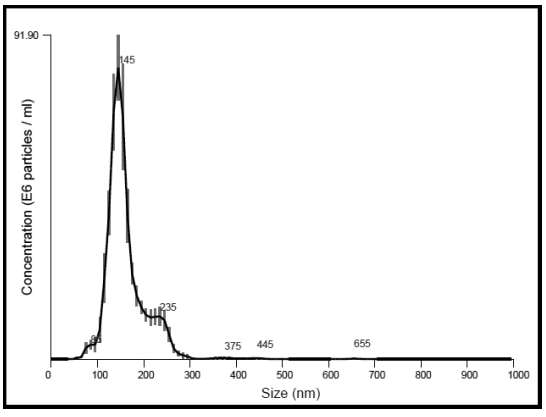

Figure 2: Concentration vs. size (nm) distribution plot for plasma membrane vesicles.