

Study of vesicle size distribution dependence on pH value based on nanopore resistive pulse method

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Abstract

Vesicles are low-micron to sub-micron spheres formed by a lipid bilayer shell and serve as potential vehicles for drug delivery. The size of vesicle is proposed to be one of the instrumental variables affecting delivery efficiency since the size is correlated to factors like circulation and residence time in blood, the rate for cell endocytosis, and efficiency in cell targeting. In this work, we demonstrate accessible and reliable detection and size distribution measurement employing a glass nanopore device based on the resistive pulse method. This novel method enables us to investigate the size distribution dependence of pH difference across the membrane of vesicles with very small sample volume and rapid speed. This provides useful information for optimizing the efficiency of drug delivery in a pH sensitive environment.