

## **Quantitative Analysis of the Cellular Uptake of Liposomes by Live Cell Microscopy**

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In recent years, liposome-mediated methods have become useful tools for cellular transfection, and potentially applicable to gene therapy [1]. Cellular internalization of liposomes is the primary barrier need to be overcome for gene transfer. Numerous liposomes have been synthesized and structurally modified for improvement of internalization efficiency [2]. In the present study, a novel strategy was proposed for the quantification of lipophilic dye stained liposomes in cell and at cell surface, respectively. Cells were settled on top of liposomes coated glasses rather than adding liposomes to adherent cells. In this approach, total internal reflection fluorescence (TIRF) microscopy was applied to monitor liposomes attached with the basal surface of cells, and the sequential Z-series images of intracellular liposomes were captured by dynamic confocal microscopy in real time. Through the two high spatiotemporal resolution microscopy, the liposomes at cell surface were counted and the total fluorescent intensity in cell was calculated versus time. A LabView software was built to analyze internalization efficiency of liposomes. Furthermore, subcellular localization of liposomes in cytosol or vesicles was quantified based on dynamic confocal images. This method enabled the quantitative analysis of the cellular uptake of liposomes and provided useful information for optimizing nonviral gene delivery systems.

**KEY WORDS:** Liposome, cellular uptake, quantification, live cell microscopy

### **REFERENCES**

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