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Assembly and Characterization of NanoComplexes: Quantum Dot Encapsulated Liposomes ANGELA HIGHT WALKER, EMREN ESENTURK, PETER YIM, JEESEONG HWANG, Physics Laboratory, National Institute of Standards and Technology (NIST) — Liposome complexes have received significant attention for a variety of biochemical and biomedical applications including drug targeting and drug delivery and tumor imaging and diagnostics. Semiconductor nano-crystals, also known as quantum dots, are now beginning to be used in similar biochemical experiments. Like fluorescent dyes, these quantum dots have the ability to reliably fluoresce at pre-engineered wavelengths. However, these nanocrystals have lifetimes significantly longer comparable to fluorescence dye counterparts. We have successfully encapsulated approximately 10nm CdSe nano-crystals inside approximately 100nm liposomes and studied the resulting complex using fluorescence resonance energy transfer (FRET) microscopy. Further studies were performed using transmission electron microscopy (TEM) showing the details of the encapsulation, and Raman spectroscopy to examine their structural details. Our nano-manufactured quantum dot liposome complexes do not bleach over periods of hours and are general enough to allow the addition of drugs targeted for the vectored cells thus offering the ability to both image and medicate simultaneously over a long period of time.

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