

MAR05-2004-020016

Abstract for an Invited Paper
for the MAR05 Meeting of
the American Physical Society

In vivo imaging with quantum dots encapsulated in phospholipid micelles

BENOIT DUBERTRET

While fluorescent semiconductor nanocrystals (quantum dots) promise to revolutionize biological imaging, their use has been limited by difficulties in obtaining nanocrystals that are bio-compatible. To address this problem, we encapsulate individual nanocrystals in phospholipid block-copolymer micelles, and demonstrate both in vitro and in vivo imaging. When conjugated to DNA, the nanocrystal-micelles act as in vitro fluorescent probes to hybridize to specific complementary sequences. More importantly, when injected into *Xenopus* embryos, the nanocrystal-micelles are stable, non-toxic ($<5 \times 10^9$ nanocrystals per cell), cell autonomous, and slow to photobleach. Nanocrystal fluorescence can be followed to the tadpole stage, allowing lineage tracing experiments in embryogenesis.