Supplementary information:

1. Material and methods

A simple, 10 minute method was used to encapsulate QDs in PEG-PE/PC micelles. Typically, 100μL of ZnS-overcoated CdSe QDs in hexane (170 mg/mL), synthesized according to standard methods (*1,2*), were precipitated with methanol and dried under vacuum. The QDs were then suspended in 1mL chloroform with $5.5x10^{-6}$ moles of phospholipids containing 40% 1,2-dipalmitoyl-*sn*-glycero-3-phosphoethanolamine-N-[methoxy(polyethylene glycol)-2000] (mPEG-2000 PE) and 60% of 1,2-dipalmitoyl-glycero-3-phosphocholine (DPPC), both from Avanti Polar Lipids, Inc., Alabaster, AL. After complete evaporation of the chloroform, the residue was heated at 80C and 1mL of water was added to obtain an optically clear suspension containing PEG-PE/PC micelles. Since this suspension contained both empty micelles and those containing QDs, the empty micelles were removed with ultracentrifugation at 500,000g for two hours. The micelles containing QDs formed a pellet while the empty micelles stayed suspended. The supernatant was discarded and the QD-micelles were resuspended in water.

All of the micelles used in this work contained 60% DPPC due to the initial belief that the DPPC would allow better packing of the PEG chains on the surface of the micelle. However, preliminary results also indicate that QD-micelles made from 100% mPEG-2000 PE are similar in behavior.

Conjugation of QD-micelles with DNA was obtained by replacing 50% of the mPEG-2000 PE with an amino PEG-PE (1,2-distearoyl-*sn*-glycero-3-phosphoethanolamine-N-[amino(polyethylene glycol)2000] (Avanti Polar Lipids, Inc, Alabaster, AL). The DNA (purchased from Midland Certified Reagent Company,

Midland, TX) contained a disulfide group at the 5' end. The disulfide bond was cleaved with dithiothreitol (DTT) and the oligonucleotide was purified of excess DTT. The coupling of the DNA to the QD-micelle was performed using Sulfosuccinimidyl 4-(N-maleimidomethyl)cyclohexane-1-carboxylate (Sulfo-SMCC) (Pierce, Rockford, IL).

To determine the number of QDs injected into the embryo, the absorbance of an aqueous suspension of QD-micelles was measured in a cuvette of known path length. From recently reported values for the extinction coefficient of CdSe QDs (*3*), the concentration of QDs could be obtained.

References:

1. C. B. Murray, D. J. Norris, M. G. Bawendi, *J. Am. Chem. Soc.* **115**, 8706 (1993).
2. M. A. Hines, P. Guyot-Sionnest, *J. Phys. Chem.* **100**, 468 (1996).
3. C. A. Leatherdale, W.-K. Woo, F. V. Mikulec, M. G. Bawendi, *J. Phys. Chem.* **106**, 7619 (2002).

2.Supporting figure

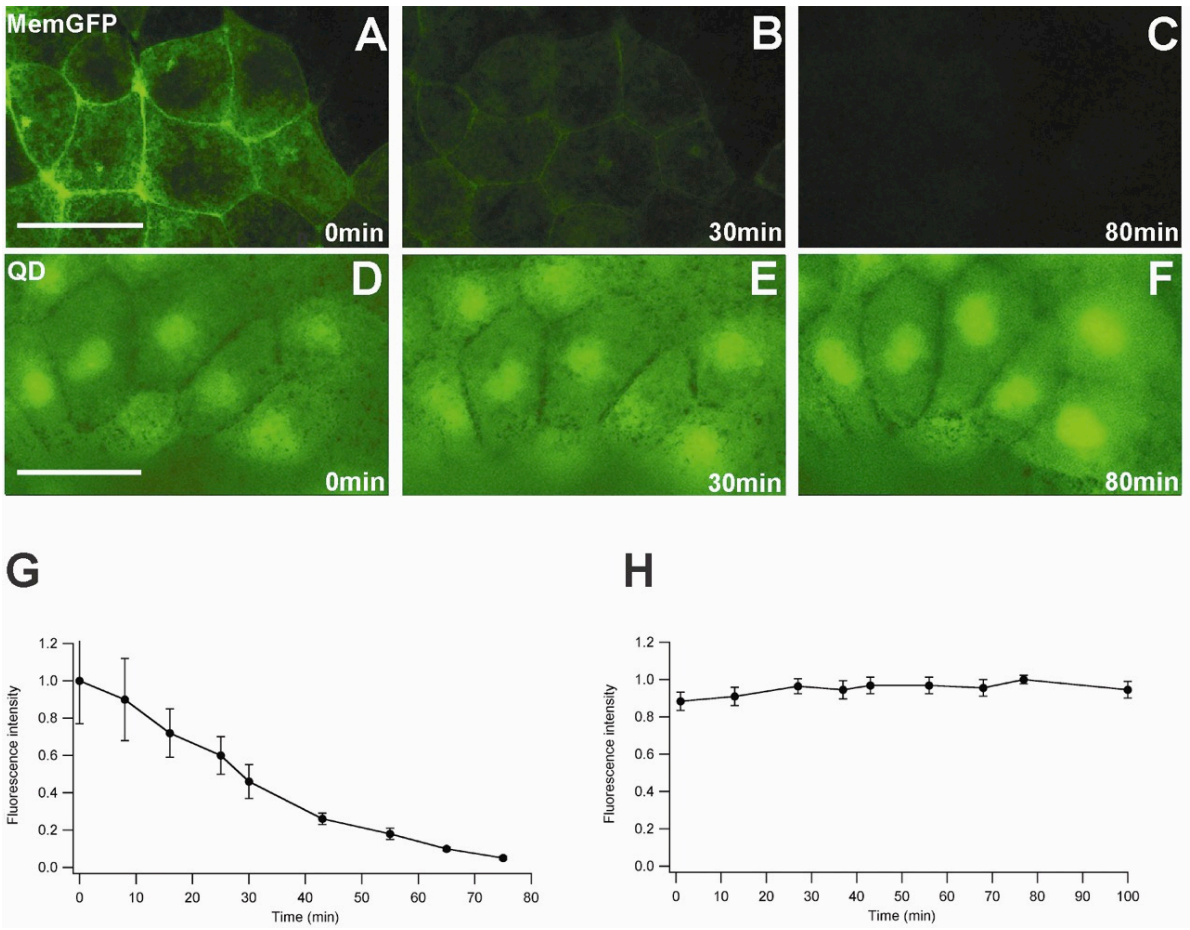

Figure S1 legend: QD resistance to photobleaching compared to GFP. (A) through (C) are consecutive images of membrane-GFP expressed in *Xenopus* ectoderm (animal pole). (D) through (F) are consecutive images of QD-injected *Xenopus* animal pole blastomeres. (G) and (H) are graphs representing the GFP and QD fluorescence intensity respectively through an 80min period during which both fluorophores were exposed to continuous excitation. (Bar = 30μm).

3. Online movies

Movie1 (qdbleaching(compressed).AVI)

Time lapse imaging of QD injected ectodermal cells under constant excitation.

Movie2 (QD nuclear translocation 1(compressed).AVI)

QD's are cytoplasmic at early blastula stages but become nuclear (punctate staining) at laste blastula stages.

Movie3 (QD nuclear relocalization Short(compressed).AVI)

Higher magnification movie of the nuclear translocation of the QD's at late blastula stages.