Figure S1. Plasmonic property of gold nanorod disappearad with time if Au nanorod and hydrophobic CdSe-ZnS are mixed in reverse micelle, suggesting that nanorod reacts with CdSe-ZnS in few minutes. However, if borohydride is present in the medium the nanorod plasmon remains almost stable for hours, indicating that borohydride prevents the nanorod reaction/degradation.
Figure S2. Energy-dispersive X-ray (EDX) spectra of gold nanorod-QD hybrid. Presence of Au, Cd, S, Se peaks suggest the composite nature of nanoparticle.
Figure S3. Energy-dispersive X-ray (EDX) spectra of gold nanorod-$\gamma$-Fe$_2$O$_3$-QD hybrid. Presence of Au, Fe, Cd, S, Se peaks suggest the composite nature of nanoparticle.
Figure S4. Absorption and fluorescence property of QD (a) and absorption spectrum of gold nanorod (b) that have been used for hybrid nanoparticle synthesis.
Figure S5. Absorption (top panel) and fluorescence spectra (bottom panel) of a representative gold nanorod-QD hybrid solution in PBS buffer having different pH. Digital images of respective solutions are shown in left side.

Figure S6. Imaging of HepG2 cell with control nanorod-QD without any surface bound glucose. All other labelling conditions were same.