Electronic Supplementary Material (ESI) for Nanoscale

Supplementary Information

Visible Light-Sensitive APTES-Bound ZnO Nanowire toward a Potent Nanoinjector Sensing Biomolecules in a Living Cell

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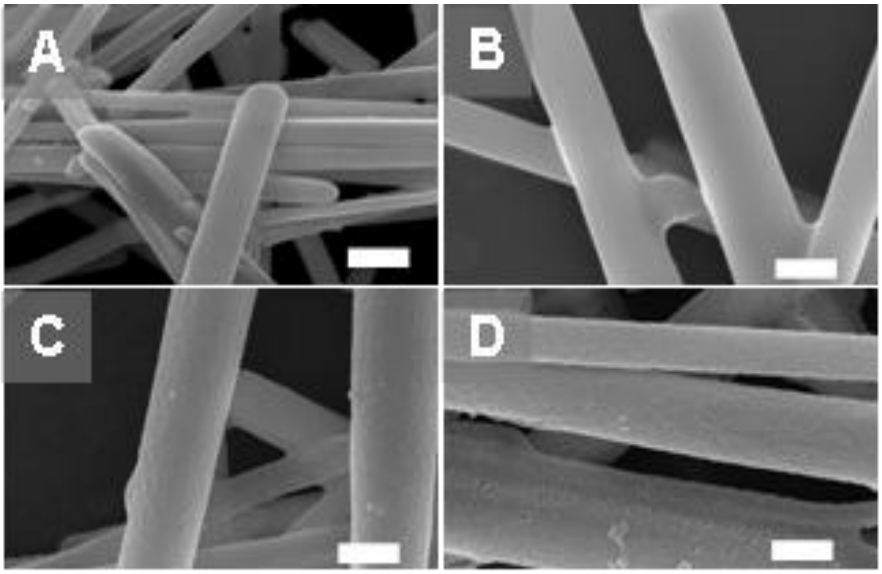


Fig S1. SEM images of ZnO NWs (A), APTES-ZnO NWs (B), *ss* DNA-APTES-ZnO NWs (C) and *ds* DNA-APTES-ZnO NWs (D). White scale bars indicate 400 nm.

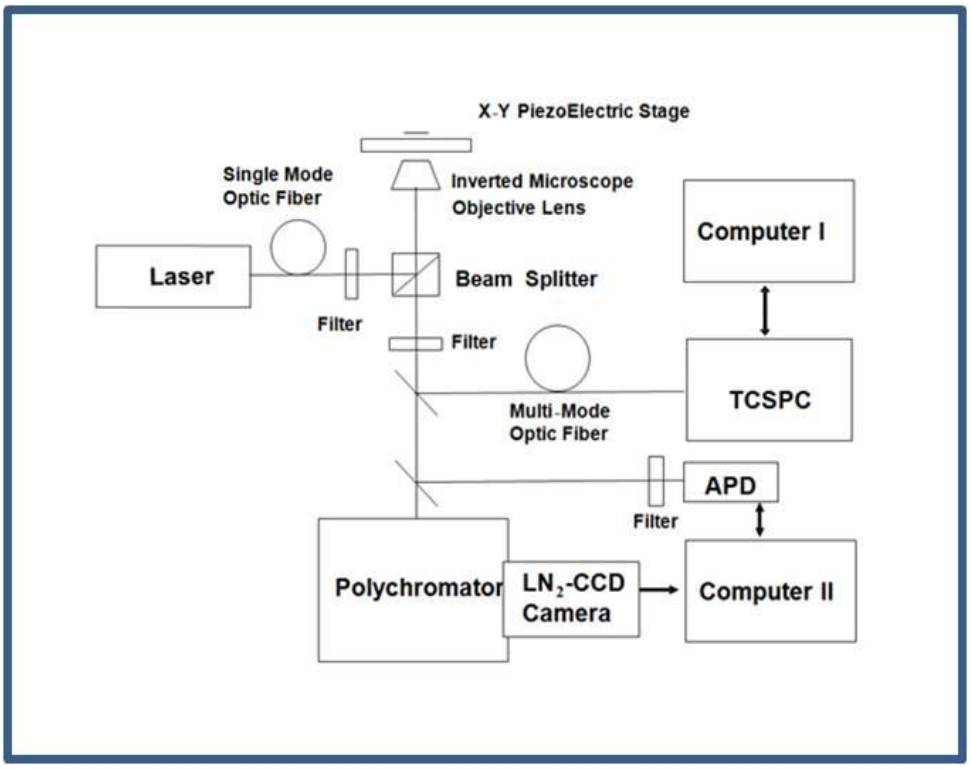


Fig S2. Layout of laser confocal scanning microscope (LCSM)-coupled spatial and ps-time-resolved PL system. The sample is mounted on a piezoelectric x, y scanning stage. Light from a laser is coupled onto the single-mode optical fiber, illuminating the sample through the objective lens.

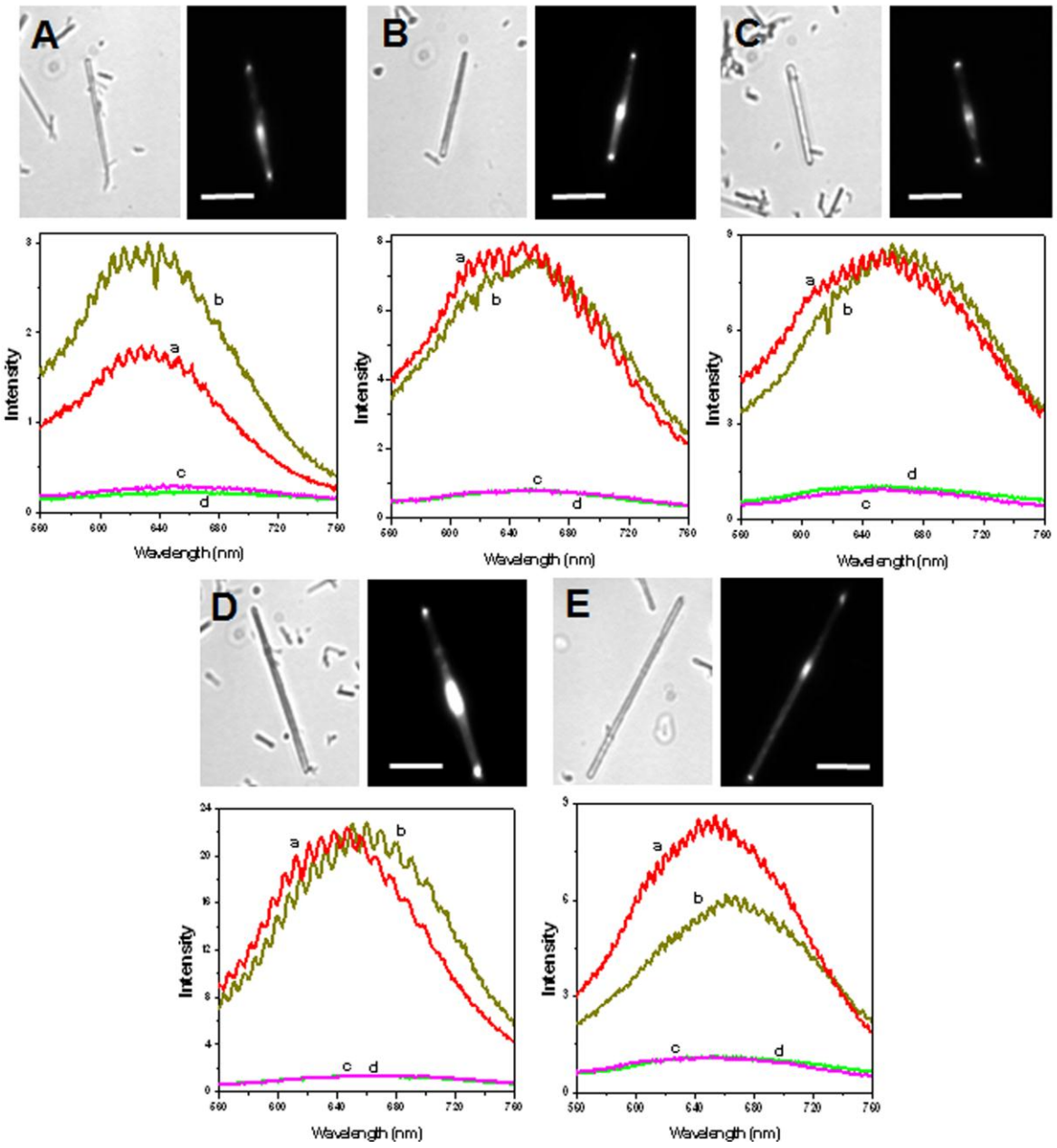
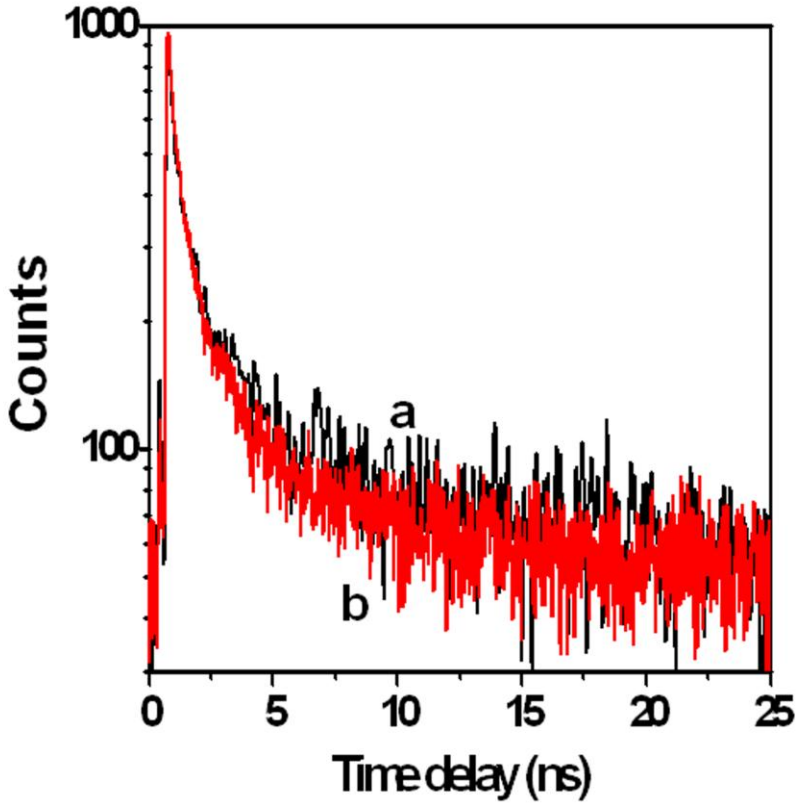


Fig S3. Bright-field and PL images of different single ZnO NWs. Emission spectra were collected from the tip and body of the selected single ZnO NW (A), APTES-ZnO NW (B), *ss* DNA-APTES-ZnO NW (C), complementary *ds* DNA-APTES-ZnO NW (D) and non-complementary *ds* NA-APTES-ZnO NW (E). Excitation wavelength was 410nm. (a): tip of the selected single ZnO NW (b): body of the selected single ZnO NW.



λ_{em}=650nm	τ_1(ns) (%)	τ_2 (ns) (%)	τ (average)	χ^2
APTES-ZnO NWs	0.41 (25.2)	3.72 (74.8)	2.89	1.040
*ds*DNA-APTES-ZnO NWs	0.47 (33.5)	3.02 (66.5)	2.17	1.050

Fig S4. PL decay profiles of APTES-ZnO NWs (a) and complementary *ds* DNA-APTES-ZnO NWs (b). The fluorescence decays were measured with 410 nm light by using time-correlated single photon counting method with a self- mode-locked femtosecond Ti;sapphire laser (Coherent model Mira 900) pumped by a Nd:YVO_4 laser (Coherent Verdi).

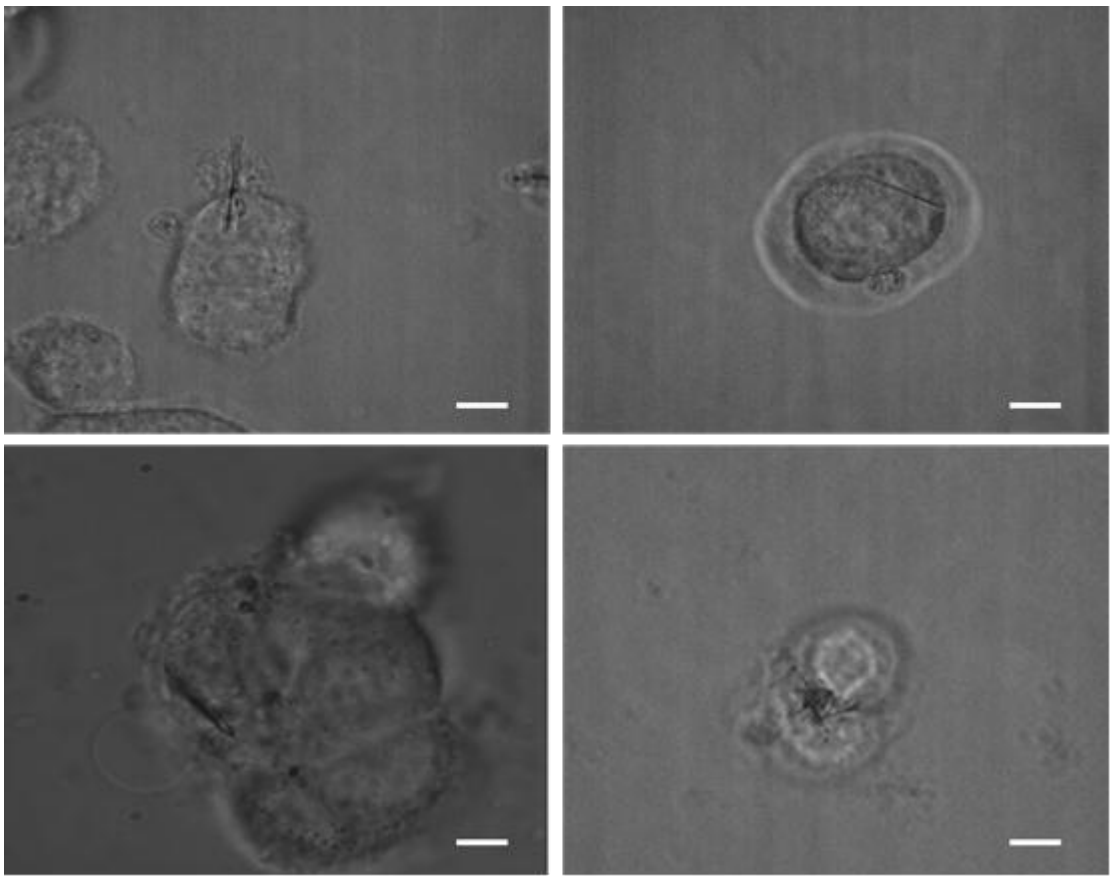


Fig S5. Bright-field confocal microscopic images of a single APTES-ZnO NW in 293 cell. The scale bar is 10μm.

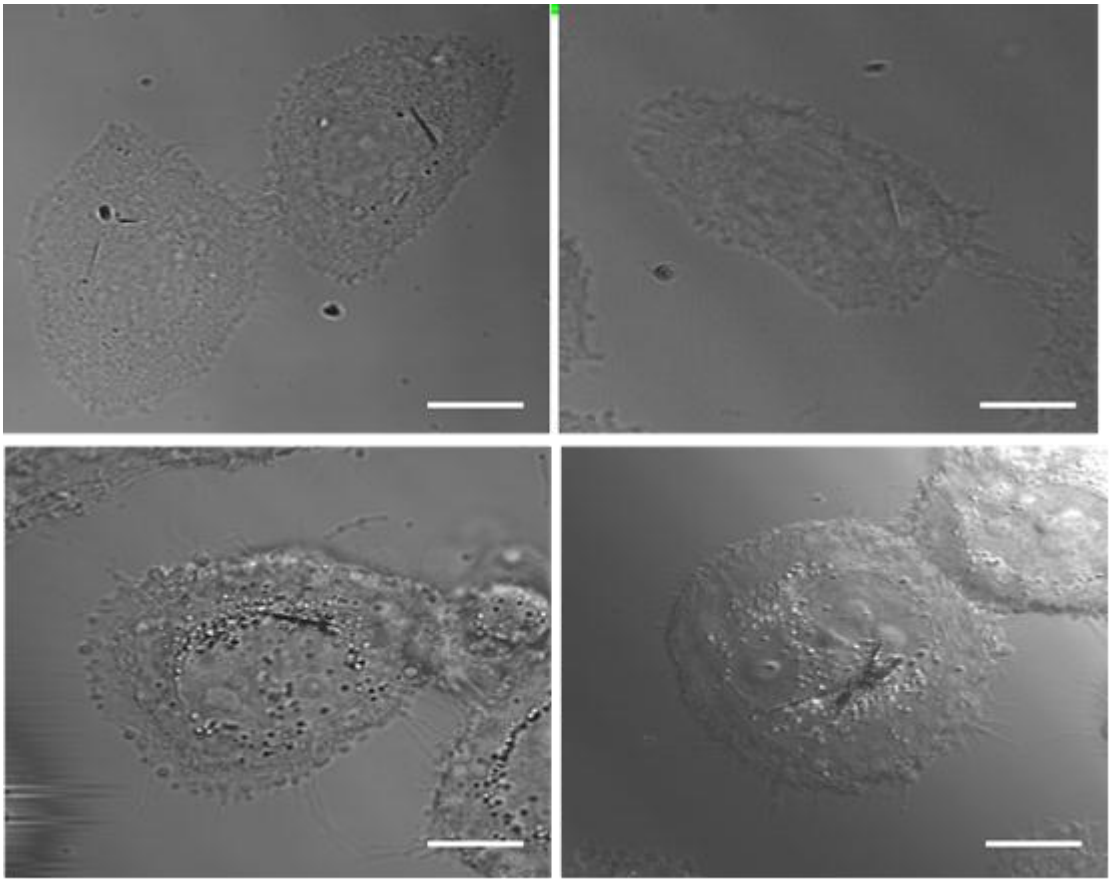


Fig S6. Bright-field confocal microscopic images of a single APTES-ZnO NW in HeLa cell. The scale bar is 10μm.

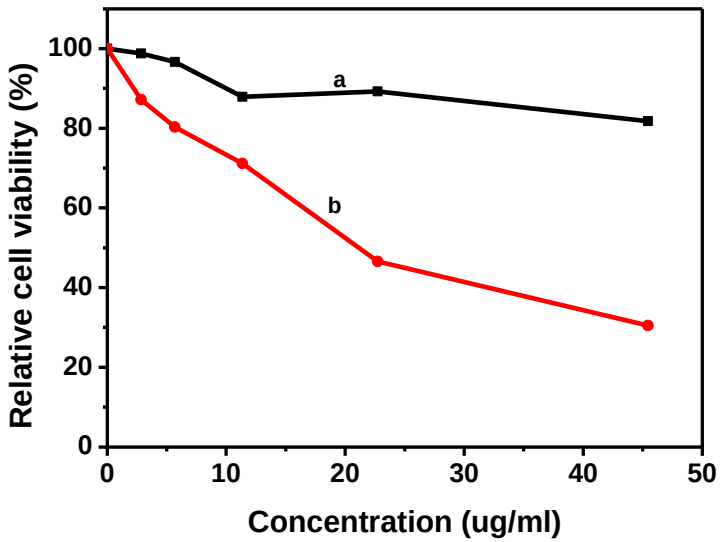


Fig S7. Effect of APTES-ZnO NWs on viability of HEK 293 cells which were seeded 2 x 10^4 cells per well in a 96 well plate. After 24 hours seeding, the cells were exposed to the indicated concentrations of each carrier for 2 days. Relative cell viability was calculated, regarding the absorbance at 570 nm of intact HEK 293 cells as 100%. The absorbance is directly proportional to the number of living cells. (a) APTES-ZnO NWs, (b) PEI 25KDa.