Supporting Information for:

Photo-regulated aptamer sensor for spatiotemporally controlled monitoring of ATP in mitochondria of living cells

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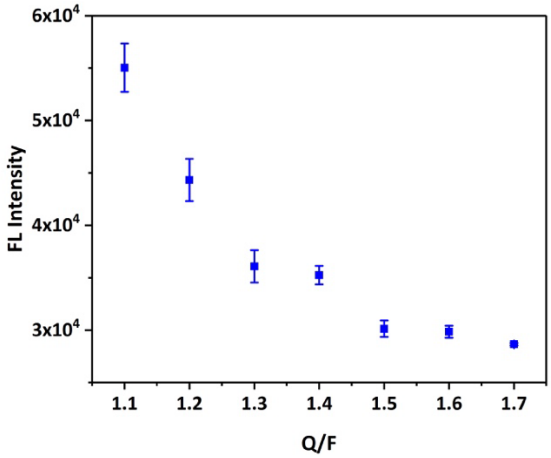

Figure S1. Fluorescence quenching efficiency of different molar ratios of PC-Blocker-Q strand with 200 nM aptamer strand. Q represents PC-Blocker-Q strand, F represents aptamer strand.

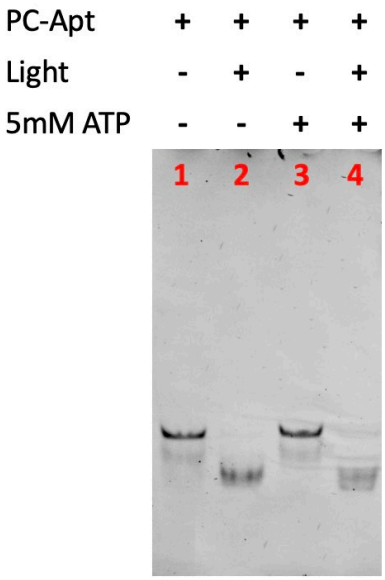

Figure S2. Analysis by 12 % native PAGE. Lane 1: 200 nM PC-Apt; lane 2: 200 nM PC-Apt with light irradiation; lane 3: 200 nM PC-Apt with 5 mM ATP; lane 4: 200 nM PC-Apt with 5 mM ATP and light irradiation. Light irradiation time was 10 min.

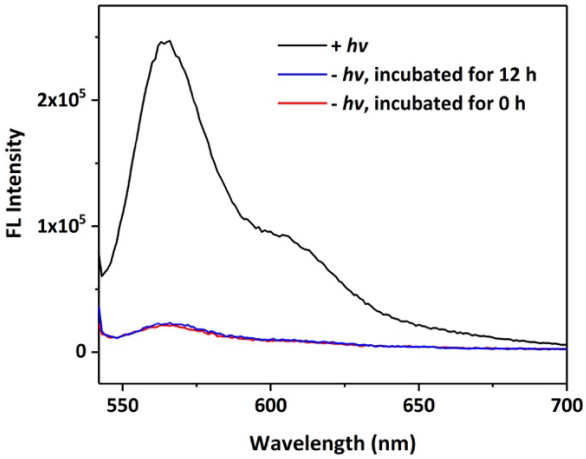

Figure S3. Feasibility and stability of PC-Apt sensors in lysate of 5000 cells. Red Curve, fluorescence spectra of 200 nM PC-Apt probes mixed with 5 mM ATP in cell lysate solution without light irradiation. Blue curve, fluorescence spectra of 200 nM PC-Apt probes with 5 mM ATP incubated in cell lysate for 12 h without light irradiation. Black Curve, fluorescence spectra of 200 nM PC-Apt probes with 5 mM ATP incubated in cell lysate for 12 h followed by 20 min *hv* light irradiation. Ex: 530 nm, Em: 540 - 700 nm.

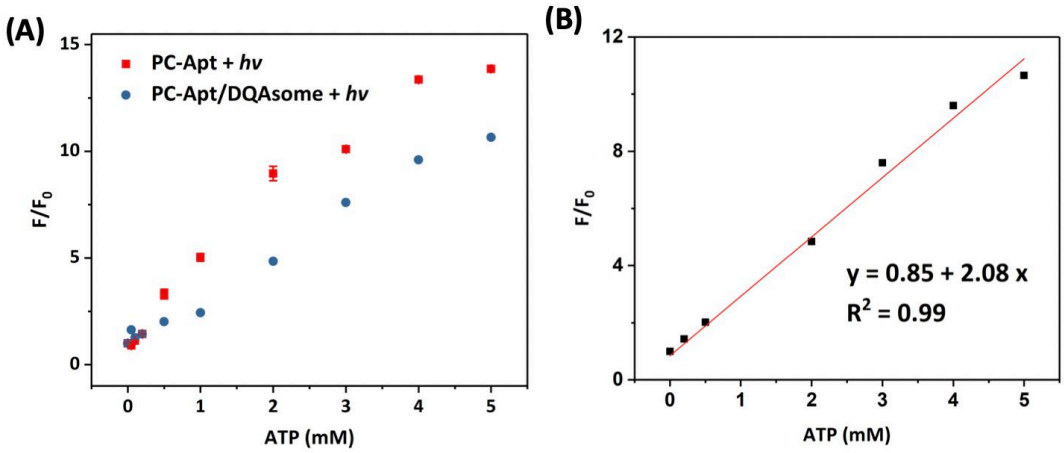

Figure S4. (A) Comparison of the fluorescence change between PC-Apt and PC-Apt/DQAsome complex with 365 nm light (*hv*) exposure when incubated with different concentrations of ATP. [ATP] = 0, 0.05, 0.1, 0.2, 0.5, 1, 2, 3, 4, 5 mM. Ex = 530 nm, Em = 565 nm. (B) Linear relationship between fluorescence and various concentrations of ATP of PC-Apt/DQAsome complex after 365 nm light exposure.

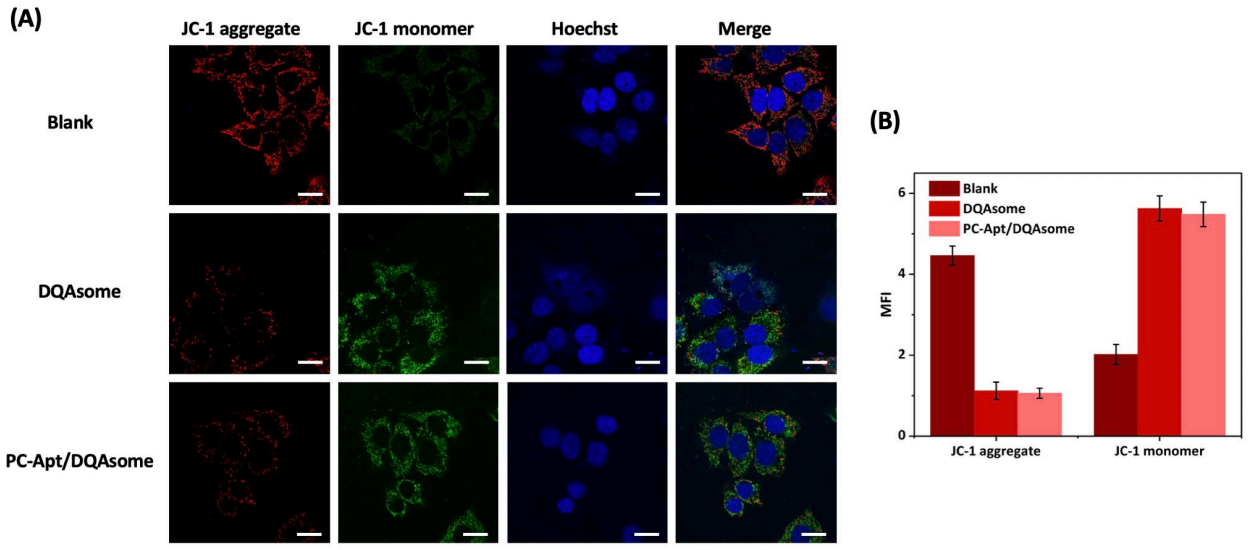

Figure S5. (A) Fluorescence images of mitochondrial membrane potential (JC-1 staining) of blank control (Blank) and the cells with the treatment of 20 μg/ml DQAsomes (DQAsomes) or PC-Apt/DQAsome complex for 4 h. (B) Quantitative analysis of fluorescence images. MFI means the mean fluorescence intensity of three images. Error bars represent standard deviations from three experiments. Scale bar, 20 μm.

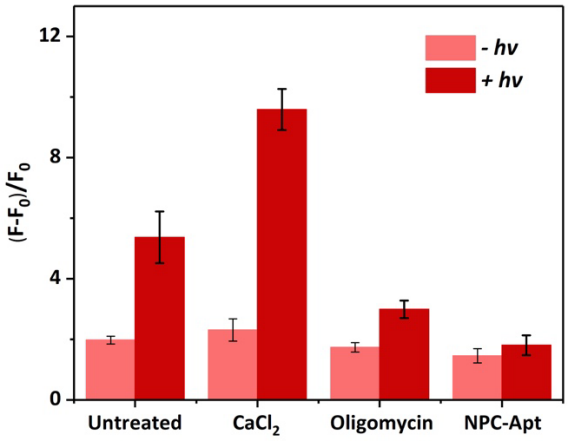

Figure S6. Flow cytometry quantification of fluorescence of Hela cells with different treatments. NPC-Apt represents the negative control of the cell samples transfected with NPC-Apt/DQAsome. Untreated means untreated cell samples detect by PC-Apt/DQAsome. Oligomycin means the cell sample pretreated with 10 μM Oligomycin and transfected with PC-Apt/DQAsome. $CaCl_2$ means the cell samples pretreated with 5 mM $CaCl_2$ and transfected with PC-Apt/DQAsome. Data are medians ± quartiles, n = 6.