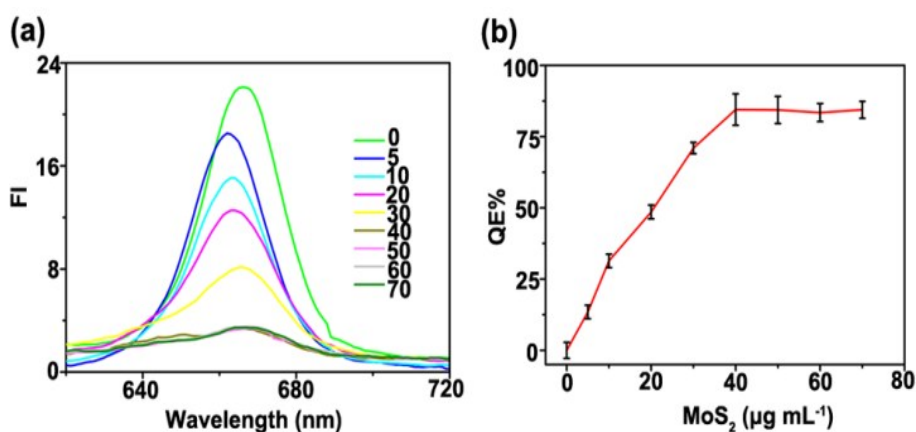


## Electronic Supplementary Information

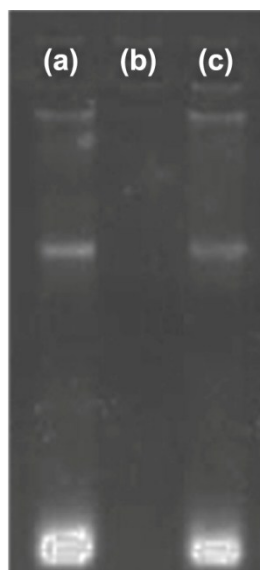
### Aptamer loaded MoS<sub>2</sub> nanoplates as nanoprobe for detection of intracellular ATP and controllable photodynamic therapy

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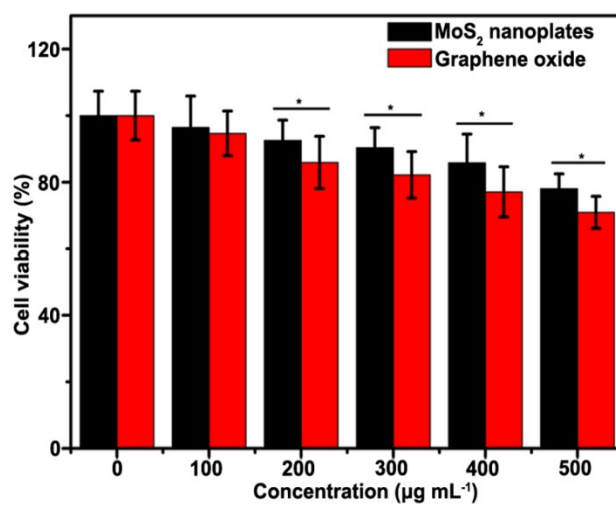
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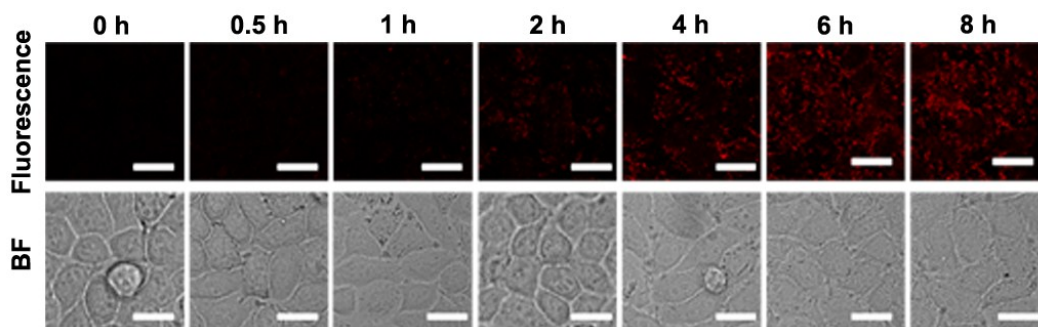
**Fig. S1** (a) Effect of MoS<sub>2</sub> nanoplate concentration (µg mL<sup>-1</sup>) on fluorescence emission spectra of Ce6-aptamer of 200 nM in 20 mM HEPES buffer solution (pH 7.4). (b) Fluorescence quenching efficiency (QE%) as a function of the MoS<sub>2</sub> nanoplate concentration.  $QE\% = (1 - F/F_0) \times 100\%$ ,  $F$  and  $F_0$  stand for the fluorescence peak intensities of test sample and Ce6-aptamer without addition of MoS<sub>2</sub> nanoplates, respectively.



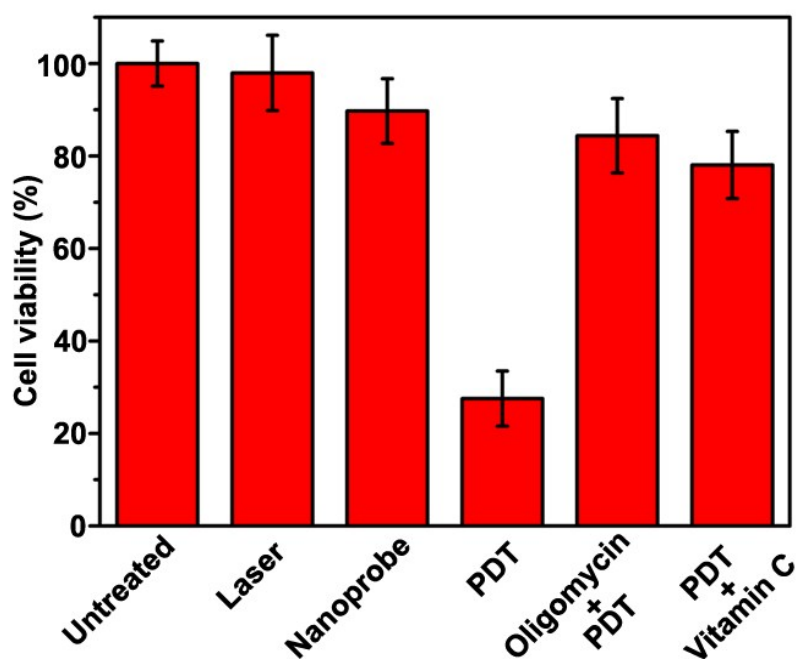
**Fig. S2** Gel electrophoresis of Ce6-aptamer (6.0  $\mu\text{M}$  Ce6 equiv., Lane a) and supernatants from nanoprobe (6.0  $\mu\text{M}$  Ce6 equiv.) without (Lane b) and with (Lane c) addition of 1.5 mM ATP.



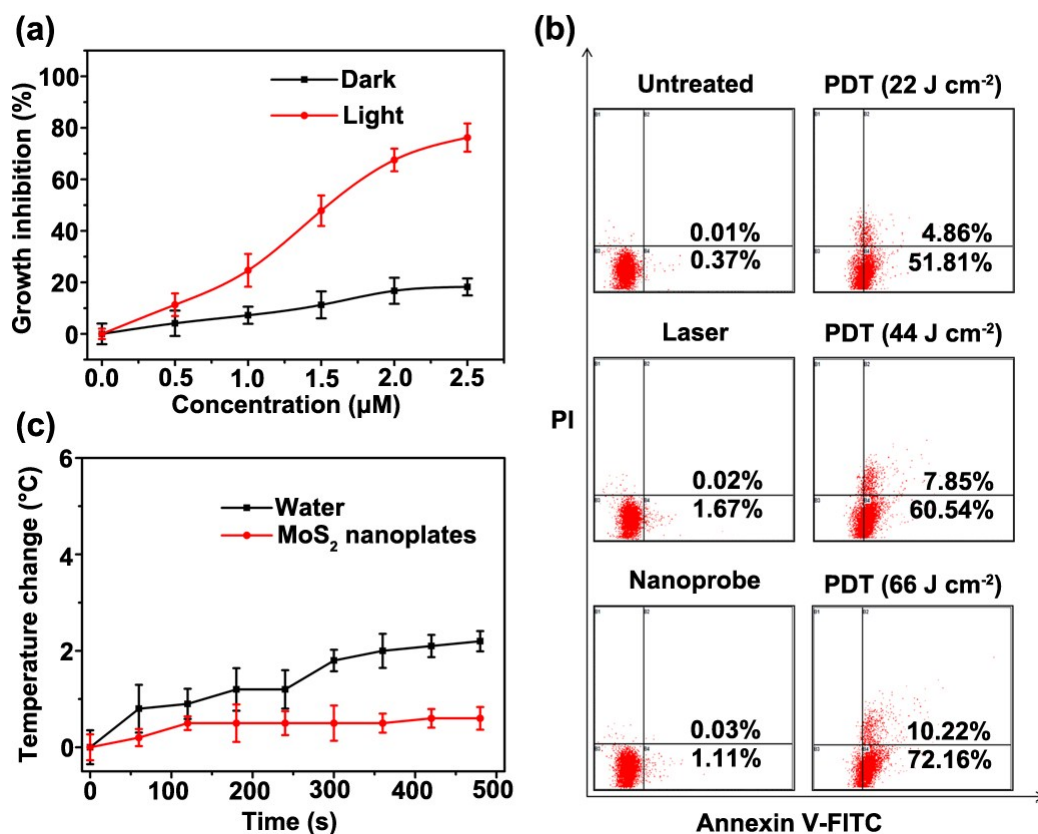
**Fig. S3** Percentage of cell viability of HeLa cells after 24-h exposure to different concentrations of MoS<sub>2</sub> nanoplates or graphene oxide. ( $n = 8$ , \*  $P < 0.05$  for treatment with MoS<sub>2</sub> nanoplates compared to graphene oxide at the same concentration using a Student's t test)



**Fig. S4** Time course of confocal fluorescence images and bright field (BF) images of HeLa cells incubated with nanoprobe (2.0 μM Ce6 equiv.) at 37 °C. Scale bar: 25 μm.



**Fig. S5** MTT assays for HeLa cells with different treatments.



**Fig. S6** (a) MTT assays for HeLa cells incubated with the nanoprobe of different concentrations (Ce6 equiv.) in the presence (light) and absence (dark) of 660 nm irradiation. (b) Flow cytometric analysis of HeLa cell death after different treatments. (c) Temperature change of water and  $\text{MoS}_2$  nanoplate solution with concentration of  $400 \mu\text{g mL}^{-1}$  as a function of irradiation time.