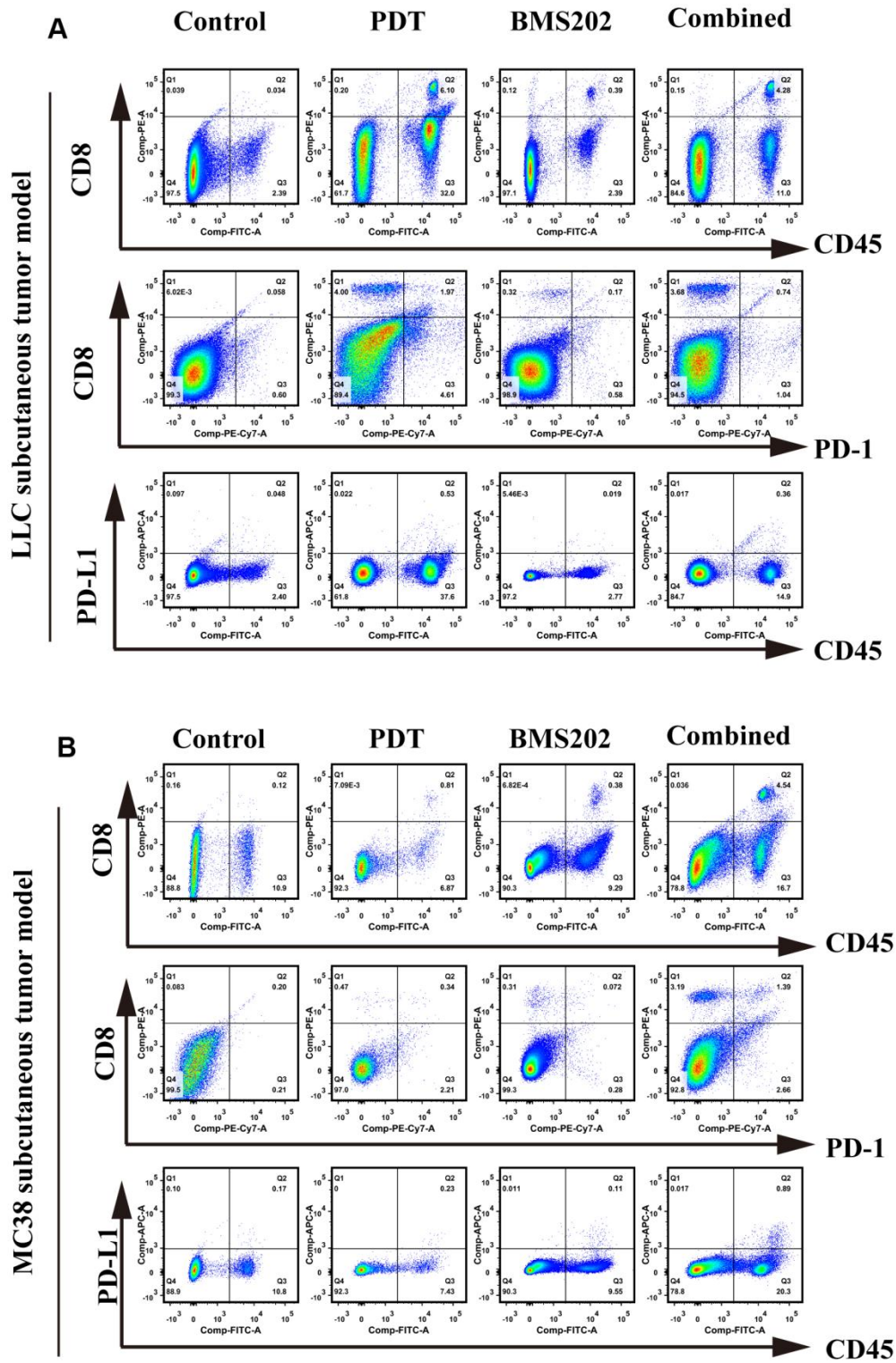
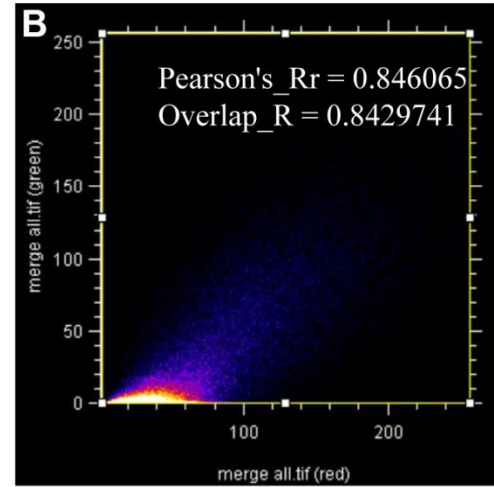
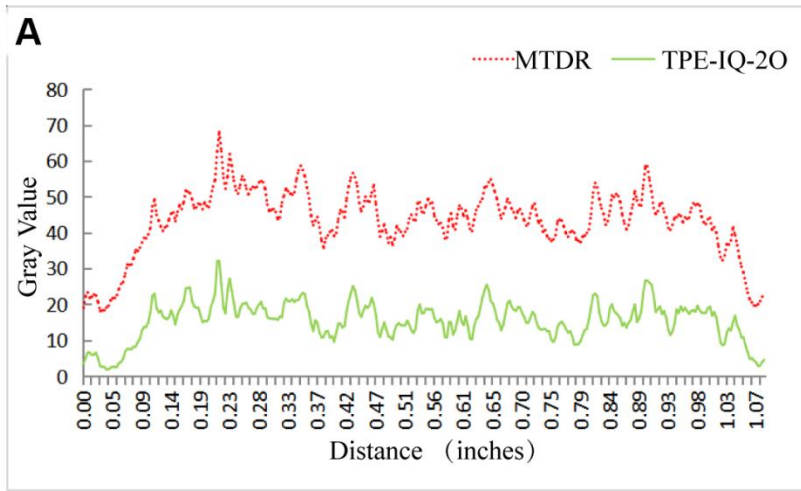


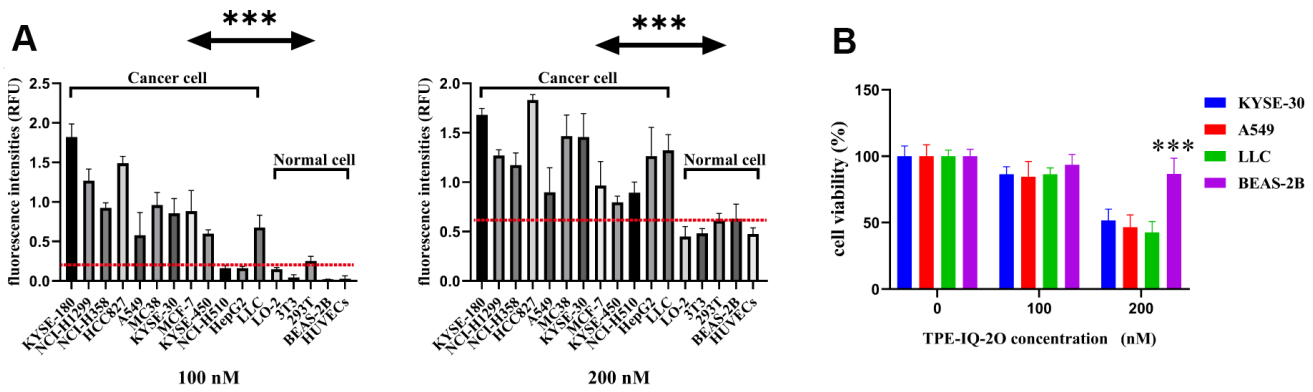
SUPPLEMENTARY FIGURES



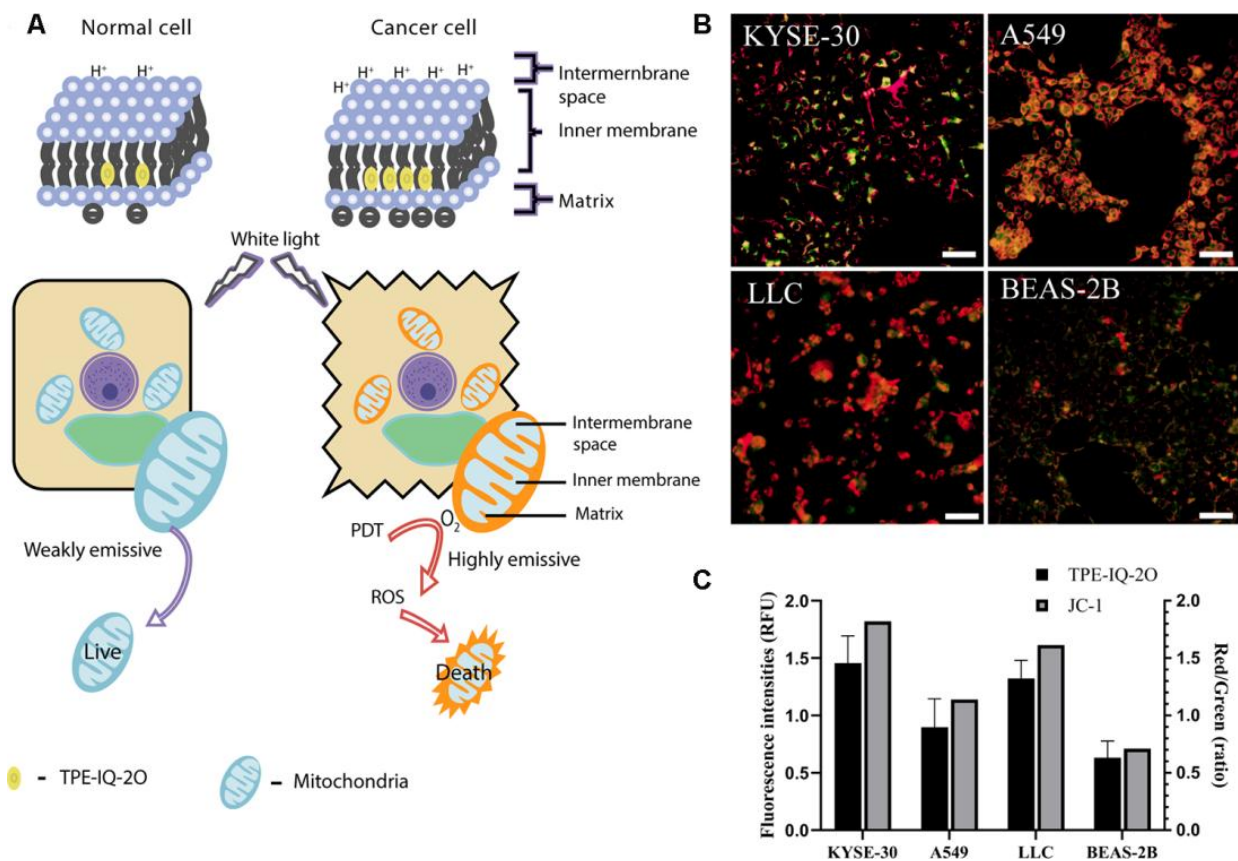
Supplementary Figure 1. Scatter diagram of flow cytometry analysis in each group in LLC subcutaneous tumor model (A) and MC38 subcutaneous tumor model (B).



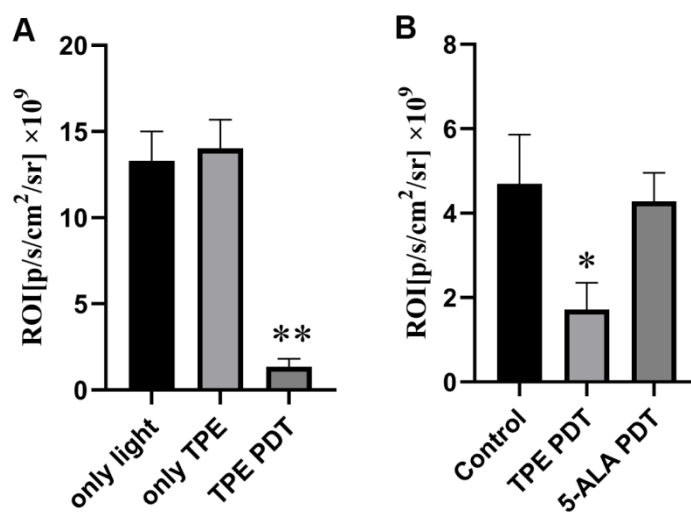
**Supplementary Figure 2. The staining coefficient of TPE-IQ-20.** (A) The gray value of MTDR and TPE-IQ-20 were calculated using the Image J Plot Profile plugin. (B) The Mander's overlap coefficient ( $R = 0.8429741$ ) and Pearson's correlation coefficient ( $Rr = 0.846065$ ) were determined using the Image J co-localization plugin.



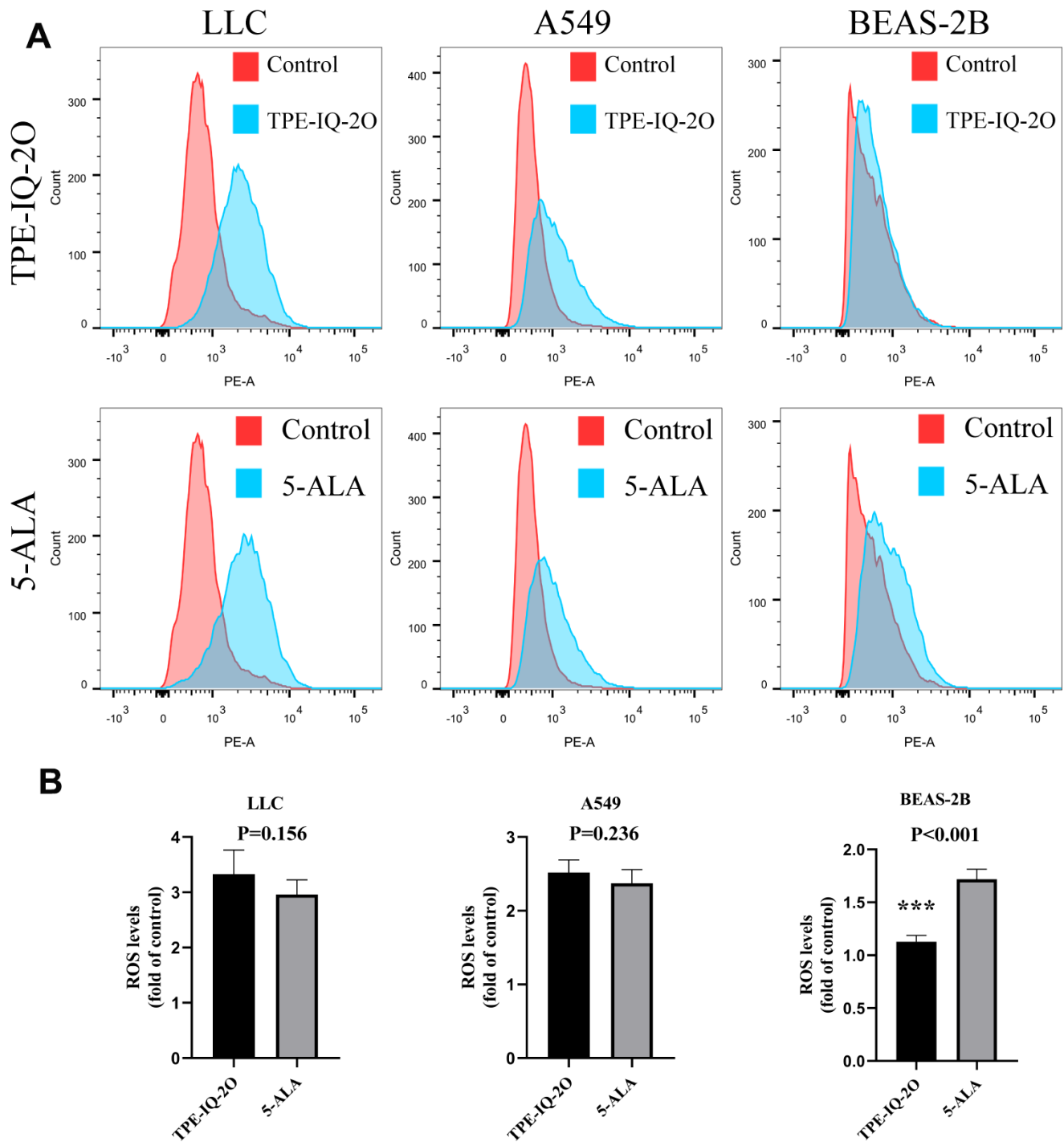
**Supplementary Figure 3. Selecting optimal concentration for TPE-IQ-20.** (A) The fluorescence intensities of cells incubated under the concentrations of 100 nM and 200 nM;  $\lambda_{ex}$ : 430 nm,  $\lambda_{em}$ : 560 nm, the red dotted line indicates the highest average fluorescence intensities of normal cell lines,  $***P < 0.001$  by unpaired Student's t-test. (B) Cell viabilities measured by CCK8 assay,  $***P < 0.001$  vs all other cell lines at 200 nM.



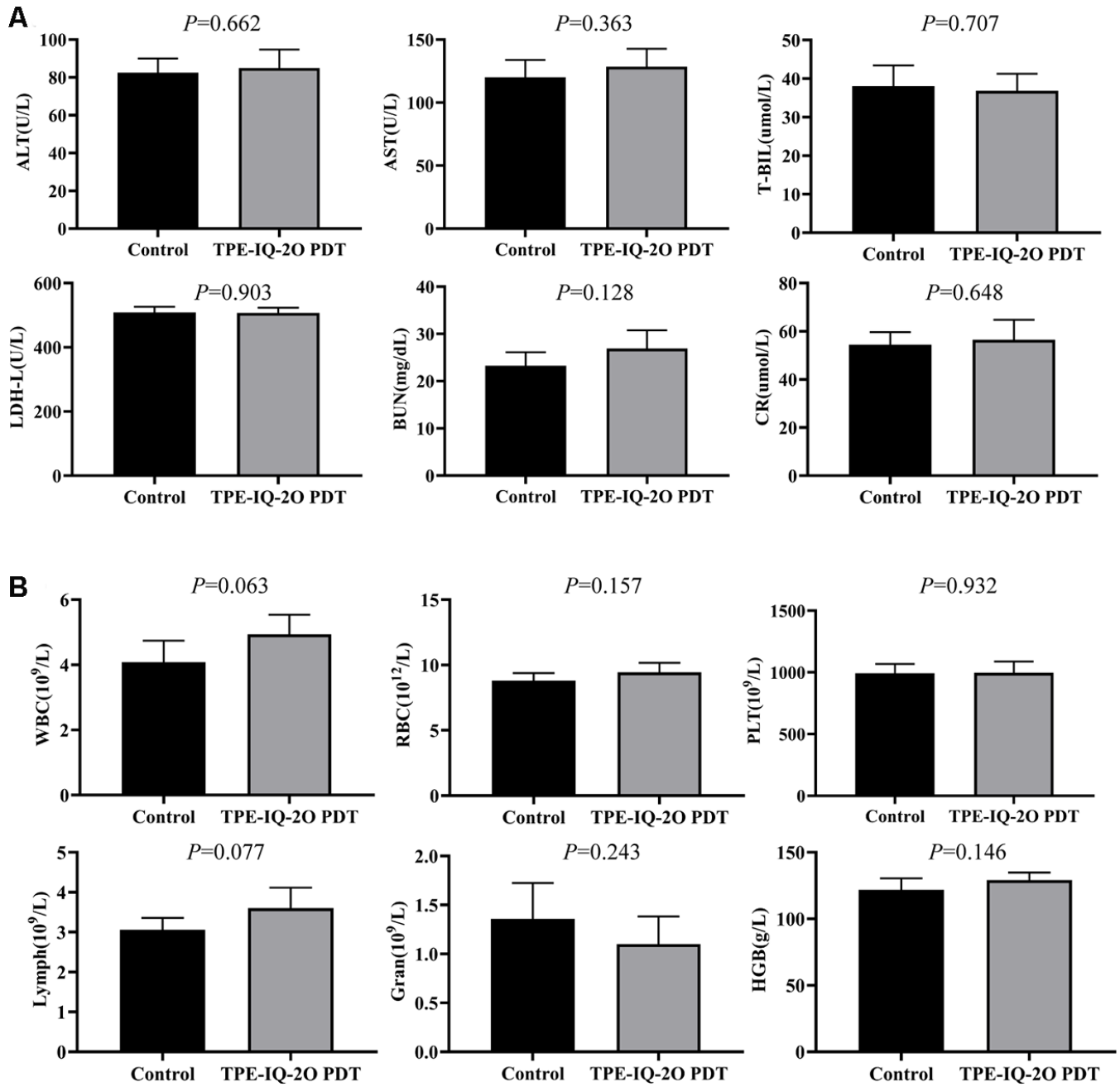
**Supplementary Figure 4. Tumor targeting mechanism of TPE-IQ-20.** (A) Schematic illustration of TPE-IQ-20 as tumor-targeting PS (Modified from [26]). (B) Representative images of JC-1 (2 μM) staining (JC-1 monomer and JC-1 aggregate exhibited green and red fluorescence, respectively, scar bar = 50 μm). (C) TPE-IQ-20 and JC-1 staining was analyzed by flow cytometry. (Black) Fluorescence intensity of different cells stained with TPE-IQ-20 (200 nM) for 20 min at FITC channel and (Grey) Mitochondrial membrane potential of different cells was assessed with JC-1 (2 μM) at PE (red) channel and FITC (green) channel (red/green ratio was represented as the ratio of aggregated and monomeric JC-1).



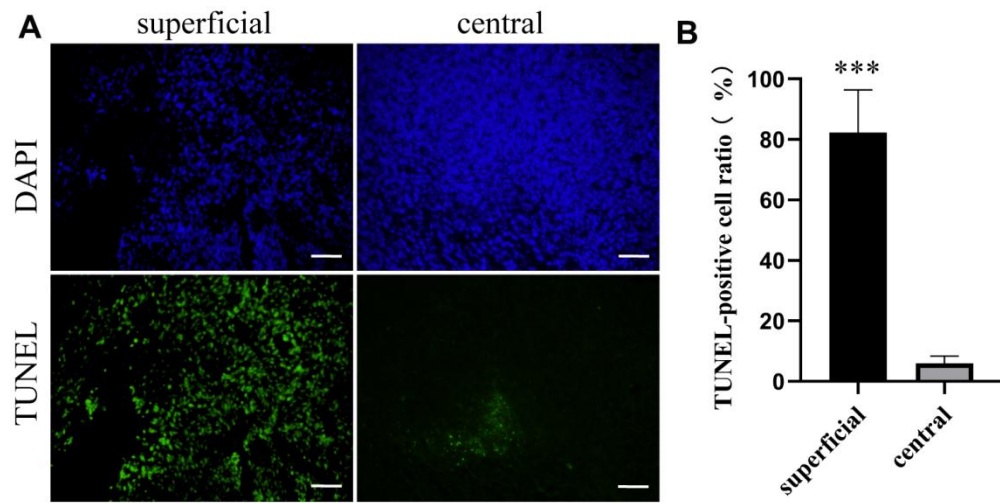
**Supplementary Figure 5.** Quantitative analysis of tumor imaging in vivo in only light, only TPE-IQ-20, TPE-IQ-20 PDT group (A) and different PDT groups (B) \**P*<0.05, \*\**P*<0.01 vs all other groups).



**Supplementary Figure 6. Comparative analysis of TPE-IQ-20 and 5-ALA to induce ROS in different cells. (A)** Representative flow cytometry plots of DHE in different groups. **(B)** Histogram shows quantitative analysis of results of flow cytometry, \*\*\* $P < 0.001$  vs 5-ALA.



**Supplementary Figure 7.** Comparison of biochemical (A) and blood cell (B) analysis in control and TPE-IQ-2O PDT group (The blood of each group was detected by Chemray 800 biochemical analyzer and BC-2800vet blood cell analyzer).



**Supplementary Figure 8.** TUNEL staining images (A) and quantification analysis by Image J (B) of the superficial and central LLC tumor (Green indicates the TUNEL-positive cells, Scar bar=50  $\mu$ m, \*\*\* $P$ <0.001 vs central tumors).