

## Supporting information

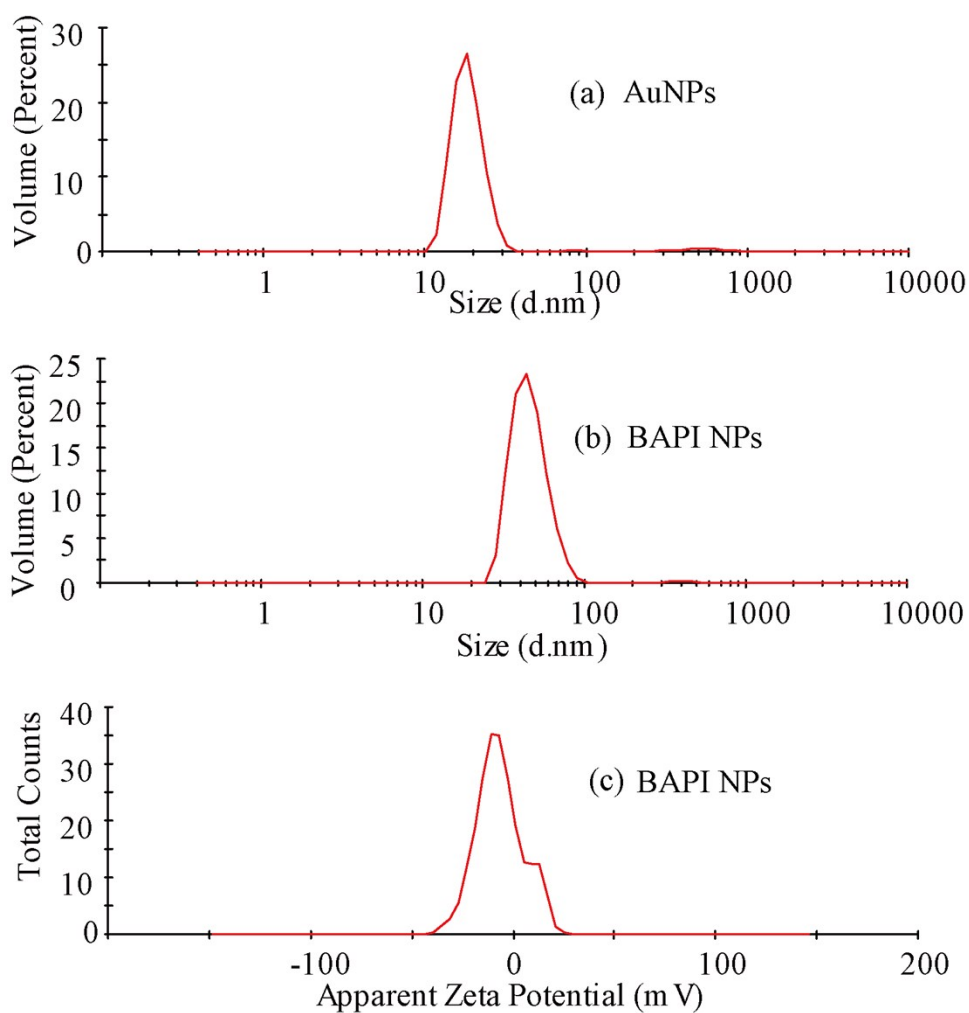


Figure S1 The size distribution of the AuNPs (a), BAPI NPs (b) and the Zeta potential of the BAPI NPs(c).

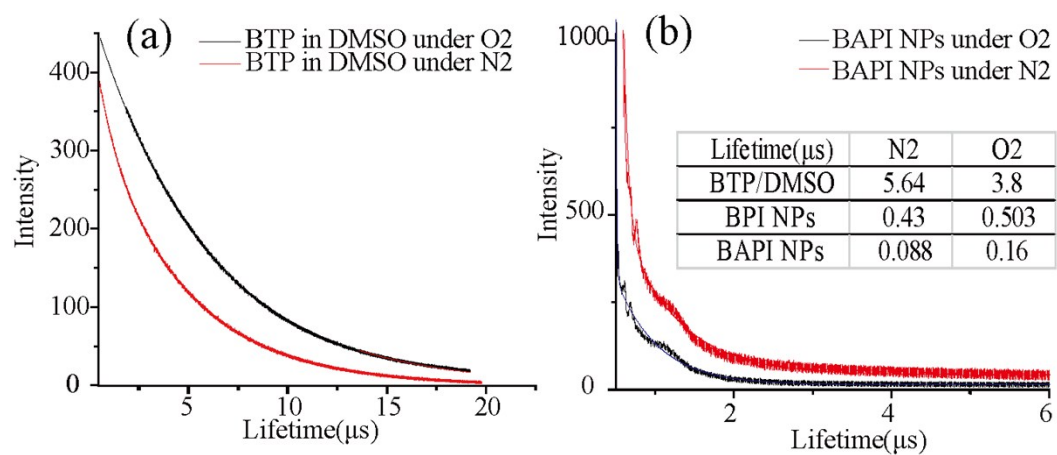


Figure S2 The phosphorescence lifetime of the BTP in DMSO(a) and the BAPI NPs(b) under air and N<sub>2</sub> atmosphere. The insert table showed the detail data of the lifetime parameters of the lifetime of the above samples.

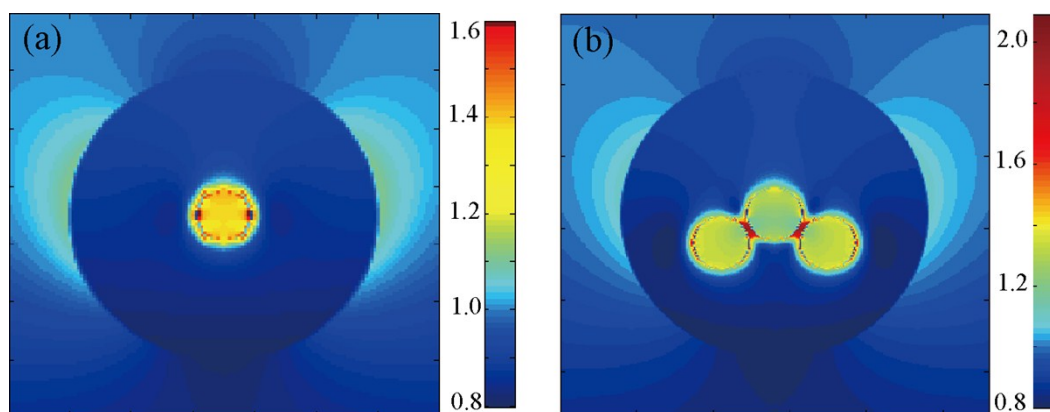


Figure S3 The 2D FDTD stimulation result of the single AuNPs(a) and triple AuNPs(b) coated with BTP in the same polyiohexol particles.

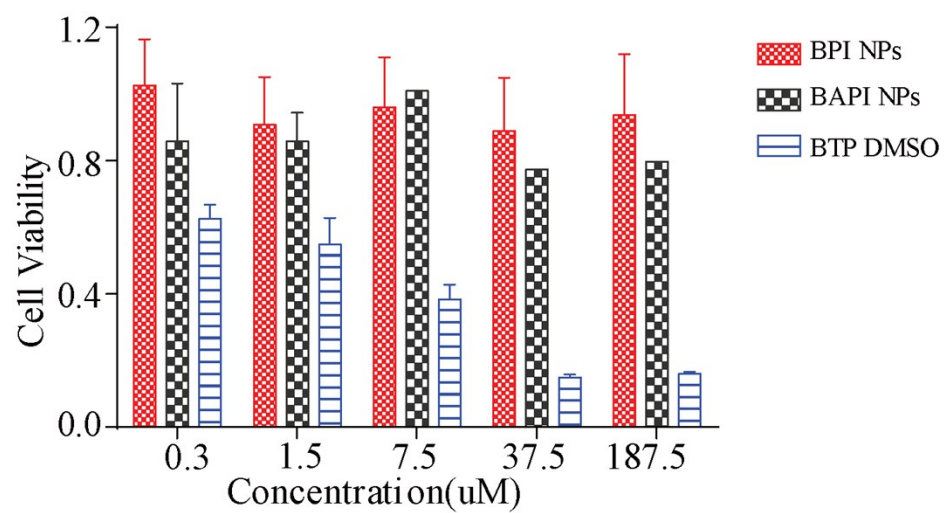


Figure S4 The MTT assay results applied on PC-3 cell line with the BAPI NPs, BPI NPs and BTP/DMSO at the concentration range of 0.03-187.5 uM.

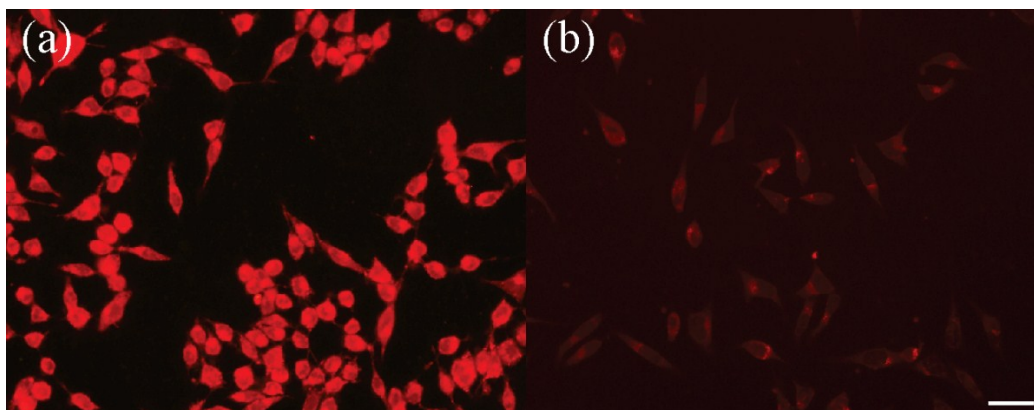
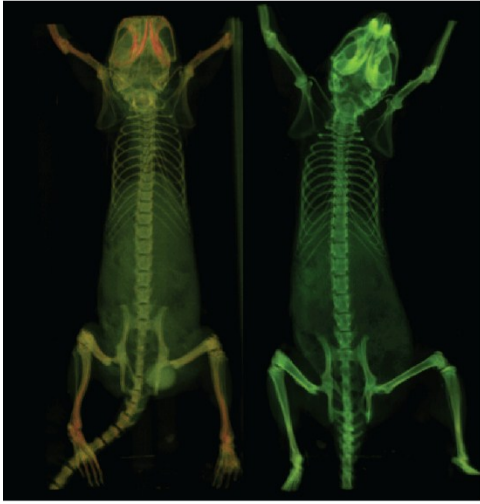


Figure S5 The phosphorescence images of the cells which incubated with BAPI NPs(a) and BPI NPs(b). (The scale bar is 25um)

(a)



(b)

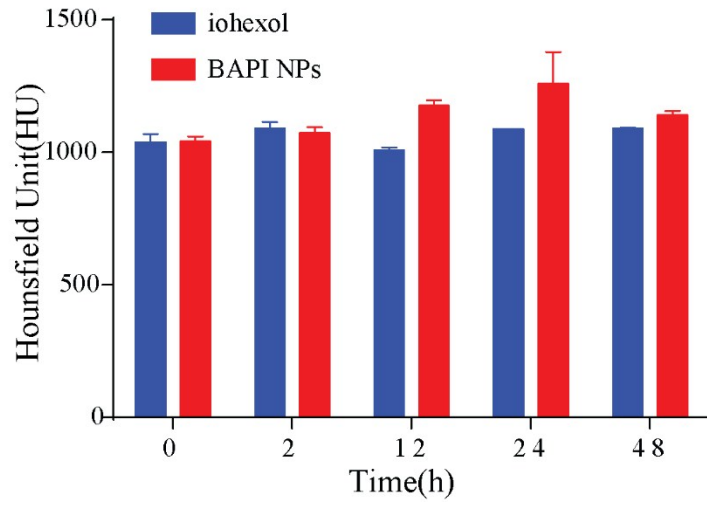


Figure S6 (a)The 3D CT images of the mice injected with iohexol at different time point, 0.5h (left) and 48h (right); (b)the tumor HU value of the mice injected with the BAPI NPs and iohexol over different time points (inject dosage is 100 mg Kg<sup>-1</sup> body weight)