

Supplemental Figure 1. Photographs of PLGA, GOx@PLGA, PLGA-Fe₃O₄ and GOx@PLGA-Fe₃O₄ nanoparticles dispersed in PBS.



Supplemental Figure 2. Absorbance spectra of Fe₃O₄, GOx, PLGA and GOx@PLGA-Fe₃O₄ as recorded by UV–vis–NIR spectrophotometer.



Supplemental Figure 3. The response of GOx@PLGA-Fe₃O₄ nanoparticles in an external magnetic field.



Supplemental Figure 4. The pH change of 4 groups (GOx+PBS, GOx+Glucose, PLGA-Fe₃O₄+Glucose and GOx@PLGA-Fe₃O₄+Glucose).



Supplemental Figure 5. Michaelis–Menten steady-state kinetics of $GOx@PLGA-Fe_3O_4$ nanoparticles. **A-B**) Time-course absorbance of $GOx@PLGA-Fe_3O_4$ nanoparticles with **A**) H_2O_2 (30, 10, 5, 3 and 1 mM) or **B**) glucose (30, 10, 5, 3 and 1 mM). **C-D**) Michaelis–Menten kinetics and **E-F**) Lineweaver–Burk plotting of $GOx@PLGA-Fe_3O_4$ nanoparticles. Mean values and error bars are defined as mean and s.d., respectively.



Supplemental Figure 6. A) Changes of fluorescence signal intensities within tumor regions at corresponding time points. **B**) Quantitative biodistribution of GOx@PLGA-Fe₃O₄ nanoparticles with/without an external magnetic field in mice as determined by the average FL intensities of organs and tumors. (Values are means \pm s.d., n = 5. *P < 0.05). **C**) Ex *vivo* fluorescence images of major organs and tumors dissected from mice 24 hrs post injection of GOx@PLGA-Fe₃O₄ nanoparticles with/without an external magnetic field.



Supplemental Figure 7. A) Full spectrum scan of $GOx@PLGA-Fe_3O_4$ from 680 nm to 950 nm (interval = 5 nm). **B**) PA contrast images and PA values of $GOx@PLGA-Fe_3O_4$ nanoparticles at different Fe_3O_4 concentrations.



Supplemental Figure 8. Changes of PA-signal intensities within tumor regions at corresponding time points (Values are means \pm s.d., n = 3. *P < 0.05).



Supplemental Figure 9. A) MRI contrast images and MRI values of GOx@PLGA-Fe₃O₄ nanoparticles at different Fe₃O₄ concentrations. **B**) Changes of T₂-weighted signal intensities within tumor regions at corresponding time points (Values are means \pm s.d., n = 3. *P < 0.05.).



Supplemental Figure 10. *In vivo* biosafety of $GOx@PLGA-Fe_3O_4$ nanoparticles. **A**) Blood glucose level of mice in time of day. Mice were intravenously injected of $GOx@PLGA-Fe_3O_4$ nanoparticles (Values are means \pm s.d.). **B**) Blood biochemical indexes analysis of BALB/c mice (n = 5). **C**) H&E staining of the major organs (heart, liver, spleen, lung, and kidney) of 4T1 tumor-bearing mice after different treatments.