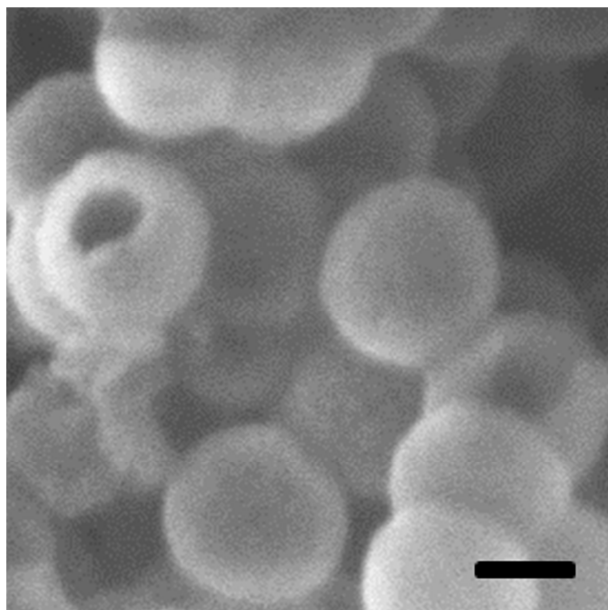


## **Supplementary Methods**

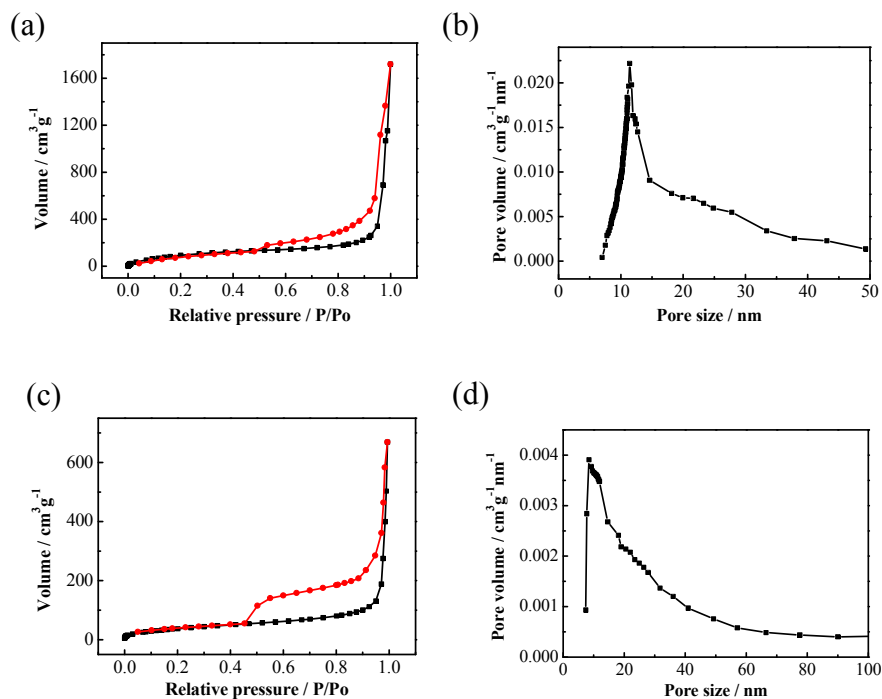
**A biomimetic nanoreactor for synergistic chemiexcited photodynamic therapy and starvation therapy against tumor metastasis**

***Yu et al.***

**Instruments.** High-resolution transmission electron microscope (HRTEM, JEM-2100). Fluorescence spectra were obtained with an Edinburgh fluorescence spectrometer with a xenon lamp (FLS-920). Absorption spectra were measured on a pharماسpec UV-1700 UV-visible spectrophotometer (Shimadzu, Japan). All pH measurements were made using a pH-3c digital pH meter (Shanghai Leici Equipment Engineering Co., Ltd., Shanghai, China). In the MTT assay, the absorbance was measured using a microplate reader (Synergy 2, Biotek, USA). Cell disruption was performed using a homogenizer (IKA, Germany, T10 basic ultra-turrrax). Confocal fluorescence images were captured using TCS-SP8 confocal laser scanning microscope (Leica, Germany), objective lens ( $\times 40$ ,  $\times 60$ ). Elemental analysis was performed using a coupled plasma spectrometer (Thermo Fisher, iCAP 7400, USA). *In vivo* fluorescence images were captured using Bio-Rad imaging system (Bio-Rad, Hercules, CA, USA).



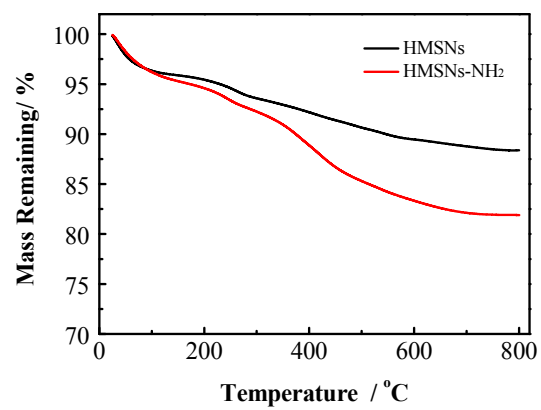
**Supplementary Figure 1** SEM image of HMSNs. Scale bar is 50 nm.



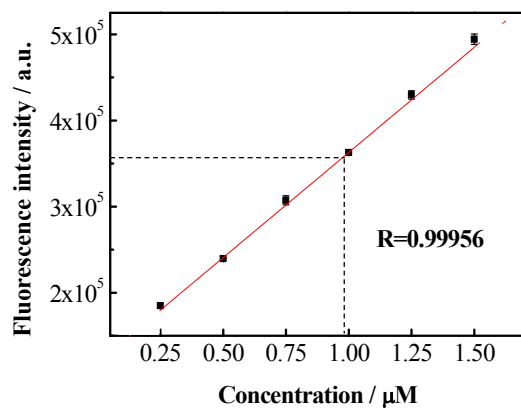
**Supplementary Figure 2** N<sub>2</sub> adsorption-desorption isotherms of HMSNs (a) and HMSNs-NH<sub>2</sub> (c). Pore size distribution of HMSNs (b) and HMSNs-NH<sub>2</sub> (d).

**Supplementary Table 1.** BET surface area and average pore size of HMSNs and HMSNs-NH<sub>2</sub>.

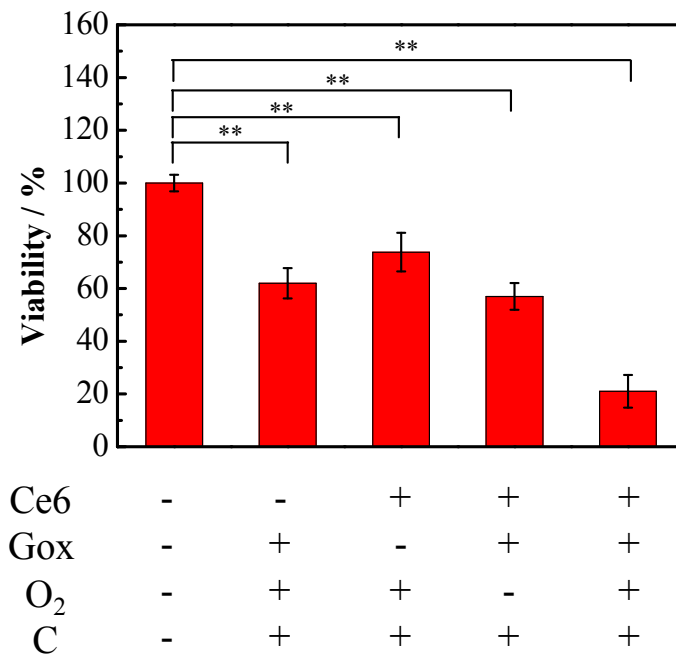
	HMSNs	HMSNs-NH <sub>2</sub>
<b>BET surface area (m<sup>2</sup>/g)</b>	<b>417.17</b>	<b>147.17</b>
<b>Pore size (nm)</b>	<b>11.4</b>	<b>8.43</b>



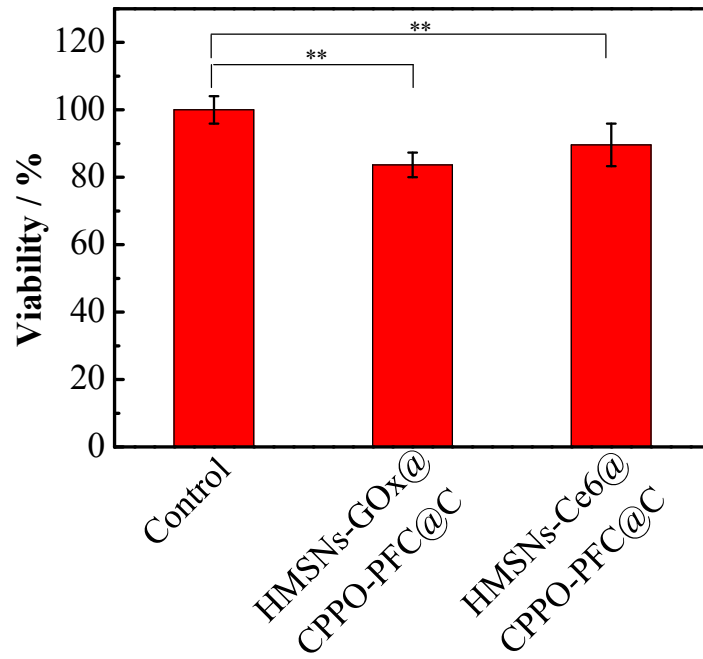
**Supplementary Figure 3** TGA analysis of HMSNs and HMSNs-NH<sub>2</sub>.



**Supplementary Figure 4** Standard linear calibration curve of Ce6.

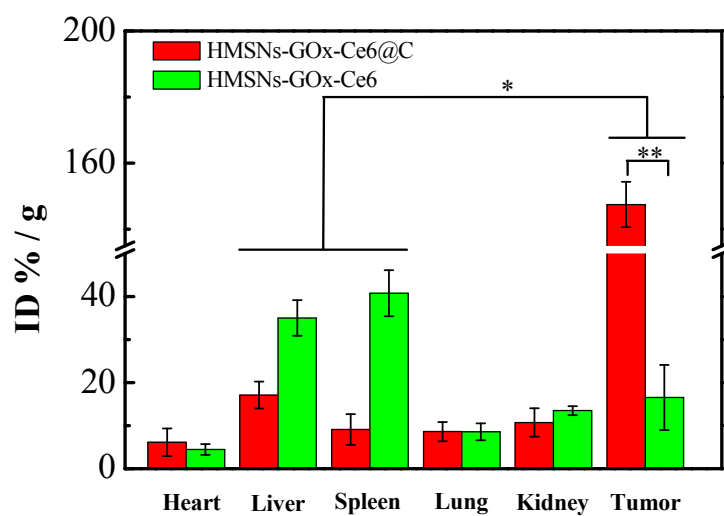


**Supplementary Figure 5** MTT assay of B16-F10 cells with different treatments in the hypoxia environment (student's t-test, \*\*p< 0.01).

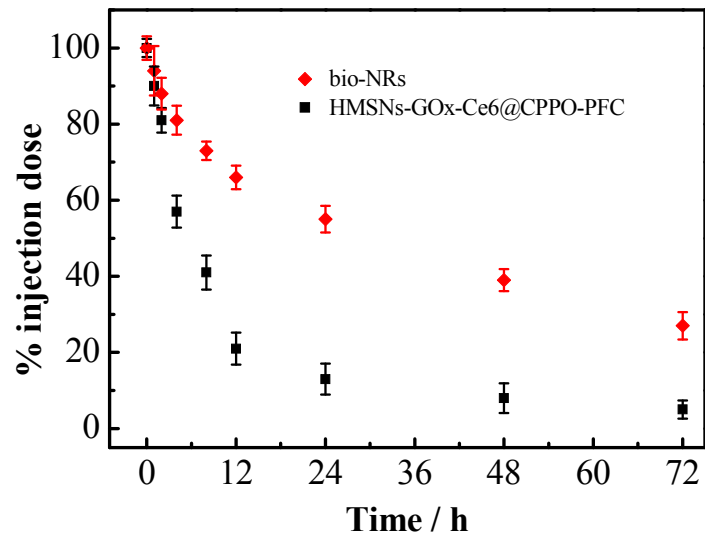


**Supplementary Figure 6** Cell viability after starvation therapy alone or PDT alone in the anaerobic conditions (student's t-test,  $**p < 0.01$ ).

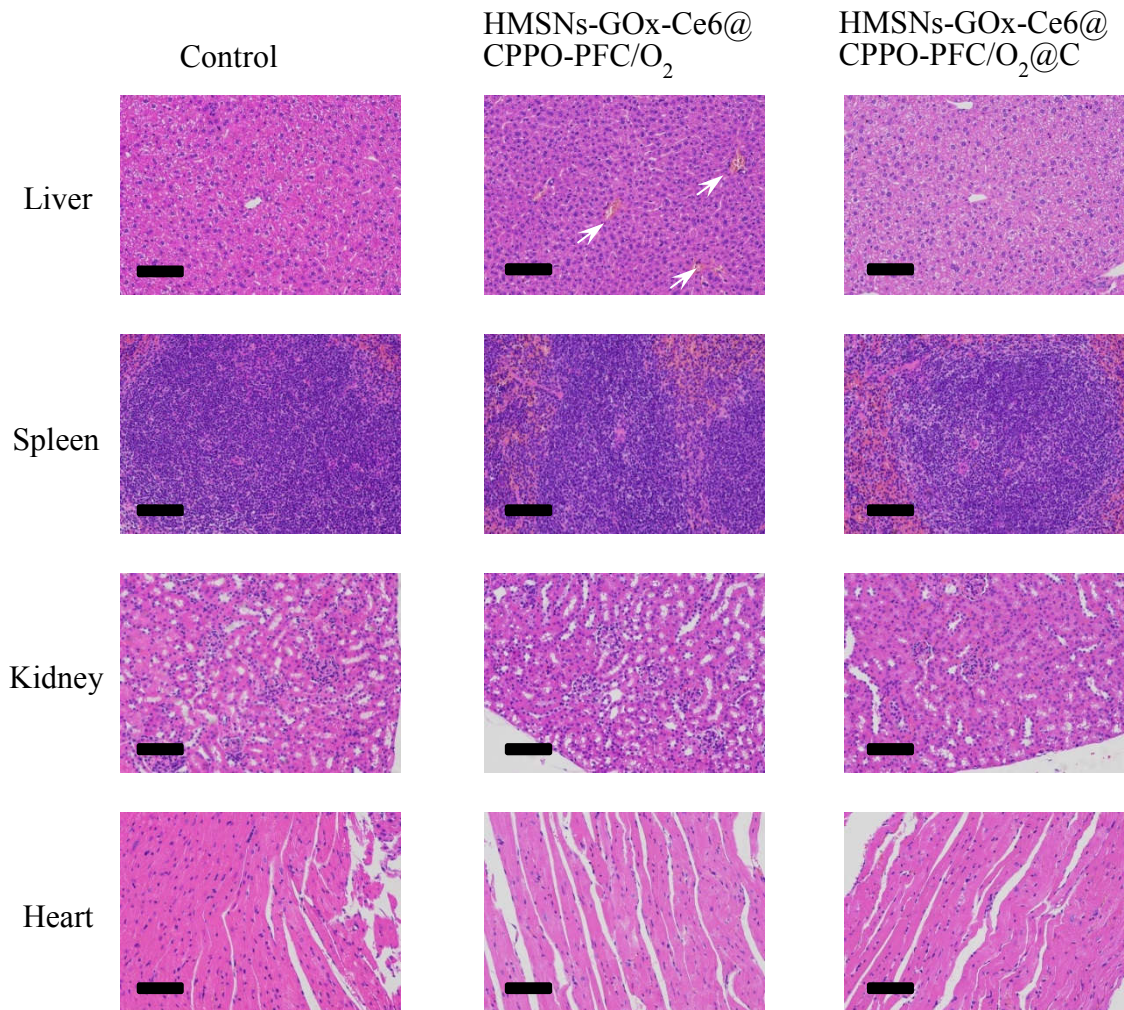




**Supplementary Figure 7** Si content in different organs and metastatic tumors after the mice were injected with HMSNs-GOx-Ce6@C or HMSNs-GOx-Ce6 *via* ICP-AES analysis (student's t-test, \* $p < 0.05$ , \*\* $p < 0.01$ ).



**Supplementary Figure 8** Retention of the bio-NRs and HMSNs-GOx-Ce6@CPPO-PFC in the body at different time via ICP-AES analysis.



**Supplementary Figure 9** H&E staining images of four major organs (liver, spleen, kidney, and heart) after the mice were treated with PBS, HMSNs-GOx-Ce6@CPPO-PFC/O<sub>2</sub> or bio-NRs (200×, scale bars are 100 μm.). The arrows are referring to liver injury.