Supporting Information

Beyond the Roles in Biomimetic Chemistry: An Insight into the Intrinsic Catalytic Activity of an Enzyme for Tumor-Selective Phototheranostics

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Figure S1. Hydrodynamic sizes of Gd@HRP<sub>4ABTS</sub> nanodots prepared at different amounts of HRP (5 mg, 10 mg, and 20 mg).

Figure S2. (A) UV-Vis absorption spectra of ABTS at different concentrations. (B) The linear fitting curve of ABTS concentration versus absorption at 342 nm.
**Figure S3.** Digital pictures of HRP, Gd@HRP, Gd@HRP$_{ABTS}$, and Gd@HRP$_{ABTS}$$+$H$_2$O$_2$ (100 μM) from left to right.

**Figure S4.** The transverse relaxation fitting curves of Gd@HRP$_{ABTS}$ and the commercial contrast agent (Magnevist, Gd-DTPA).
**Figure S5.** $T_1$-weighted MR signal intensities of the commercial Gd-DTPA and Gd@HRP$^{ABTS}$ at the same Gd concentration.

**Figure S6.** The (A) relaxation curve and (B) relaxation time of Gd@HRP$^{ABTS}$ before and after laser irradiation for 1 h and 24 h.
Figure S7 The absorption spectrum of Gd@HRP\textsuperscript{ABTS}+H\textsubscript{2}O\textsubscript{2} before laser irradiation and re-addition of ABTS and H\textsubscript{2}O\textsubscript{2} after laser irradiation.

Figure S8. The cytotoxicity of Gd-DTPA before and after laser irradiation.
Figure S9 Biodistribution (heart, liver, spleen, lung, kidney, and tumor) of Gd@HRP\textsuperscript{ABTS} nanodots in the 4T1 tumor-bearing mice at different post-injection time points (2 h, 4 h, and 24 h).