

=Electronic Supplementary Information=

# Catalase–albumin cluster incorporating protoporphyrin IX: O<sub>2</sub> generating photosensitizer for enhanced photodynamic therapy

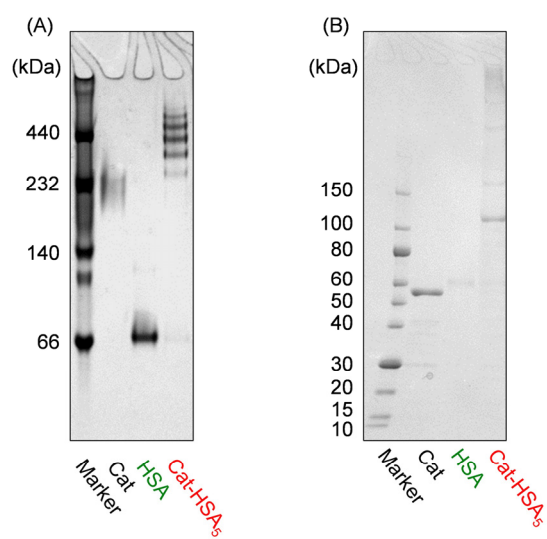
Taiga Yamada, Maho Katsumi, Yuka Yagisawa, Masato Ichihara and Teruyuki Komatsu\*

Department of Applied Chemistry, Faculty of Science and Engineering, Chuo University, 1-  
13-27 Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan

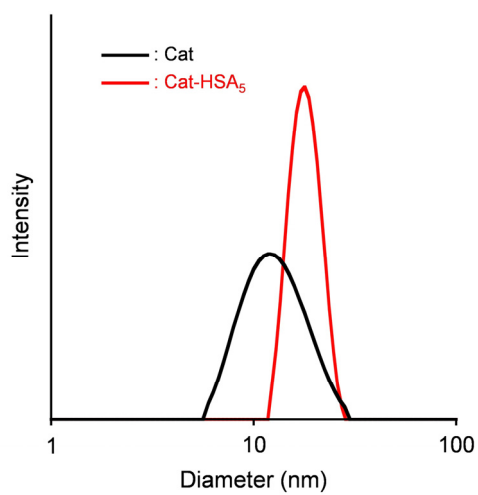
Corresponding author: Prof. Teruyuki Komatsu

Tel & Fax: +81-3-3817-1910, E-mail: komatsu@kc.chuo-u.ac.jp

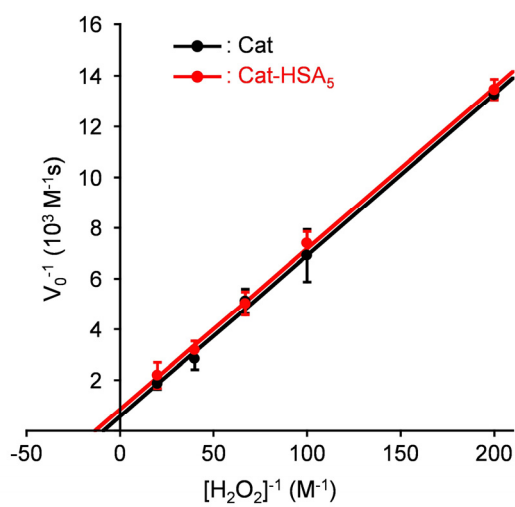
## Results



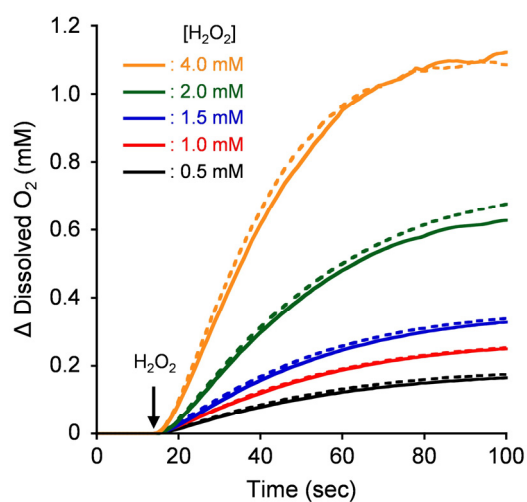
**Fig. S1** (A) Native-PAGE and (B) SDS-PAGE of Cat, HSA and Cat-HSA<sub>5</sub>.



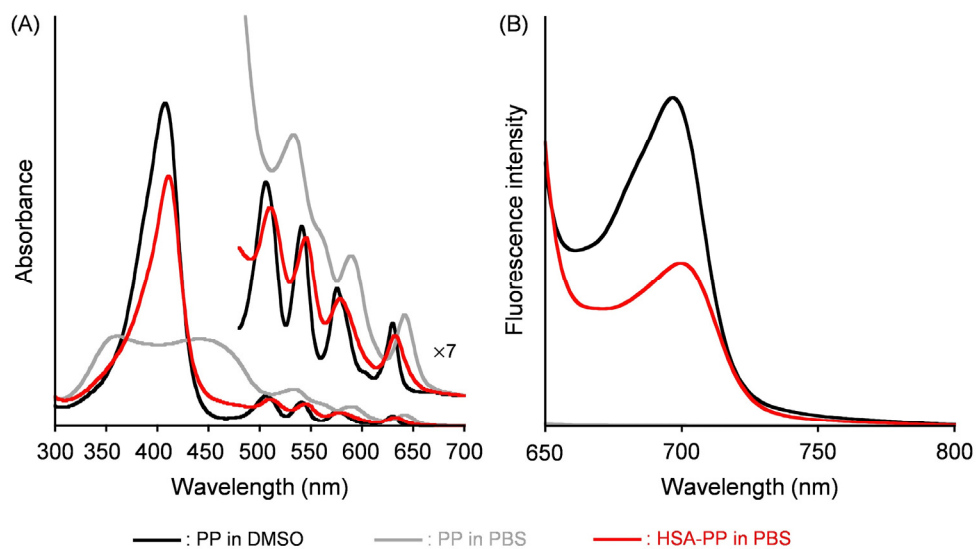
**Fig. S2** DLS profiles of Cat and Cat-HSA<sub>5</sub> in PBS (pH 7.4) at 25 °C.



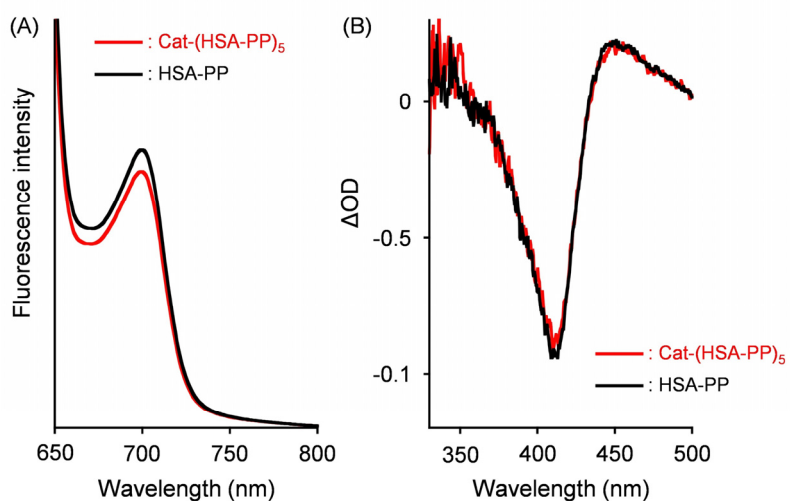
**Fig. S3** Lineweaver-Burk plots of  $H_2O_2$  degradation using Cat and Cat-HSA<sub>5</sub> in PBS (pH 7.4) at 25 °C.



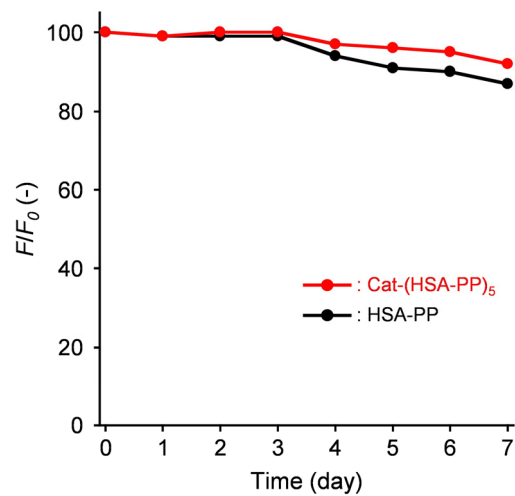
**Fig. S4** Time courses of dissolved  $O_2$  generated by  $H_2O_2$  dismutation using Cat-HSA<sub>5</sub> (solid line) or Cat (dashed line) at various  $H_2O_2$  concentrations in PBS (pH 7.4) at 25 °C.



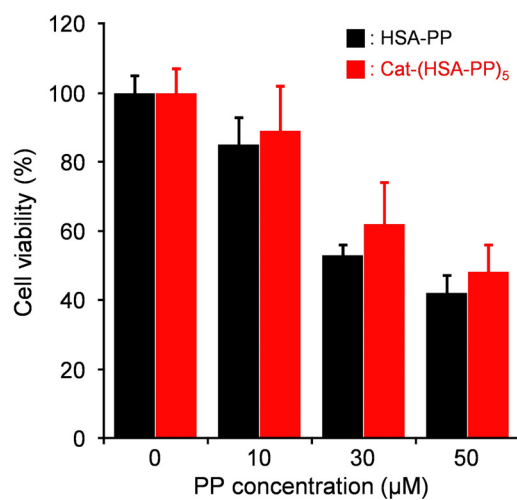
**Fig. S5** (A) Absorption and (B) fluorescence spectra of HSA-PP in PBS (pH 7.4) and PP in DMSO or PBS (25 °C).



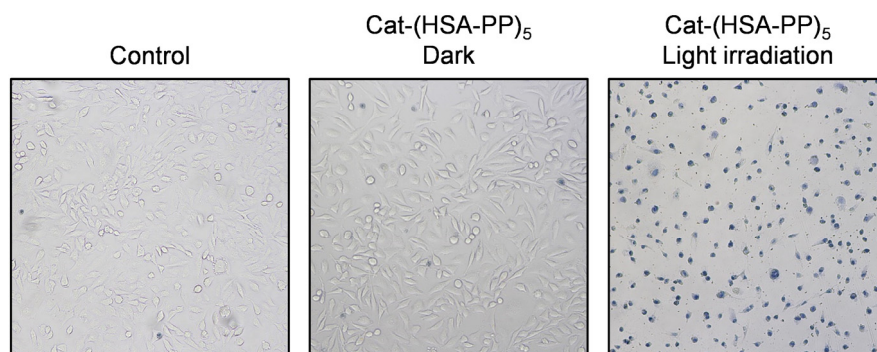
**Fig. S6** (A) Fluorescence spectra of Cat-(HSA-PP)<sub>5</sub> and HSA-PP in PBS (pH 7.4) at 25 °C. (B) Transient absorption spectra of Cat-(HSA-PP)<sub>5</sub> and HSA-PP in PBS (pH 7.4) after 200 ns from the laser flash photolysis ( $\lambda = 532$  nm) under N<sub>2</sub> atmosphere at 25 °C.



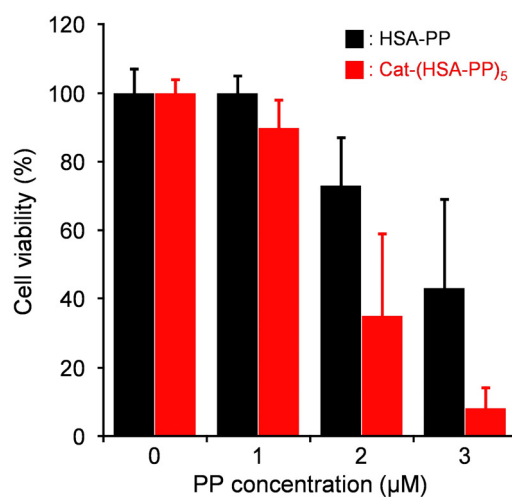
**Fig. S7** Time course of fluorescence intensity per initial fluorescence intensity ( $F/F_0$ ) at 699 nm of Cat-(HSA-PP)<sub>5</sub> and HSA-PP in PBS (pH 7.4) at 37 °C.



**Fig. S8** Cell viability of HeLa cell treated with Cat-(HSA-PP)<sub>5</sub> and HSA-PP for 24 hr. Each value represents the mean  $\pm$  SD (n = 3).



**Fig. S9** Optical microscopy images of trypan blue stained HeLa cells treated with Cat-(HSA-PP)<sub>5</sub> after incubation (center) in the dark and (right) with light irradiation ([PP] = 3 μM, λ > 620 nm, 25 mW/cm<sup>2</sup> at 630 nm, 5 min).



**Fig. S10** Cell viability of HeLa cell exposed to Cat-(HSA-PP)<sub>5</sub> and HSA-PP with light irradiation (λ > 620 nm, 25 mW/cm<sup>2</sup> at 630 nm, 5 min) under hypoxic condition ([O<sub>2</sub>] = 1%). Each value represents the mean ± SD (n = 3).