Supporting Information

A self-assembling peptide inhibits the growth and function of fungi via wrapping strategy

Gao-Feng Qi,[‡a,b,c] Xin Cui,[‡a,b,c] Xue-Feng Gong,[‡b] Xu Cui, [‡a,c] Huan-Ge Xu,[b] Qi-Lin Liang,[b] Kuo Zhang,[b] Xiao-Ling Sha,[b] Litao Li,[c] Gui-Yuan Wang,[a,b] Hong-Wen Liang[b] and Lei Wang[*b]

[a] Department of Graduate, Hebei North University, No.11 Diamond South Road, High-tech Zone, Zhangjiakou 075000, Hebei Province, China

[b] CAS Center for Excellence in Nanoscience, CAS Key Laboratory for Biomedical Effects of Nanomaterials and Nanosafety, National Center for Nanoscience and Technology (NCNST), No. 11 Beiyitiao, Zhongguancun, Beijing 100190, China

[c] Department of Orthopaedics, The 4th Medical Center of Chinese PLA General Hospital, Jia No.17 Heishanhu road, Beijing 100091, China.

[‡]These authors made equal contributions to this work.

*Corresponding author. E-mail: wanglei@nanoctr.cn

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Supporting Figures S1 to S23

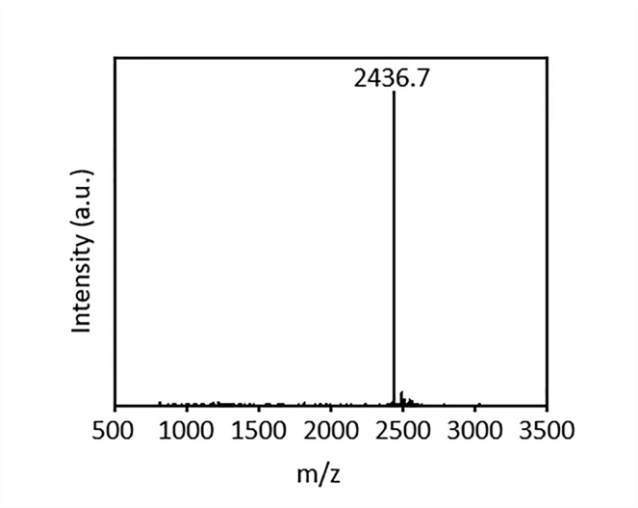

Fig. S1 The MADLI-TOF-MS spectrum of AFP.

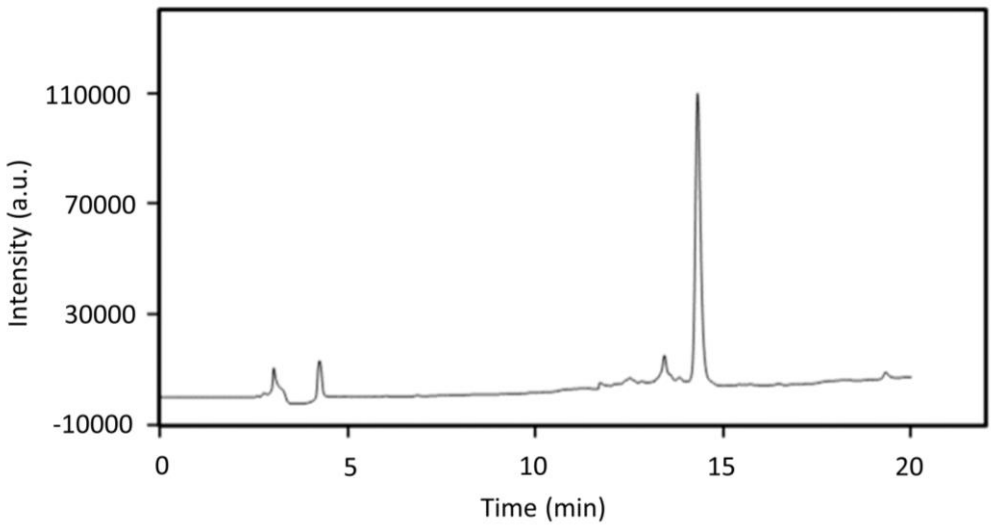

Fig. S2 AFP was analyzed using HPLC.

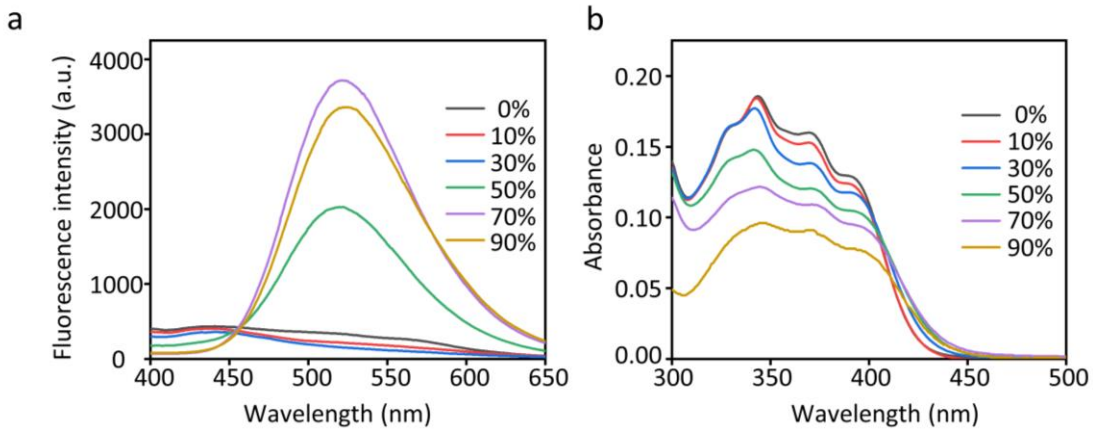

Fig. S3 (a) Fluorescence spectra of AFP in mixed solution. (b) Ultraviolet-visible of AFP in mixed solution. The percentage of water in water/DMSO was increased from 0 to 90%.

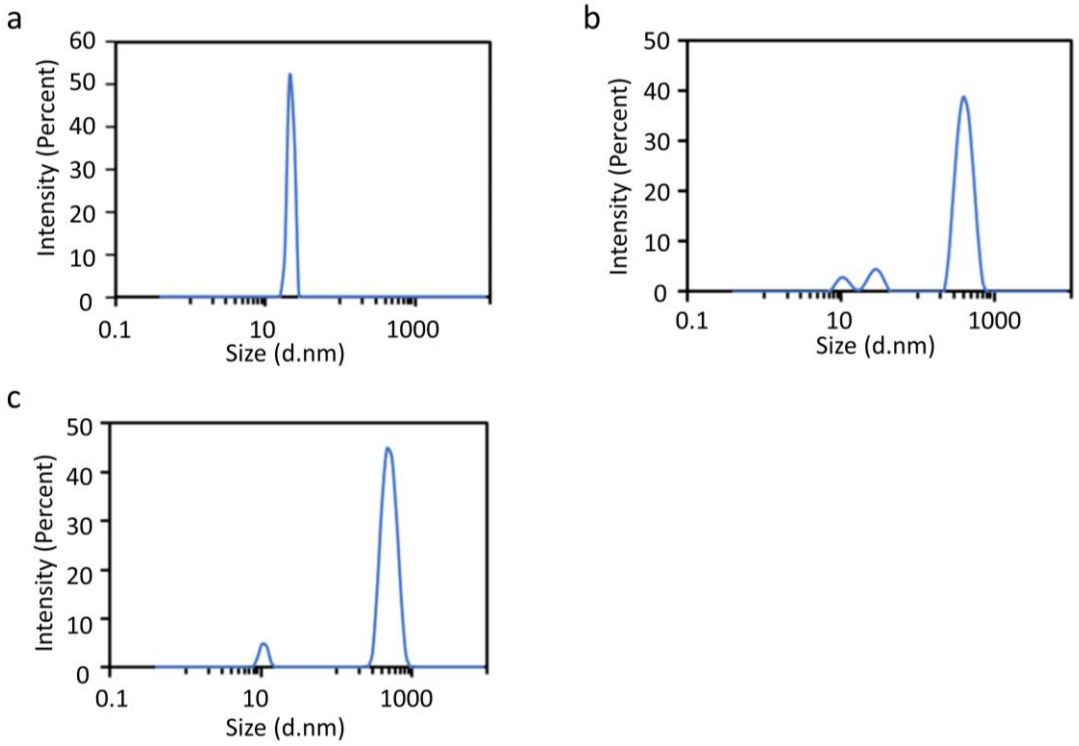

Fig. S4 The particle size of AFP NPs incubated with chitin on day 0 (a) , 3 (b) , and 5 (c) , respectively, by DLS.

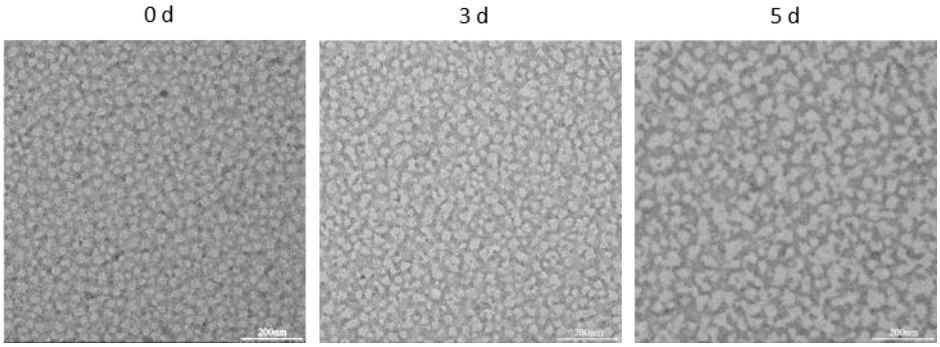

Fig. S5 The AFP NPs were stable and kept particulate formulation. TEM images of AFP (30 μM) NPs without chitin in 5 days. Scale bars, 200 nm.

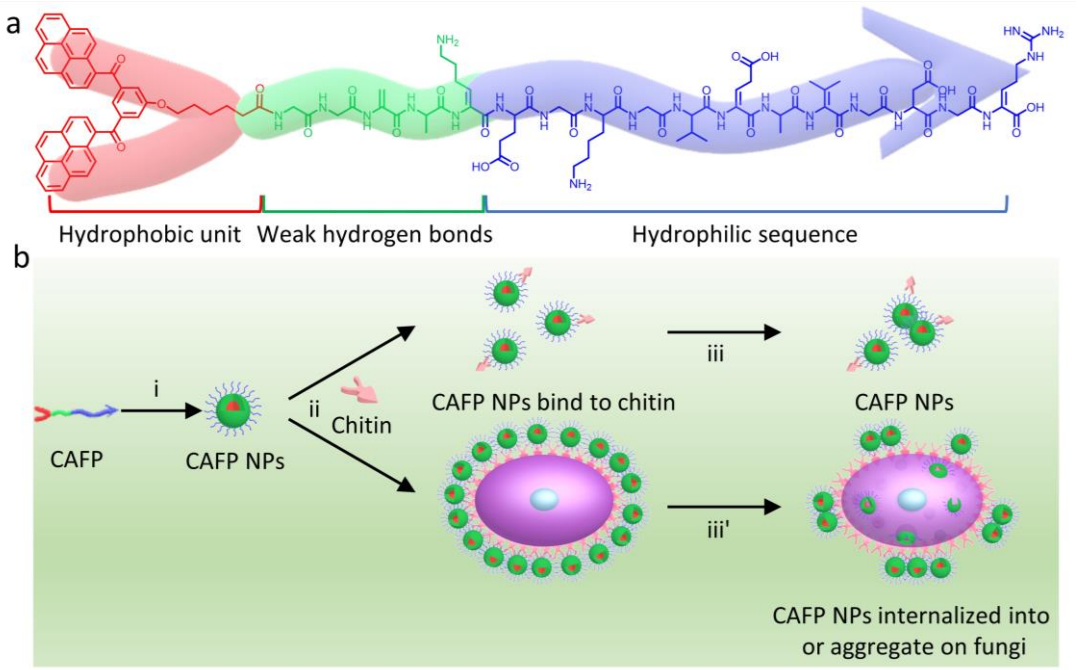

Fig. S6 (a) The Molecular structure of CAFP. (b) Schematic illustration of CAFP NPs in situ bind to chitin and remain NPs. (i) CAFP self-assemble into NPs in solution. (ii) CAFP NPs target and bind to chitin in solution or on fungal cell walls. (iii) CAFP NPs are still NPs binding to chitin, or aggregates on and are internalizes into fungal cells through binding to chitin (iii').

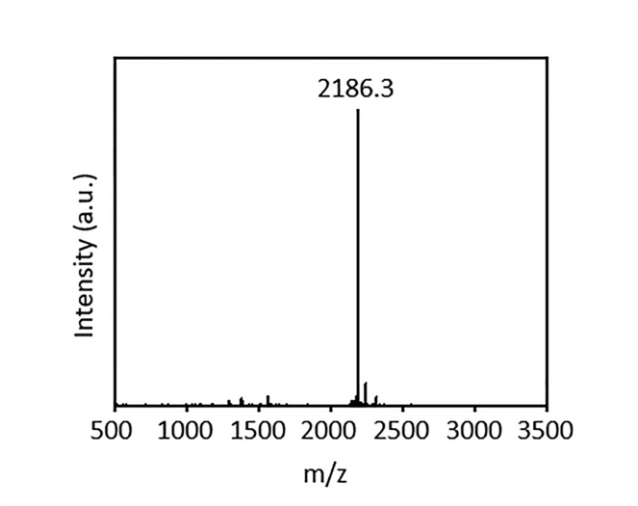

Fig. S7. The MADLI-TOF-MS spectrum of CAFP.

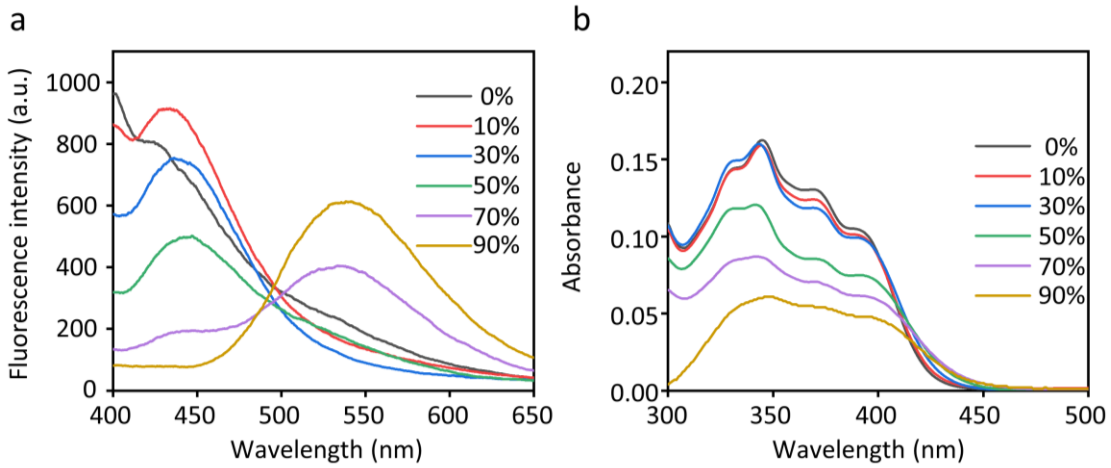

Fig. S8 (a), Fluorescence spectra of CAFP in mixed solution. (b), Ultraviolet-visible of CAFP in mixed solution. The percentage of water in water/DMSO was increased from 0 to 90%.

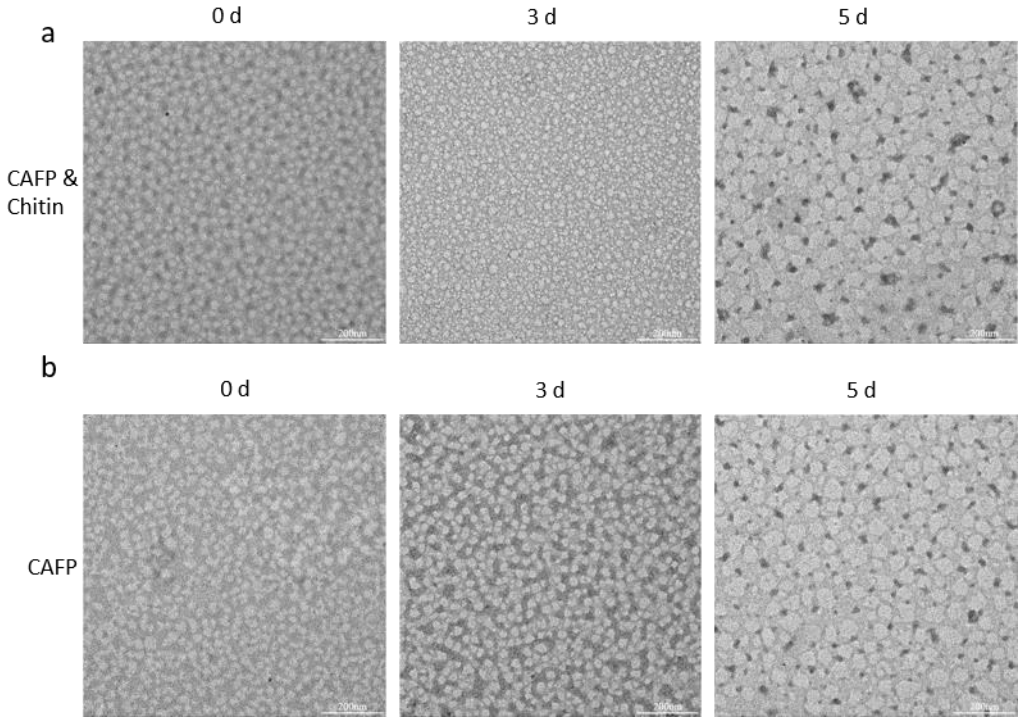

Fig. S9 The CAFP NPs were stable and kept particulate formulation even incubated with chitin. (a**),** TEM images of CAFP NPs (30 μM) with chitin. Scale bars, 200 nm. (b), TEM images of CAFP (30 μM) NPs without chitin. Scale bars, 200 nm.

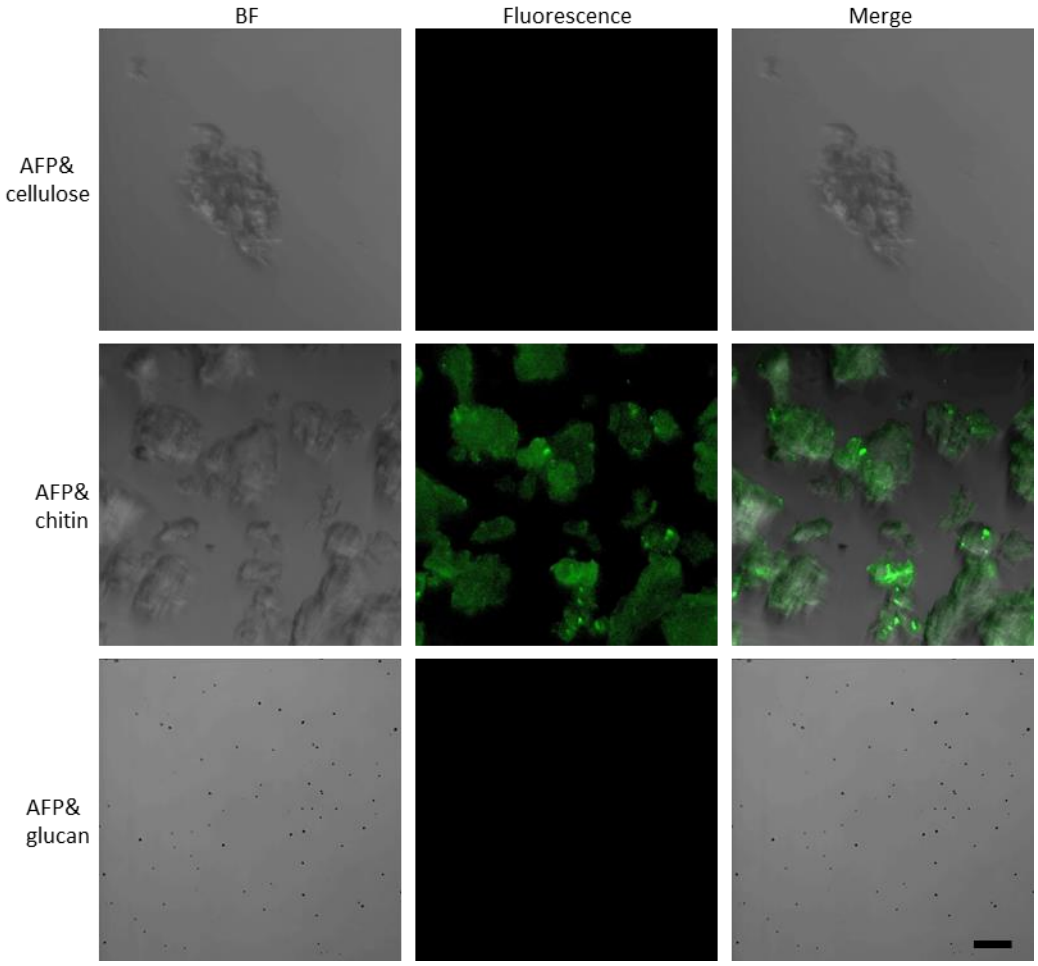

Fig. S10 Confocal images of AFP NPs incubated with cellulose, chitin and glucan for 2 h, respectively. The AFP NPs binds specifically to chitin. Scale bars, 25 μm.

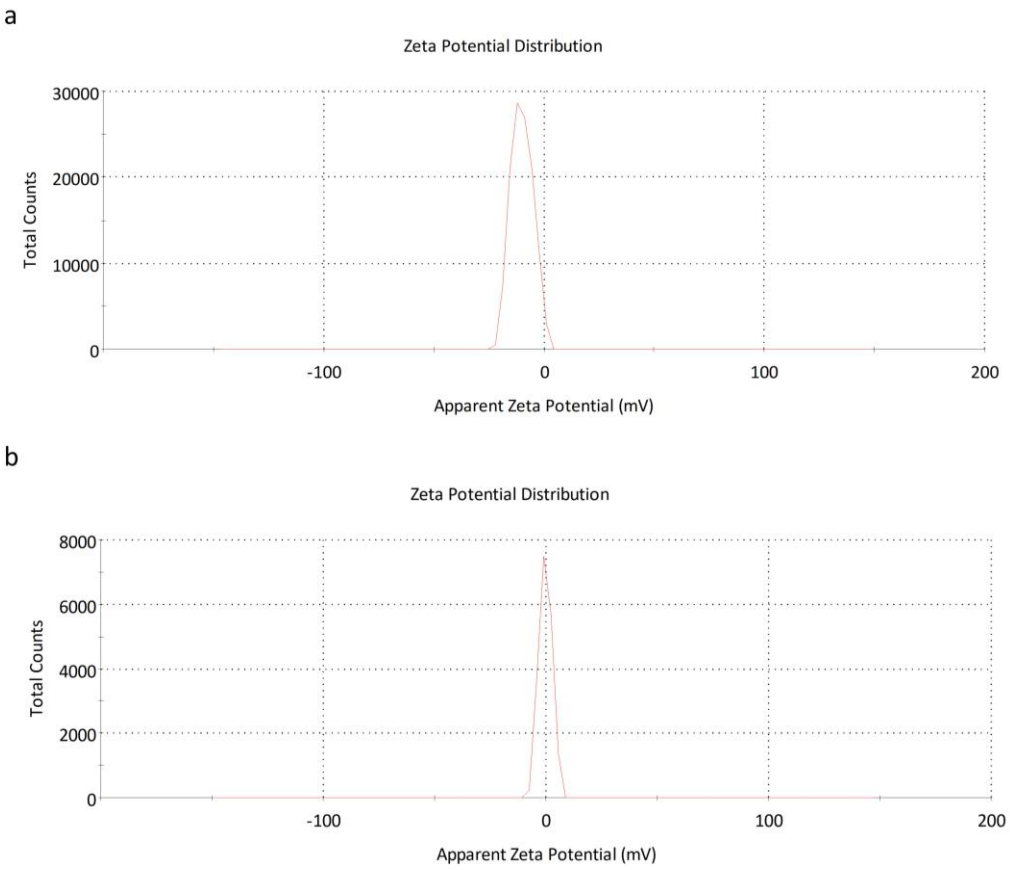

Fig. S11 (a), Zeta potential of fungal cells without treatment by AFP. (b), Zeta potential of fungal cells treated with AFP.

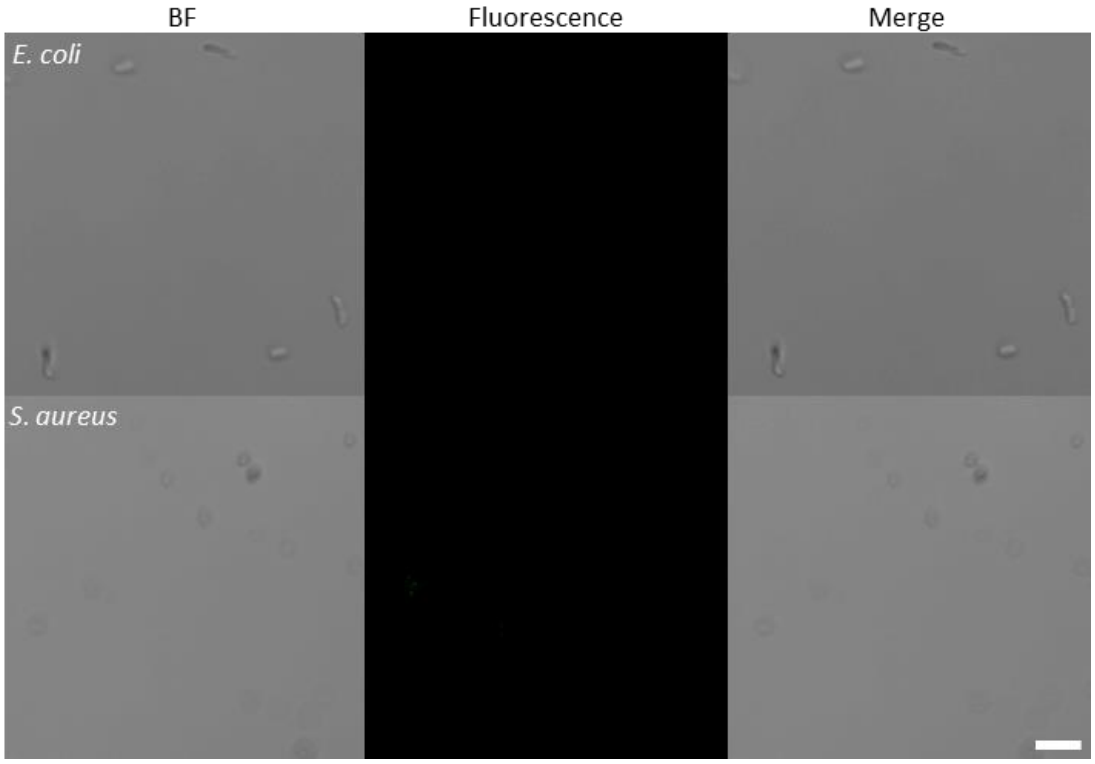

Fig. S12 Confocal images of AFP NPs incubated with *E. coli* and *S. aureus* for 4 h, respectively. Scale bars, 5 μm.

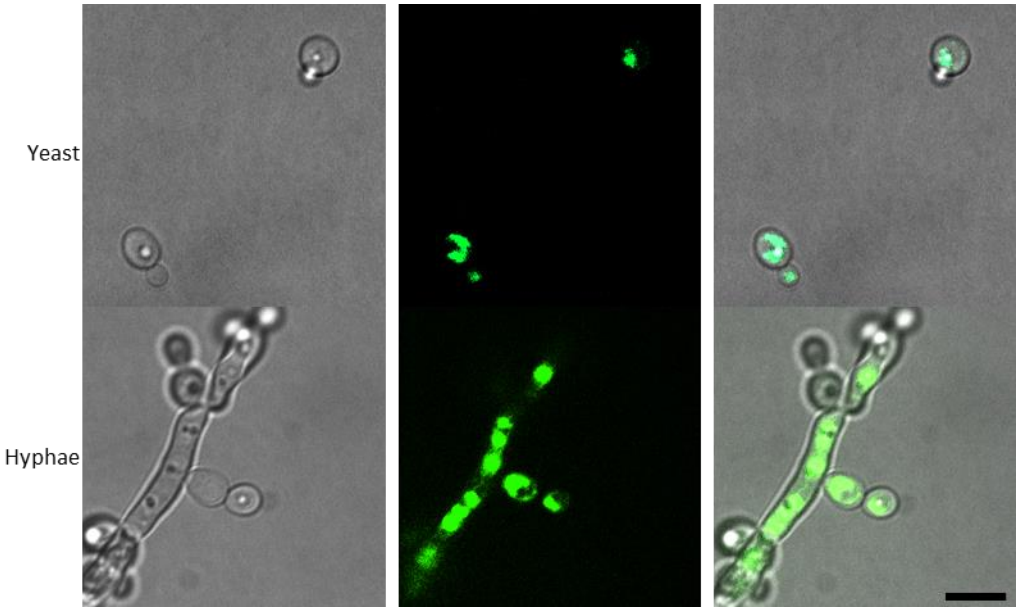

Fig. S13 Confocal images of CAFP NPs incubated with yeast and hyphae of *C. albicans* for 4 h, respectively. The CAFP NPs are internalized into the yeast or hyphae of *C. albicans*. Scale bars, 14 μm.

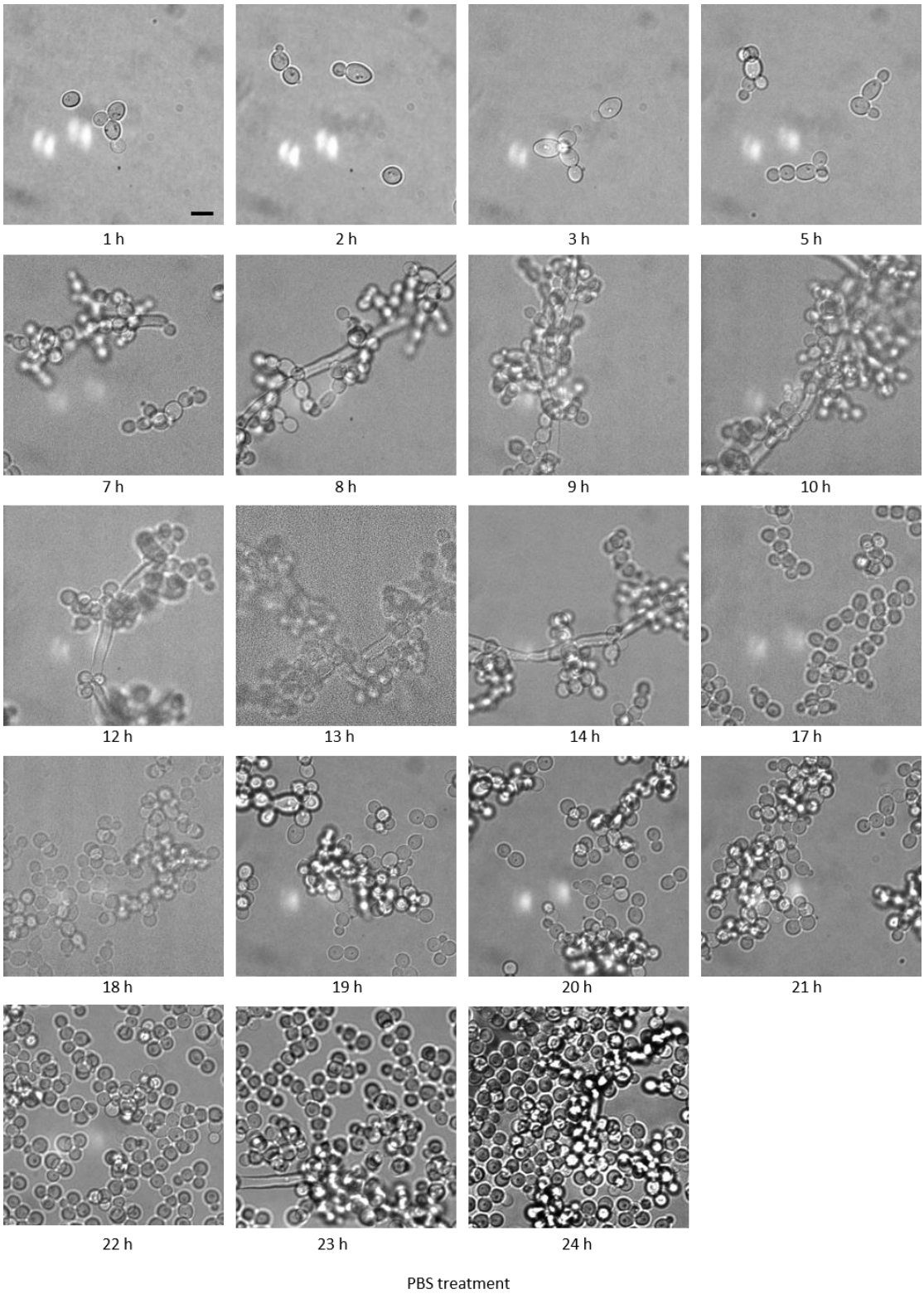

Fig. S14 Continuous confocal images of *C albicans* incubated with PBS for 24 h in normal saline. Scale bar, 7 μm.

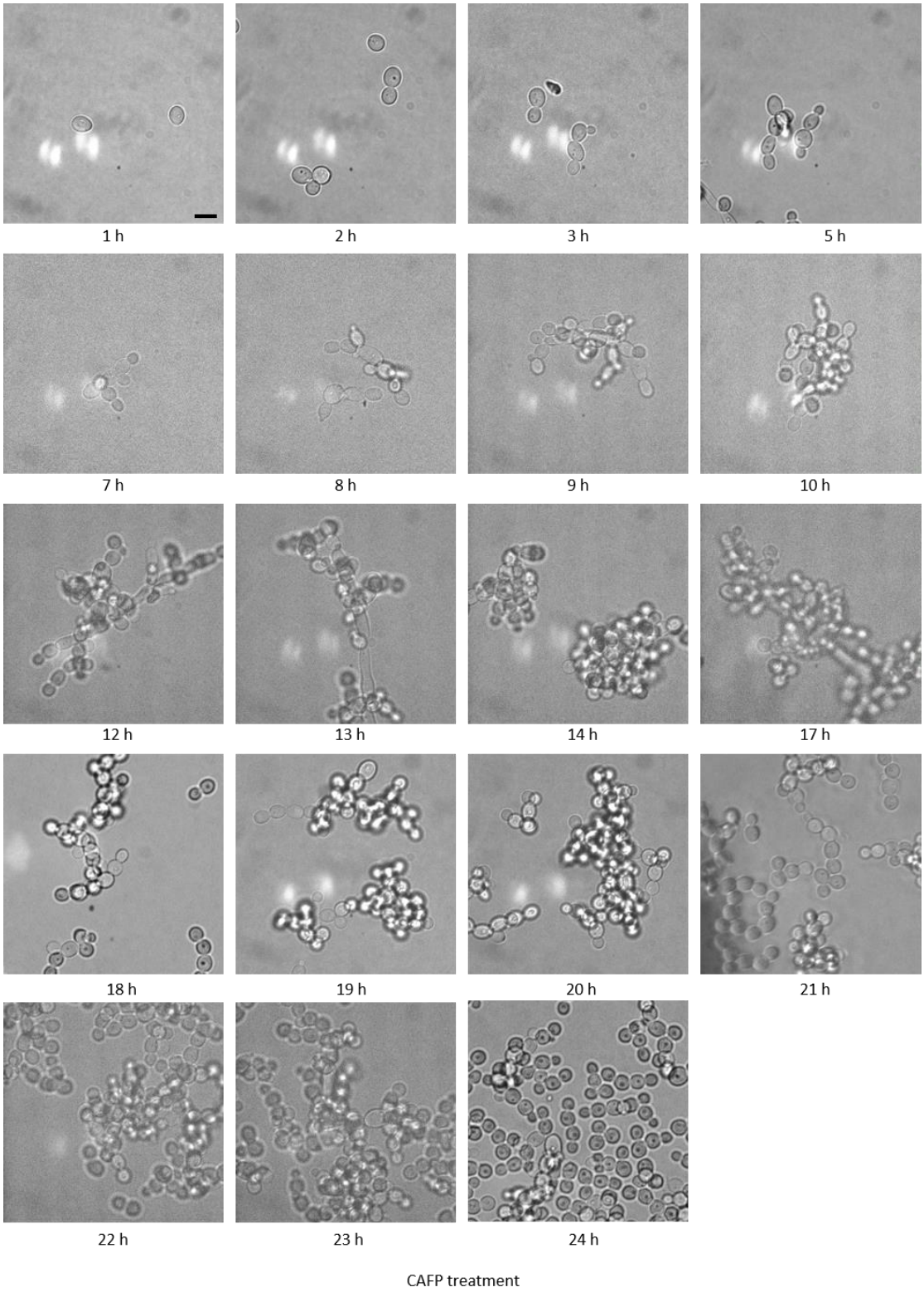

Fig. S15 Continuous confocal images of *C albicans* incubated with CAFP NPs for 24 h in normal saline. Scale bar, 7 μm.

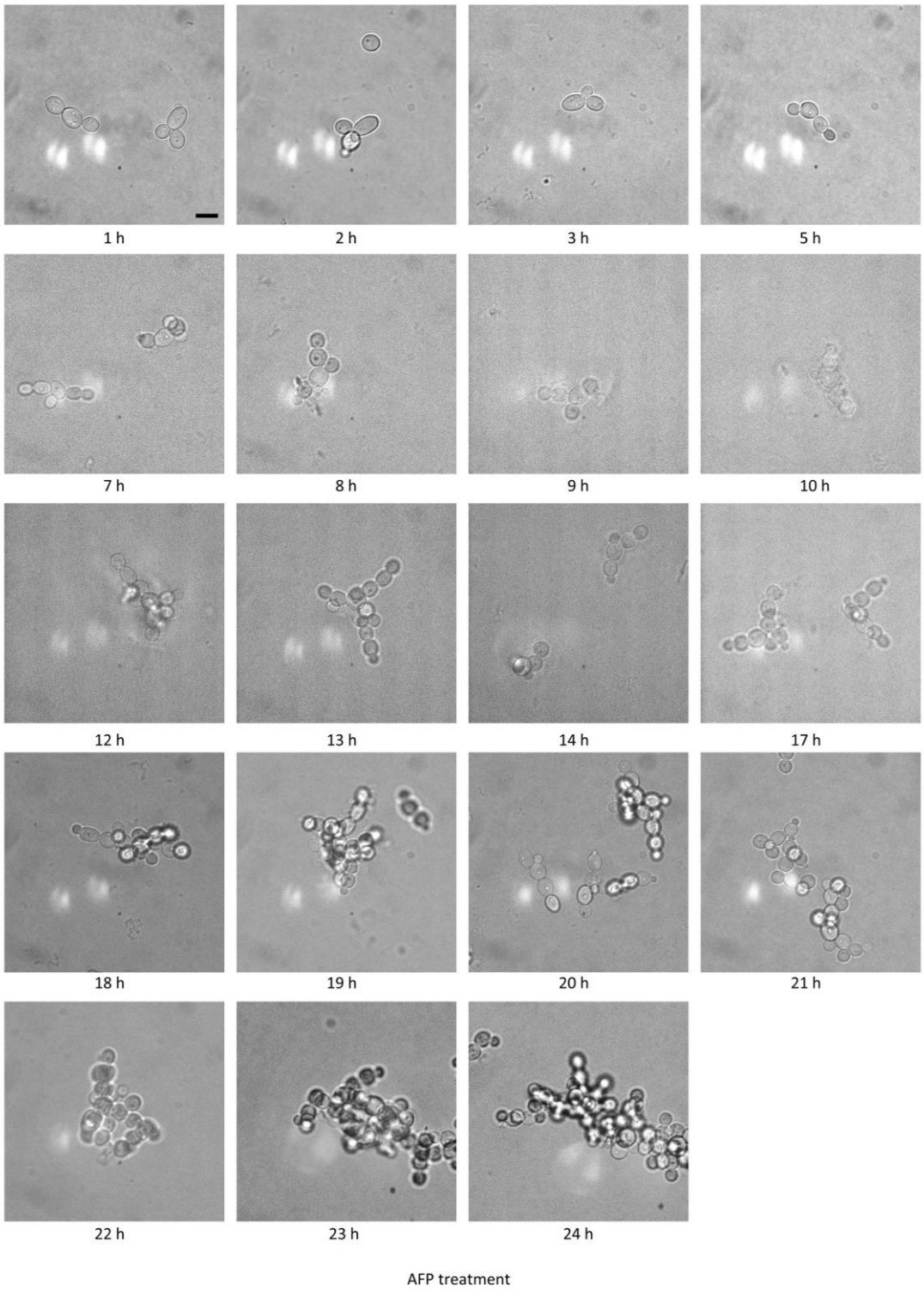

Fig. S16 Continuous confocal images of *C albicans* incubated with AFP NPs for 24 h in normal saline. Scale bar, 7 μm.

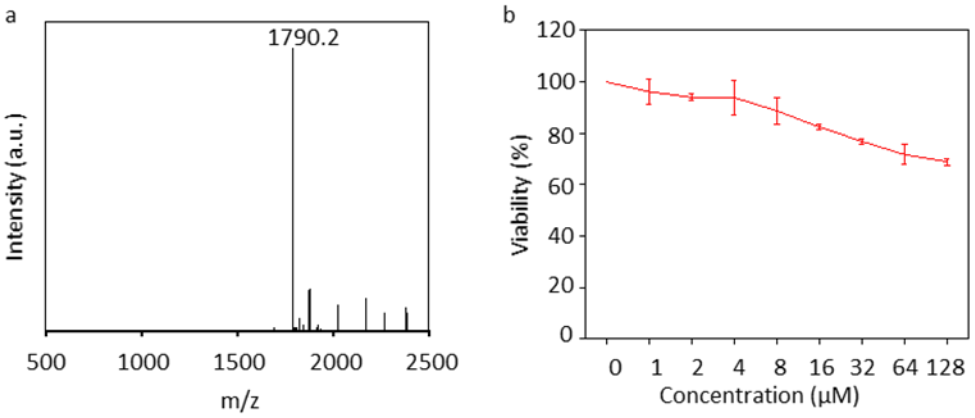

Fig. S17 (a), The MADLI-TOF-MS spectrum of FFVLK-EGKGVEAVGDGR. (b), MIC of FFVLK-EGKGVEAVGDGR to *C. albicans.*

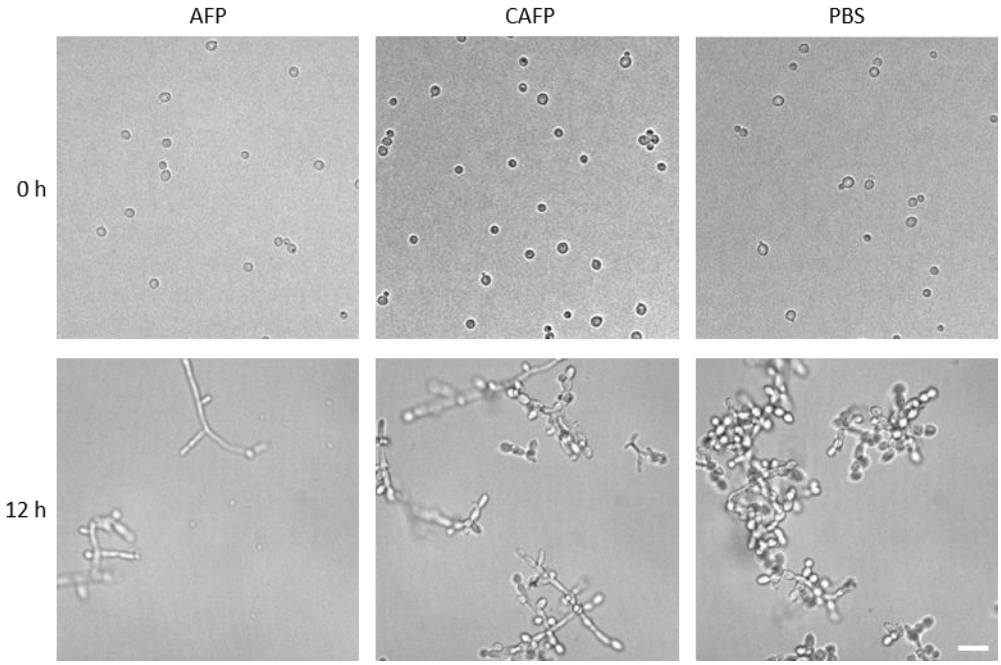

Fig.S18 Confocal images of *C albicans* incubated with AFP, CAFP NPs or PBS for 0 h and 12 h in 1640 medium with serum, respectively. Scale bars, 18 μm.

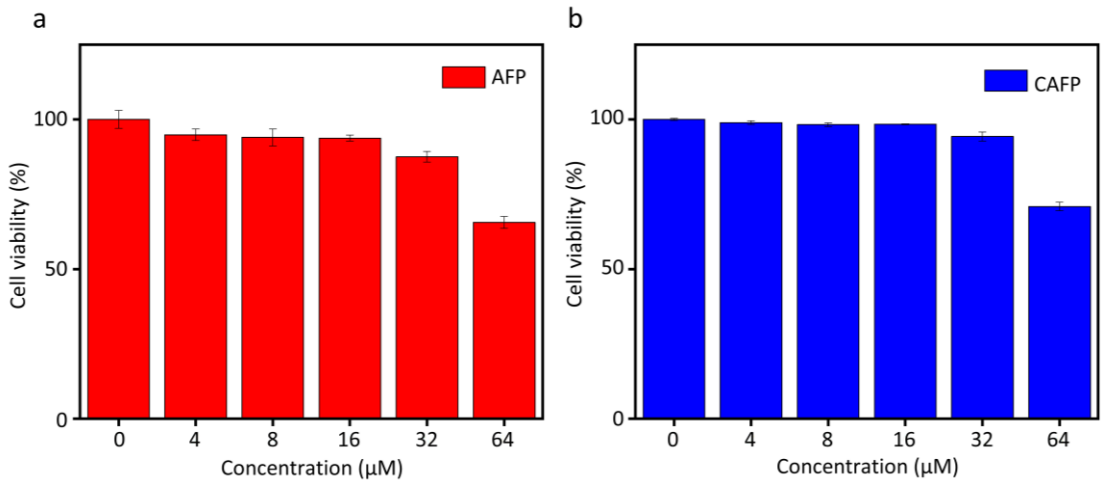

Fig. S19 Cell viability of NCM-460 cells treated with different concentrations of (a) AFP NPs and (b) CAFP NPs.

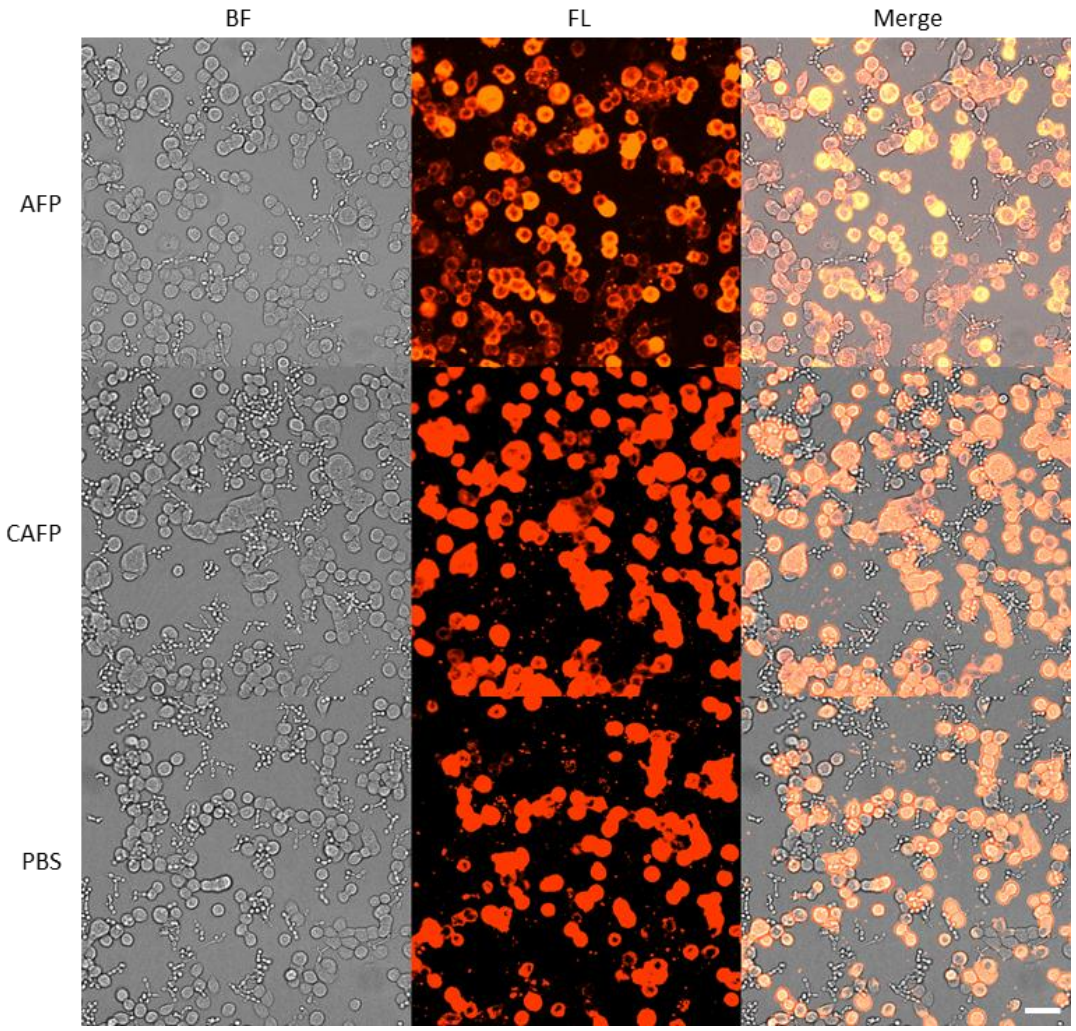

Fig. S20 CLSM images of NCM-460 cells incubated with AFP, CAFP NPs or PBS pre-treated *C albicans* for 2 h, respectively, indicating AFP significantly inhibited the adhesion of *C albicans* on NCM-460 cells. Scale bars, 36 μm.

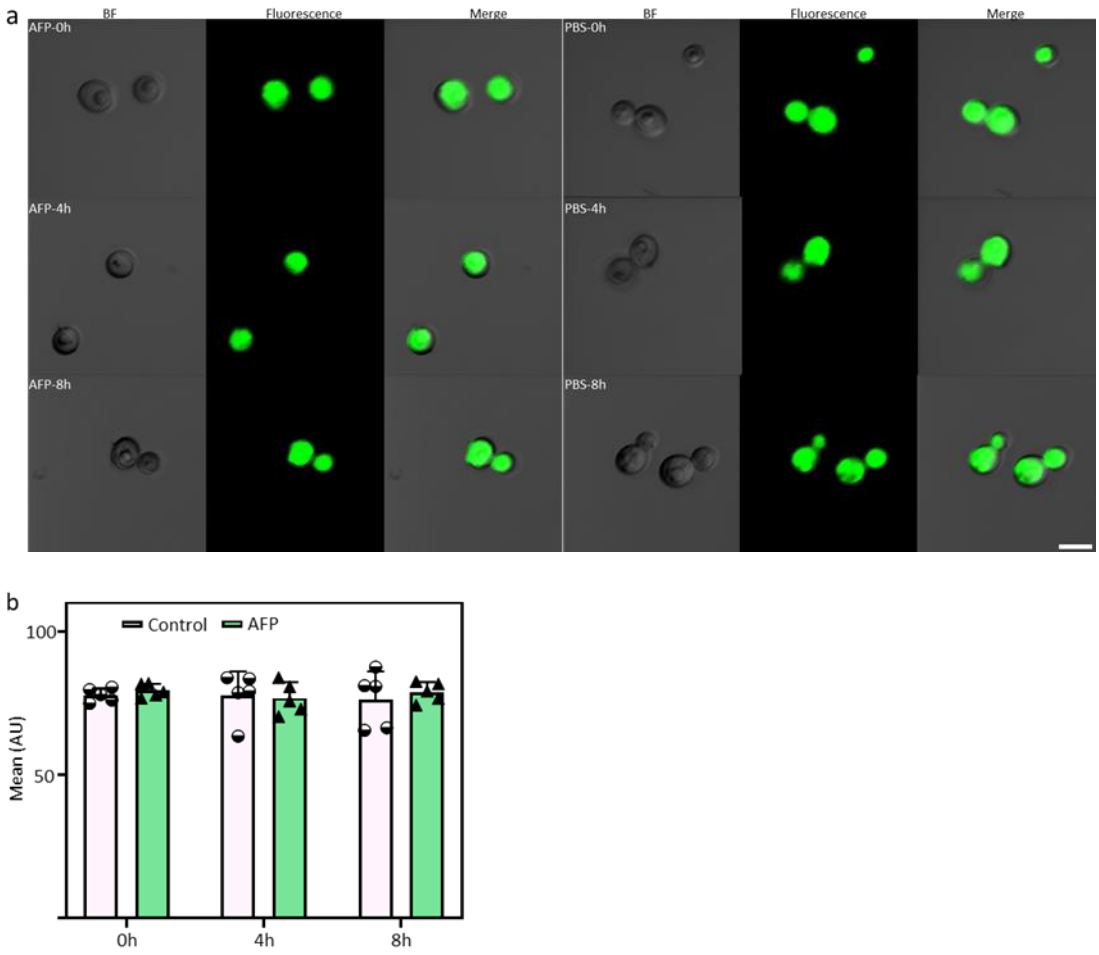

Fig. S21 AFP NPs do not disrupt fungal cell membranes. (a), AFP and PBS were incubated with calcein stained *C. albicans* for 0, 4 and 8 h under CLSM, respectively. Scale bar, 5 μm. (b), Quantitative analysis of the fluorescence intensity of *C. albicans* from (a).

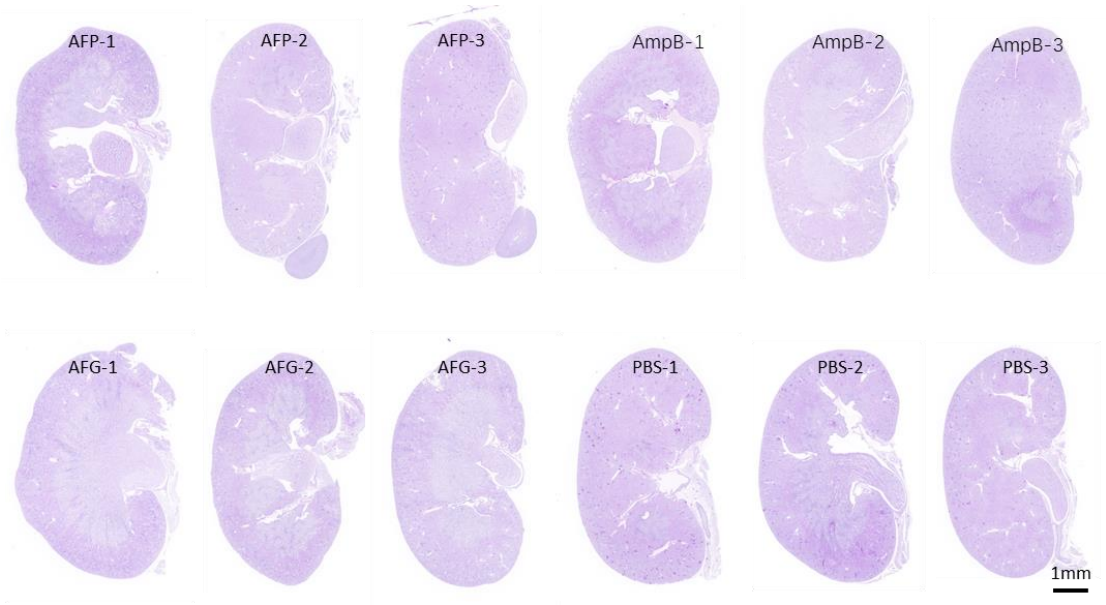

Fig. S22 Kidney sections of systemic candidiasis mice treated with AFP, AmpB, AFG and PBS were stained with PAS and observed under light microscope and. Scale bars, 1 mm.

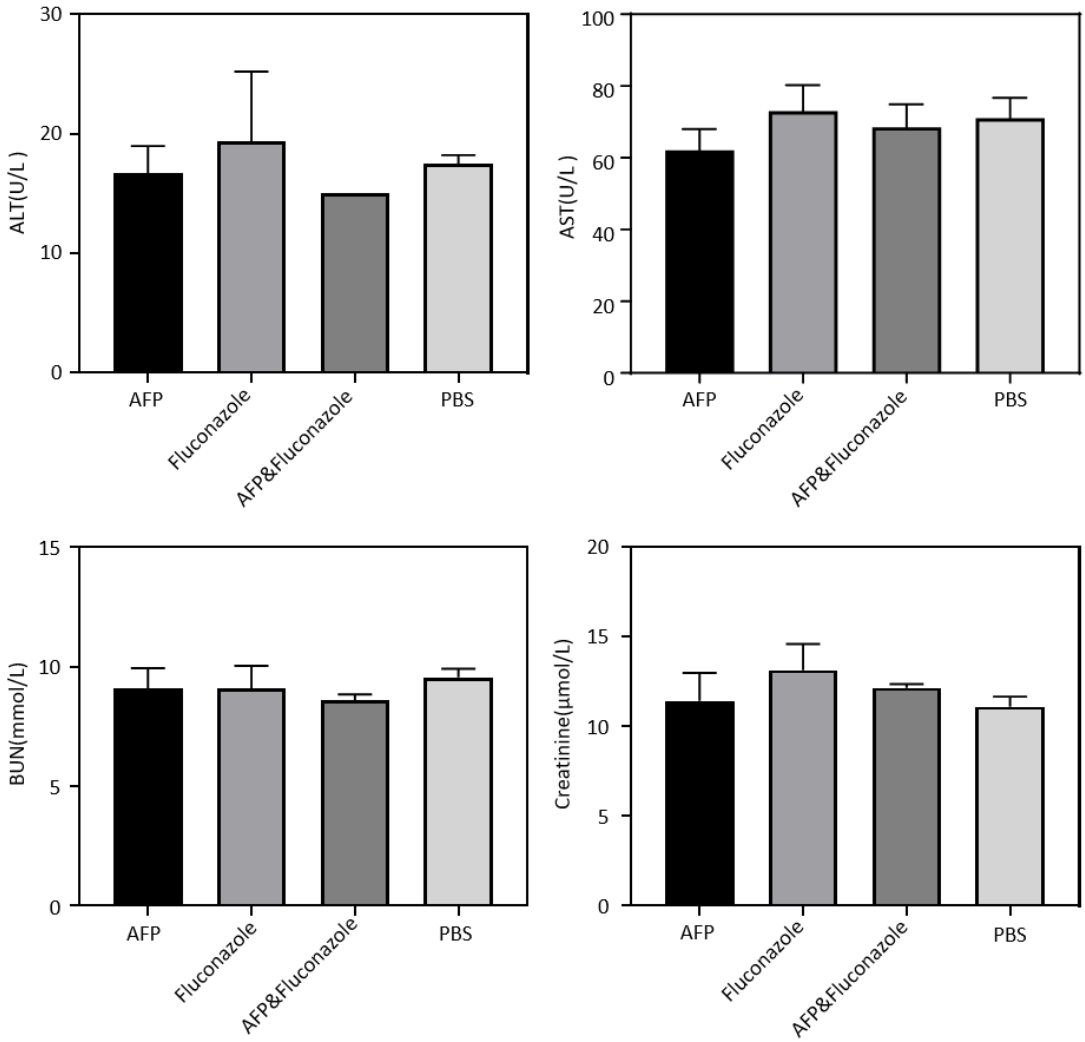

Fig. S23 Administration of AFP NPs did not induce obvious toxicity. Mice were injected with AFP NPs (10 mg/Kg), Fluconazole (10 mg/Kg), AFP NPs (5 mg/Kg) + Fluconazole (5 mg/Kg), PBS for consecutive 5 days (n=3). On day 6 post-injection, the blood was taken from three mice of each group to estimate the levels of (a) ALT, (b) AST, (c) BUN and (d) creatinine.