Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information for:

Colorimetric detection of catalase and catalase-positive bacteria (*E. coli*) using silver nanoprisms

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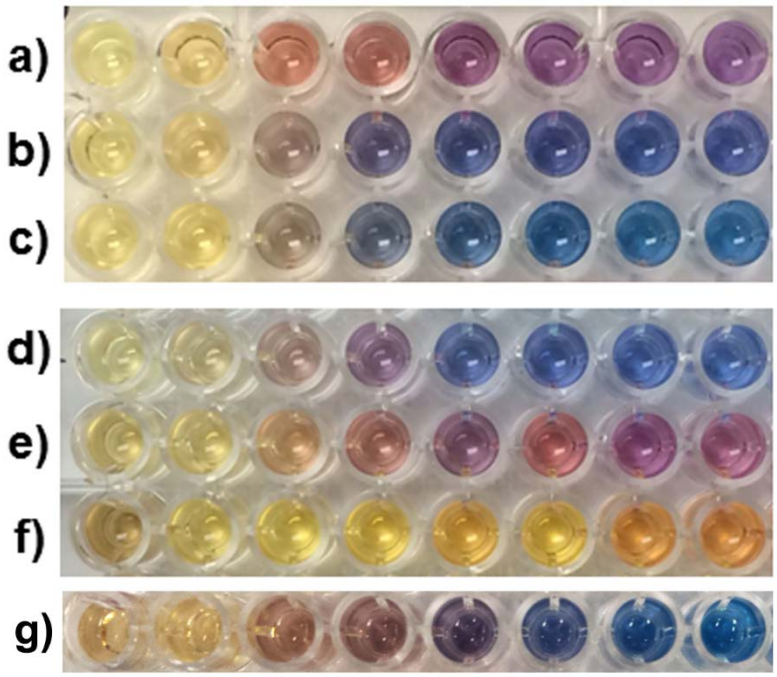

Figure S1. Photographs of a series of Ag nanoparticle synthesized under different conditions. The concentration of H_2O_2 was increased from 0 to 20 mM across all rows of the well plate. The volume of $NaBH_4$ stock (1.2 mM) injected to the wells was increased from 60 μL (a), to 70 μL (b) and 80 μL (c) while keeping the concentration of all other reagents constant. A redshift in the LSPR peak was observed with increasing amount of $NaBH_4$. The concentration of the 25 μL silver nitrate stock solution was increased from 1 mM (d), to 1.2 mM (e) and 1.5 mM (f). The solutions became more orange and yellow with increasing amount of $AgNO_3$. Colorimetric response can be achieved without the addition of PVP (g), which has the same synthetic condition as (b), but without PVP. The addition of PVP lengthens reaction time but enhances the stability of the anisotropic morphology during storage.

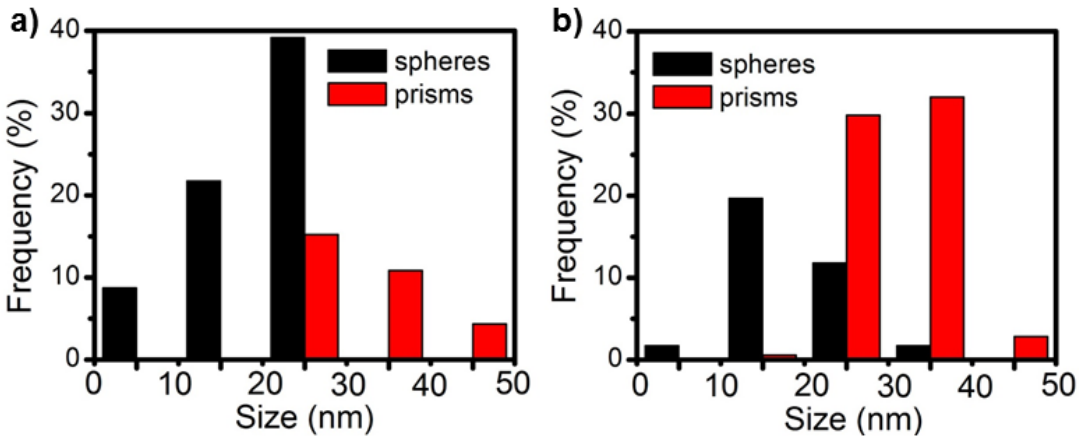

Figure S2. Size distribution of Ag nanoparticles synthesized at 3.2 mM (a) and 32.3 mM (b) H_2O_2 obtained from TEM images.

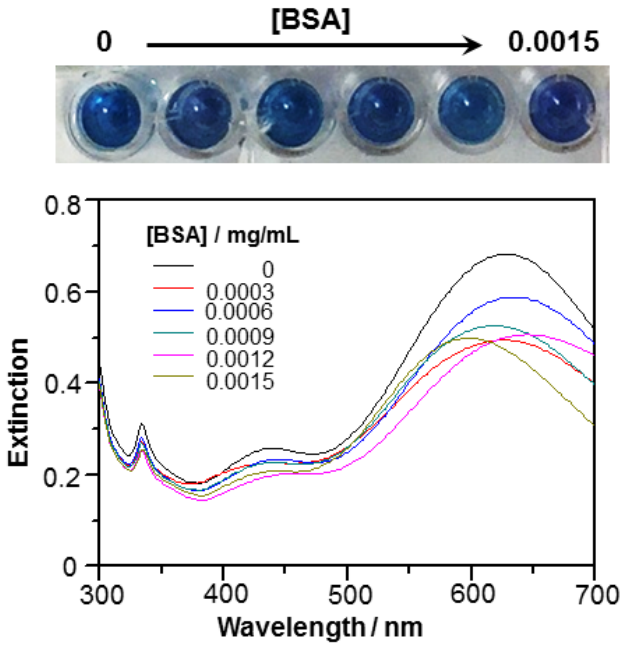

Figure S3. Photograph and extinction spectra of the silver nanoprisms synthesized with different concentrations of BSA.

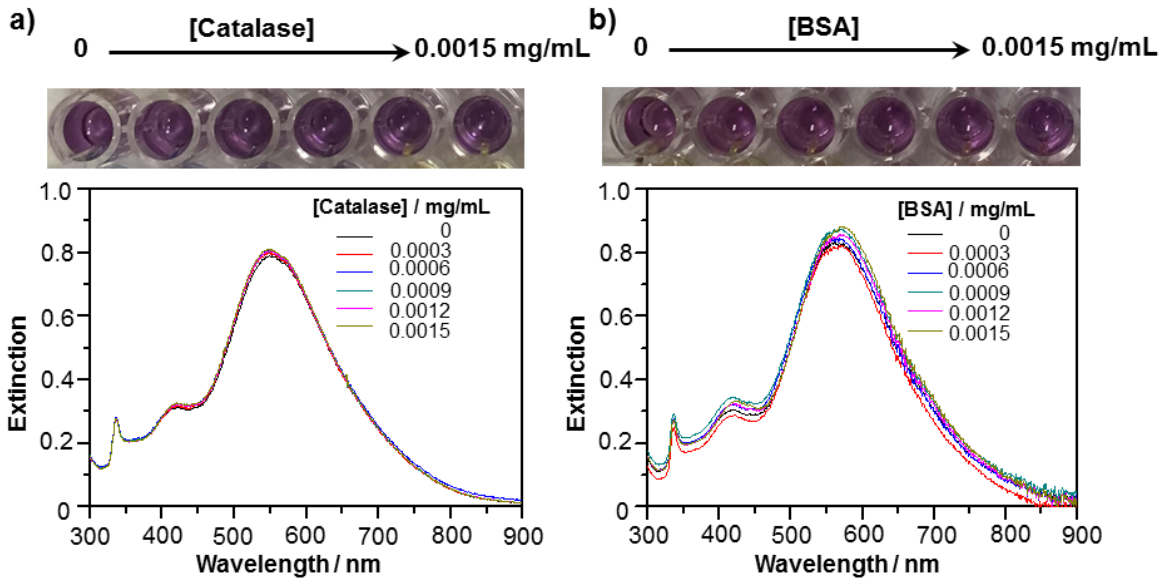

Figure S4. Photographs and extinction spectra of the as-prepared silver nanoprisms incubated with different concentrations of catalase (a) or BSA (b).

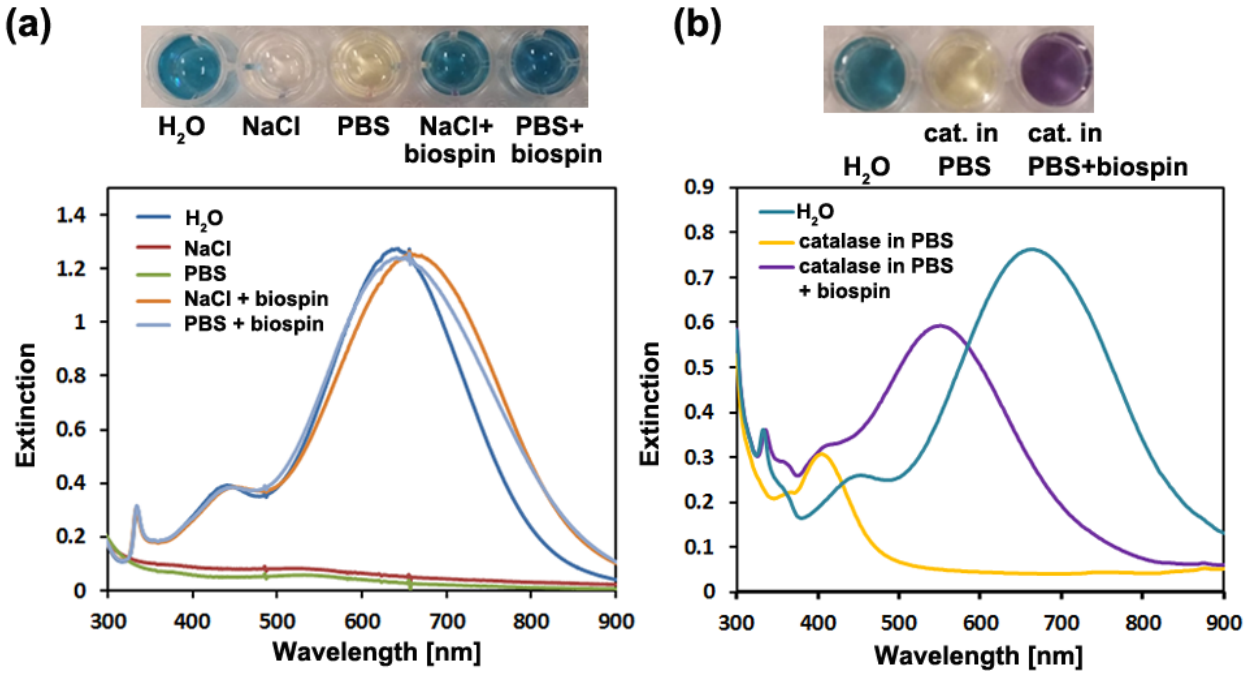

Figure S5. (a) Photograph and extinction spectra of Ag nanoparticle solutions synthesized in the presence of interferences: a volume of 20 μL of 0.1 M NaCl and 0.010 M phosphate buffer (wells 2 and 3), and the same solutions after desalting using biospin column (wells 4 and 5) were added during synthesis. The effects of interfering anions were remediated upon purification and large Ag nanoprisms giving rise to turquoise solution color were observed as in the control (well 1). (b) Photograph and extinction spectra of Ag nanoparticle solutions synthesized with H_2O (control), and 20 μL of 2 U of catalase dissolved in 0.010 M PBS with and without purification. Without purification (well 2), small Ag spheres were formed and the solution was faint yellow; upon purification using a spin column, the Ag nanoparticle solution exhibited a LSPR near 520 nm corresponding to a purple color. The use of spin column for purification resulted in some loss of the enzyme; hence the activity detected was lower than expected.

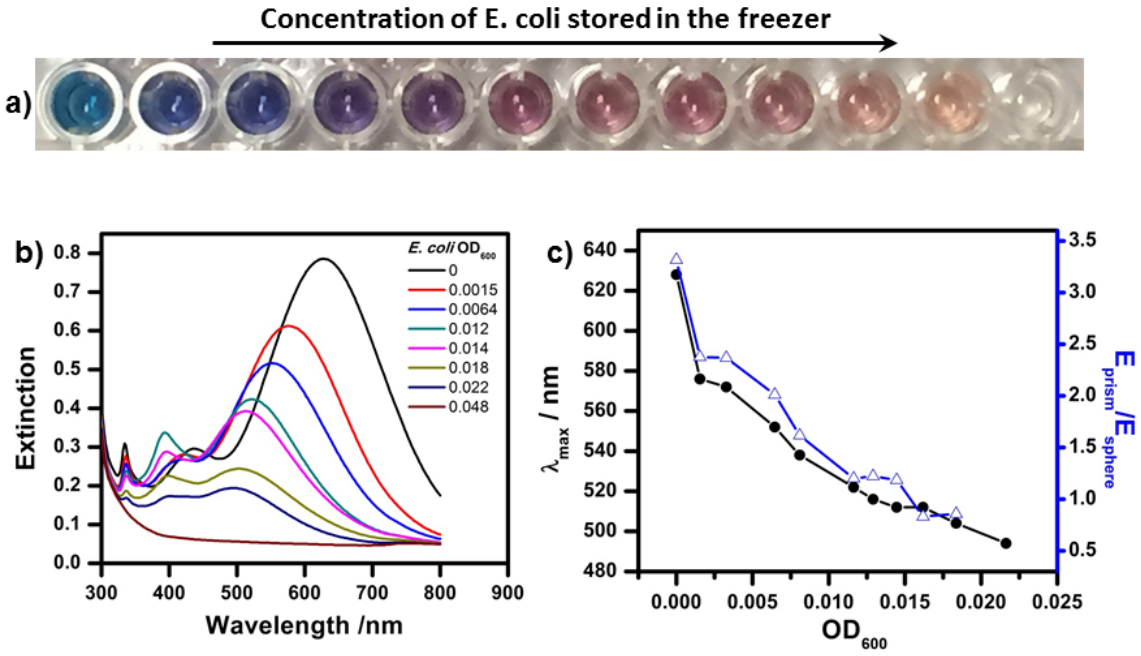

Figure S6. Photograph (a) and extinction spectra (b) of silver nanoparticle solutions synthesized with different concentrations of *E. coli* that had been stored in the freezer. The optical density of the *E. coli* was similar to the experiment carried out using freshly cultured bacteria (Fig. 3) but the colony-forming unit was much lower (1270 cfu/mL) for the previously frozen *E. coli*. The dominant LSPR peak wavelengths and intensity ratios are shown in (c).

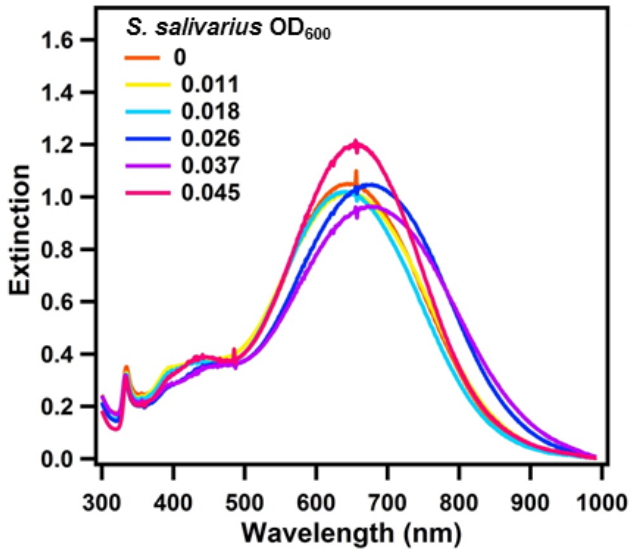

Figure S7. Extinction spectra of silver nanoprism solutions synthesized by adding different concentrations of *S. salivarius*. The concentration in terms of optical density of *S. salivarius* was similar to that of *E. coli*.

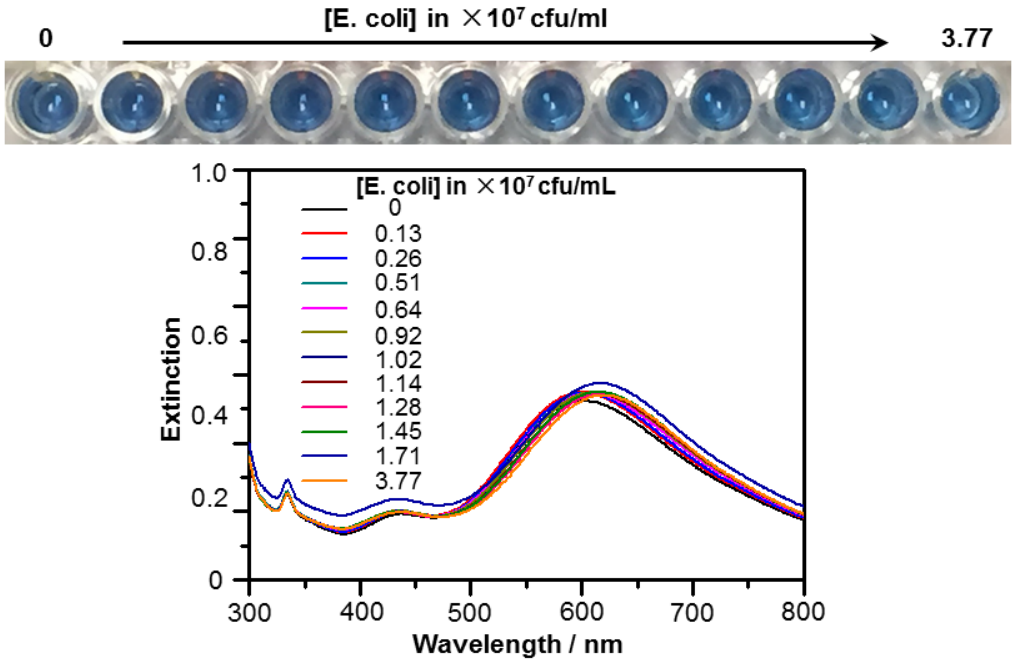

Figure S8. Photograph and extinction spectra of the as-prepared silver nanoprisms incubated with different concentrations of *E. coli*.