Electronic Supplementary Information

A multifunctional plasmonic chip for bacteria capture, imaging, detection, and in-situ elimination for wound therapy

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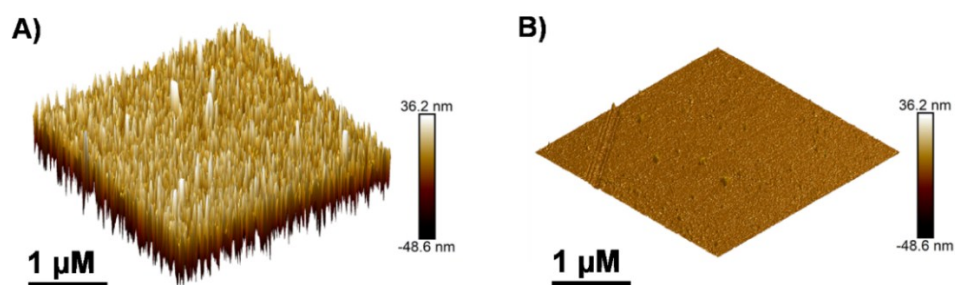
Supplementary Table and Figures

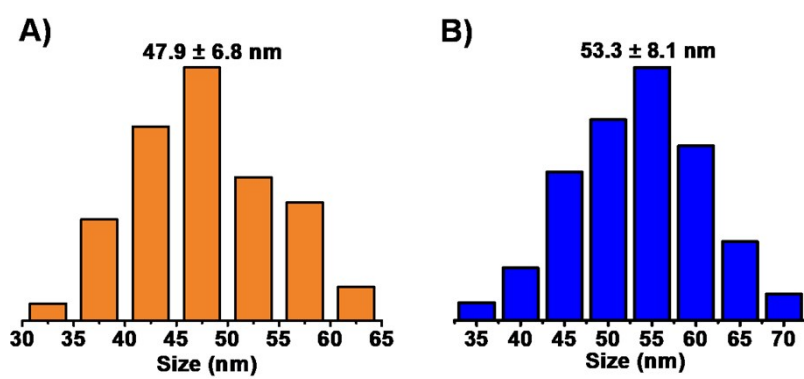**Figure S1.** 3D AFM images of the pAu (A) and the glass slide (B) from the side view.

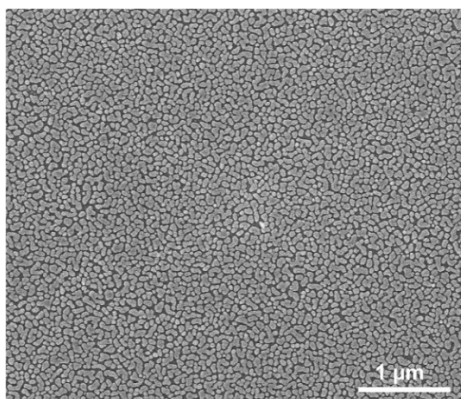**Figure S2.** The statistics data of the pAu, including their height (A) and width (B).

Figure S3. SEM image of the pAu substrate after irradiation with NIR laser (0.5 W/cm^2) for 50 min.

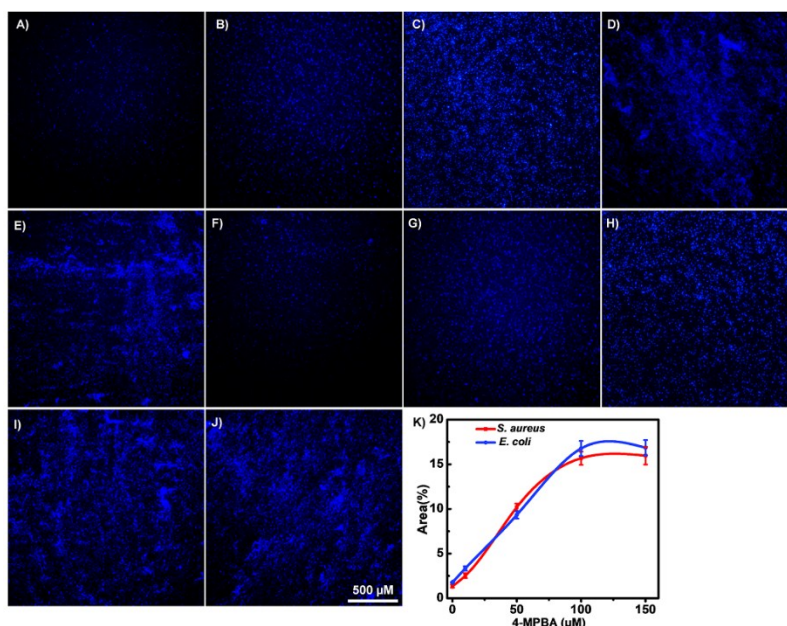**Figure S4.** The fluorescence images of the chip with various concentrations of 4-MPBA (0: A, F; 10 μM: B, G; 50 μM: C, H; 100 μM: D, I; 150 μM: E, J) after incubation with Hoechst-labeled *S. aureus* (A-E) or *E. coli* (F-J) for 30 min. The bacteria concentration is fixed at 10^6 CFU mL^{-1}. K) The calculated fluorescence area ratio of the chip under different concentrations of 4-MPBA after incubation with Hoechst-labeled *S. aureus* (red line) or *E. coli* (blue line). To investigate the capture efficiency of the MPBA/pAu chip, the concentration of 4-MPBA was studied. First, the pAu (1.0 cm × 1.2 cm) was soaked into the 4-MPBA solutions with different concentrations for 2 h. Then the chip was taken out, washed and put into Hoechst-labeled bacteria solutions (10^6 CFU mL^{-1}) with slow stirring for 30 min to capture bacteria. Next, the chip was gently cleaned and imaged by a fluorescence microscopy. Finally, the fluorescence area ratio in these images were quantitatively calculated by the Image J software. The more bacteria are captured, the larger fluorescence area will be obtained. Thus, the fluorescence area ratio was used to represent the capture efficiency of the chip.
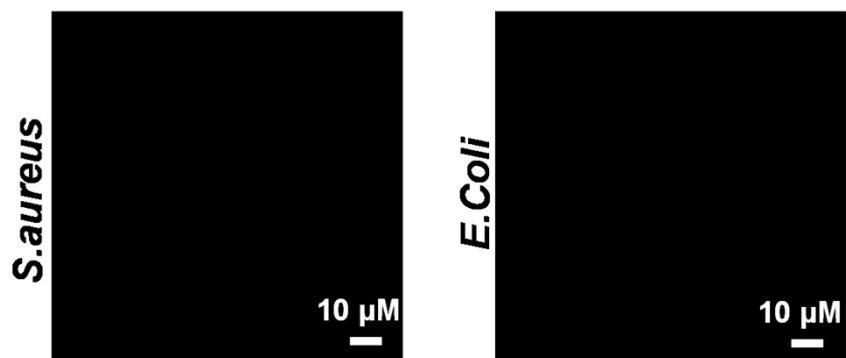
Figure S5. CLSM images of Cy5-labeled *S. aureus* and *E. coli* on the glass chips.
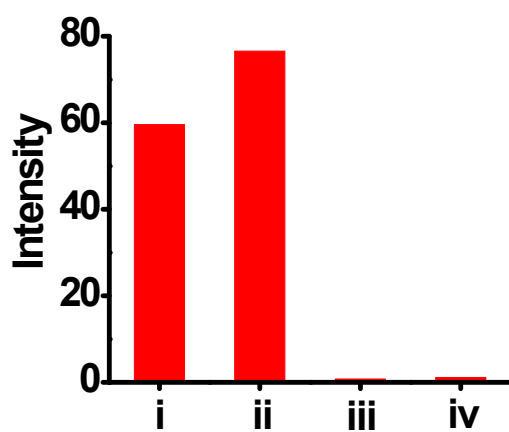

Figure S6. Signal quantification of the fluorescence intensity of Cy5-labeled *S. aureus* on the chip (ⅰ) and glass (ⅲ), and Cy5-labeled *E. coli* on the chip (ⅱ) and glass (ⅳ).
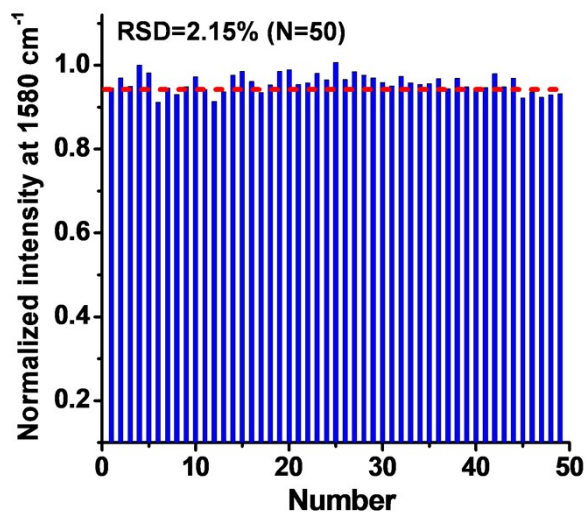
Figure S7. The Raman intensity of 4-MPBA at 1580 cm^{-1} from 50 random points.
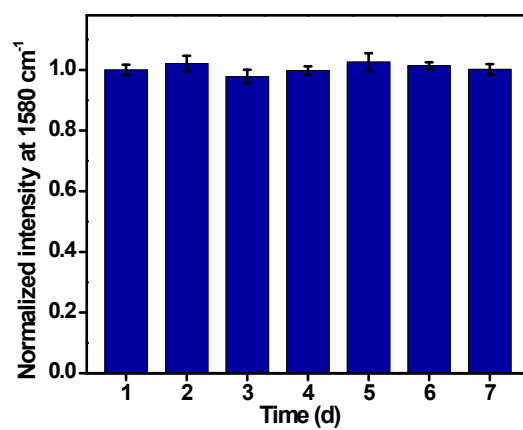

Figure S8. The normalized Raman intensity of MPBA/pAu chip at 1580 cm^{-1} for a week.
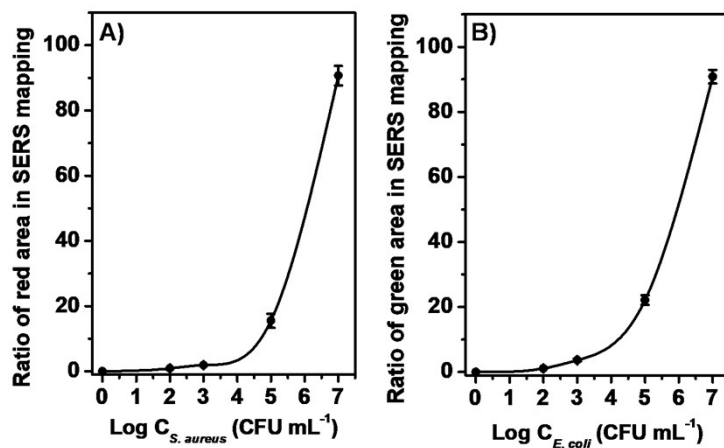
Figure S9. Quantitative analysis of the relationship between the logarithmic bacteria concentration of *S.aureus* (A) and *E. coli* (B) and the corresponding ratio of red or green area in Fig. 4D.
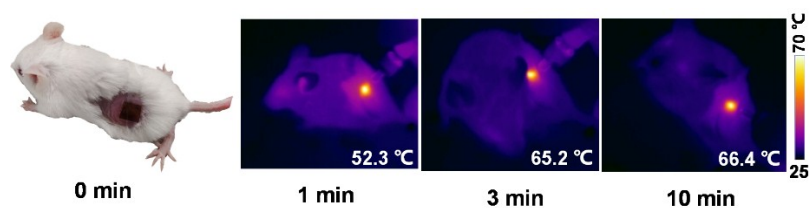

Figure S10. Photothermal images for the mouse in the process of NIR treatment.

Table S1 Comparison of normalized electric-field magnitude and intensity for pAu and the single AuNP.

	max $|\mathbf{E}|/|\mathbf{E}_0|$	max $|\mathbf{E}|^2/|\mathbf{E}_0|^2$
pAu	19.9	396.01
AuNP	5.73	32.83

Table S2 DNA sequences of bacteria-specific aptamers

Names	Sequences (from 5' to 3')
S. aureus aptamer	Cy5-TCCCTACGGCGCTAACCCCCCCAGTCCGTCCTCCCAGCCTCACACCG CCACCGTGCTACAAC
E. coli aptamer	Cy5-GCAATGGTACGGTACTTCCCCATGAGTGTTGTGAAATGTTGGGACA CTAGGTGGCATAGAGCCGCAAAAGTGCACGCTACTTTGCTAA