Supplementary Information

to

Hollow Au loading kanamycin for pharmacology and photothermal sterilization triggered by laser

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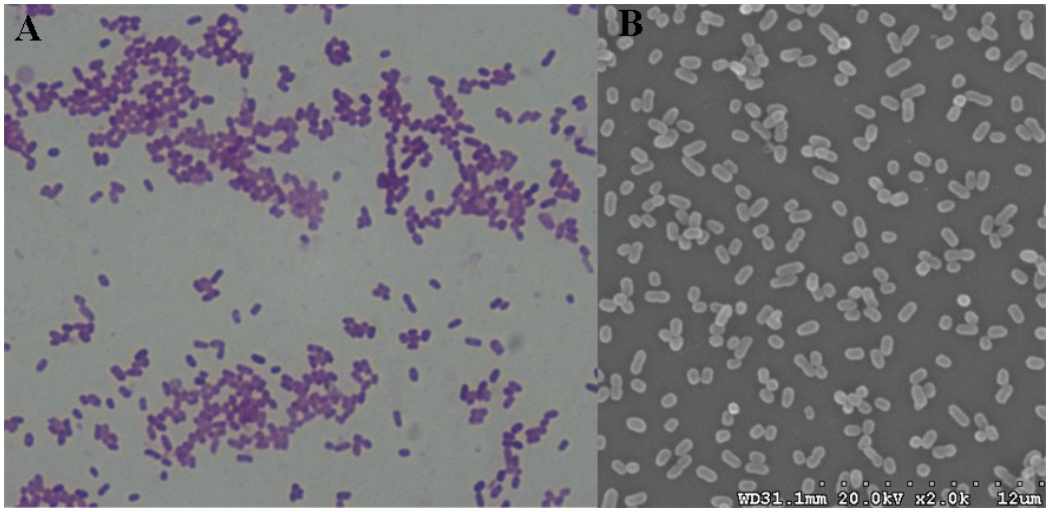


Fig.S1 Gram stain image (A), and SEM image (B) of Escherichia coli.

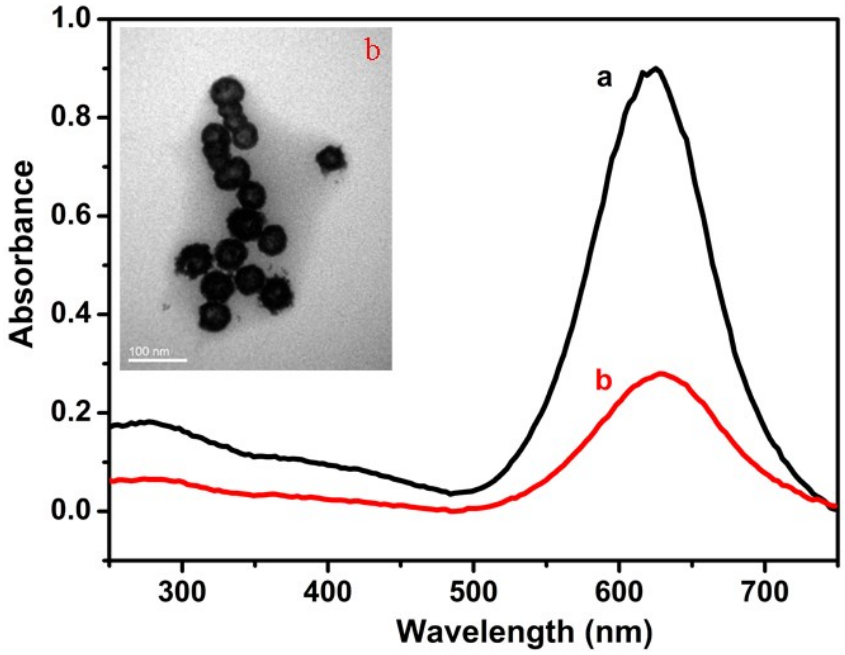


Fig.S2 UV-Vis spectra of (a) fresh prepared and (b) after 70 days stored at 4 °C under dark of hAuNPs.

Illustration is the TEM of hAuNPs corresponding curve (b).

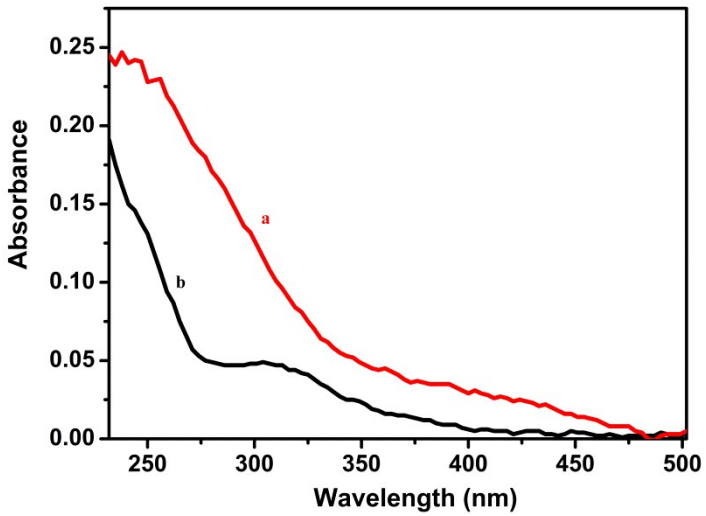
How to measure the loading amount of kanamycin on hAuNPs?

The drug loaded on the hollow nano-carrier material, which can be distributed in cavity carrier, namely internal loading (DI, Drug Inside), the external surface area can also be found in the carrier, namely the external loading (DO, Drug, Outside). Drug dissolution can be divided into two stages of early rapid and late slow dissolution, because the dissolution speed rate of DO is greater than the DI, so it can be generally considered early rapid dissolution period is only affected by the dissolution of DO, and the slow release period only related to DI. A method combining thermogravimetric analysis and dissolution experiment can be used to measure the loading amount. Fistly, measured the overall loading with the thermogravimetric analysis, then, according to the dissolution characteristics of internal loading (DI) and external loading (DO) , to determine the external loading (DO), and ultimately determine the internal loading (DI) [1, 2]. The loading amount of kanamycin on average per-nanoparticle be equal to overall loading divided by amount of hAuNPs.

Reference

1. Z. Z. Li, L. X. Wen, L. Shao and J. F. Chen, Journal of Controlled Release, 2004, **98**, 245-254.
2. Z. Z. Li, S. A. Xu, L. X. Wen, F. Liu, A. Q. Liu, Q. Wang, H. Y. Sun, W. Yu and J. F. Chen, Journal of Controlled Release, 2006, **111**, 81-88.

The release behaviors of kanamycin without and with laser irradiation (200 mW/cm^2, diameter 2 mm, 30 min).

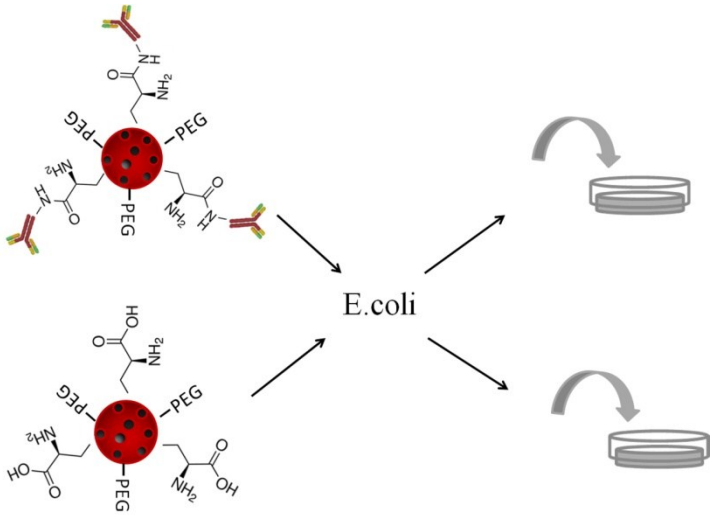


Kanamycin solution (1 mg/mL) was mixed with hAuNPs (0.5 mmol/L). The mixture was gently shaken at room temperature for 24 h in the dark. Free kanamycin was removed by centrifugation. The resulting hAuNPs-kana was placed in distilled water for 30 minutes, and the kanamycin (with laser: curve a and without laser: curve b) in suspension of the hAuNPs-kana was measured.

As shown above (256nm), the content of kanamycin with laser irradiation in the suspension was higher than that without. The results showed that laser irradiation promoted the release of kanamycin.

The control groups of hAuNPs with and without anti-E.coli for evaluating the targeting effect.

Schematic illustration of hAuNPs with and without anti-E.coli for evaluating the targeting effect.

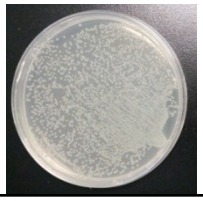
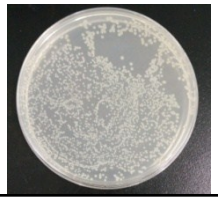
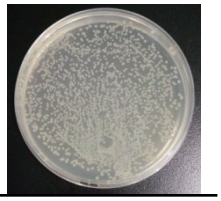


Experimental

Preparation of hAuNPs-anti-E.coli was the same as the experimental section in the manuscript, and the control group (the group of hAuNPs without anti-E.coli) eliminated the addition of antibody. To evaluate the targeting effect of the hAuNPs-anti-E.coli, E.coli (0.5 MCF) were diluted with broth to 1 × 10^5 cfu/mL, and stored as original bacteria solution. The as-prepared E.coli solution (50 μL) mixed with hAuNPs-anti-E.coli (30 μL) was shaken for 2 h at room temperature. After being collected by centrifugation (5000 rpm/s, 15 min, 4 °C), the mixture was diluted with LB broth to 500 μL. The bacteria above solution of 100 μL was coated on the LB solid medium (parallel three), and the number of bacteria colonies were counted after 37 °C culture of 16 h. The experimental procedure of the control group was the same as above, but E.coli mixed with hAuNPs modified with double-ligand only.

Results

The survival rate of E. coli in the presence of hAuNPs with and without anti-E.coli.(hAuNPs 2.0 mM)

	Bacteria (blank)	hAuNPs with anti-E.coli	hAuNPs without anti-E.coli
Bacteria Viability (%)	100.00±2.70	70.26±2.15	86.42±2.13
Colony Images			

Under the same conditions, the bacteria viability of hAuNPs with anti-E.coli was lower than without. Because of the anti-E.coli mediated, there were more hAuNPs connected to E.coli, high concentration of hAuNPs led to a certain degree of bacterial death. This result indicating the targeting effects of the hAuNPs-anti-E.coli.