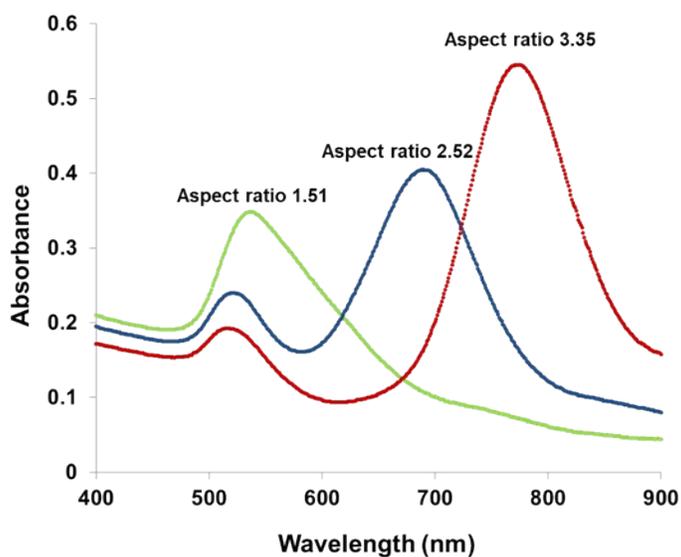


### Electronic Supplementary Information (ESI)

#### The optimization of AuNRs aspect ratio

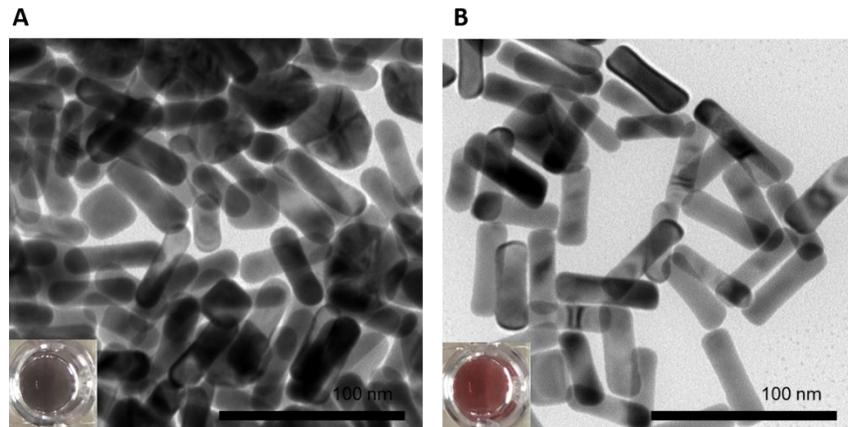
AuNRs with different aspect ratio including 1.51, 2.52, and 3.35, respectively and the absorption spectra corresponding to the AuNRs were shown in supplementary Fig. S1. It was shown that the highest SPR absorption from the AuNRs with the aspect ratio 3.35 corresponding to previous study showing that the higher aspect ratio always provides the stronger absorption.



**Figure S1** Absorption spectra of three different aspect ratio of AuNRs.

### The effect of heparin and PDADMAC on AuNRs solution

The effect of heparin and PDADMAC on AuNRs solution without any other components is included in Fig. S2. It was shown that heparin can induce AuNRs aggregation, whilst the presence of PDADMAC does not interfere the stability of AuNRs, as shown by TEM image and the change in color of AuNRs solution.



**Figure S2** TEM images and direct visualization of AuNRs in the presence of either **(A)** heparin or **(B)** PDADMAC only without any other components