Supporting Information

Unexpected Formation Of Gold Nanoflowers By A Green Synthesis Method As Agents For A Safe And Effective Photothermal Therapy

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Time effect:

In the reaction of 150 μL 0.1 M $AuCl_3$ with 20 mL star fruit juice, the color changed from yellowish to colorless and then to blue. Immediately after the color changed from colorless to blue (at the time of 2 mins), an aliquot was taken out for TEM study. The TEM image showed that the particles formed in the early stage are with branched features which cause the blue color.

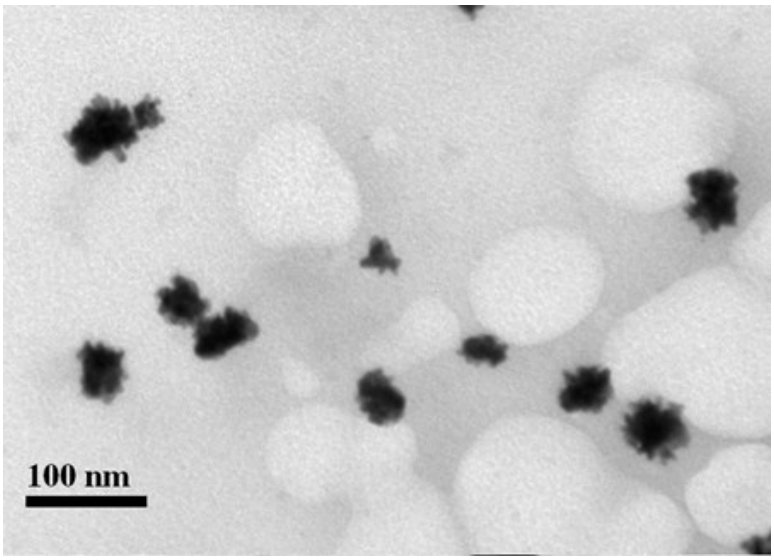

Figure S1. TEM image of the gold nanostructures in the aliquot taken out at the reaction time of 2 min.

Concentration effect:

In typical experiments, different amounts (50 uL, 100 uL, 400 uL) of 0.1 M $AuCl_3$ solution was added into 20 mL star fruit juice and reacted for 30 min. The final products were purified by centrifugation and then redispersed in DI water. The absorption spectra of all the products were recorded by a SHIMADZU UV-1800 spectrophotometer. As is shown in the Figure S1, it is found that when the amount of $AuCl_3$ is too little (50 uL or less), the obtained gold nanostructures do not show strong NIR absorption; while when the amount of $AuCl_3$ is too much (400 uL and above), only the strong absorption in the visible region is observed indicating the formation of gold nanoparticles instead of gold nanoflowers. It was evidenced by the TEM image (Figure S2) showing the gold nanoparticles formed with 400 uL 0.1 M $AuCl_3$ in 20 mL star fruit juice.

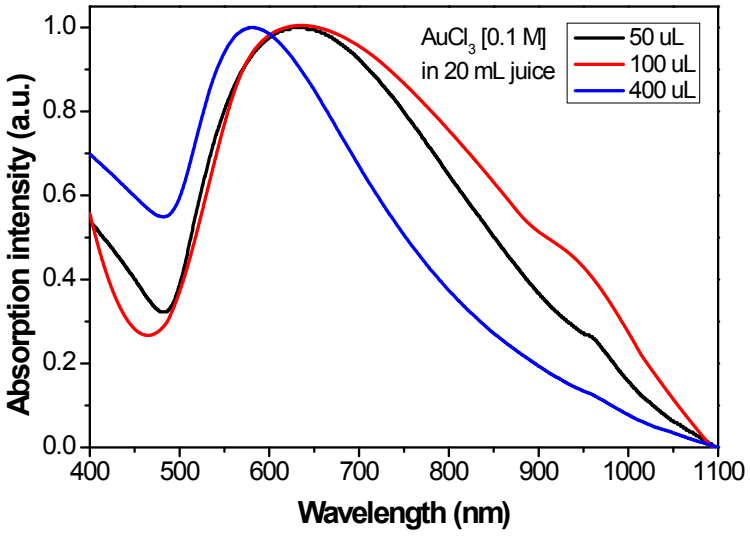

Figure S2. The absorption spectra of the gold nanostructures obtained by adding different amounts (50 uL, 100 uL, 400 uL) of 0.1 M $AuCl_3$ into 20 mL star fruit juice.

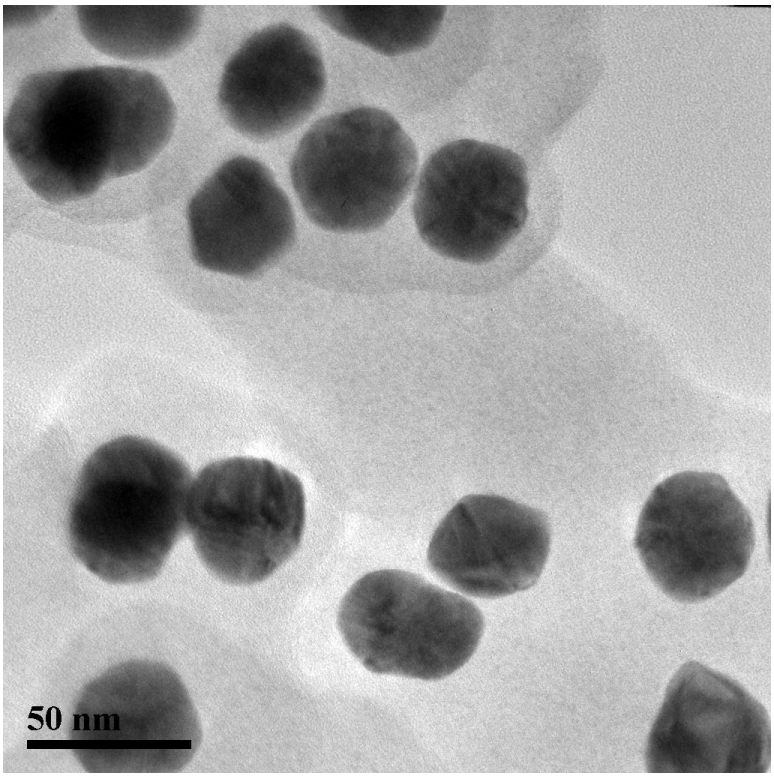

Figure S3. The TEM image of the gold nanoparticles obtained by the reaction of 400 uL 0.1 M $AuCl_3$ with 20 mL star fruit juice.

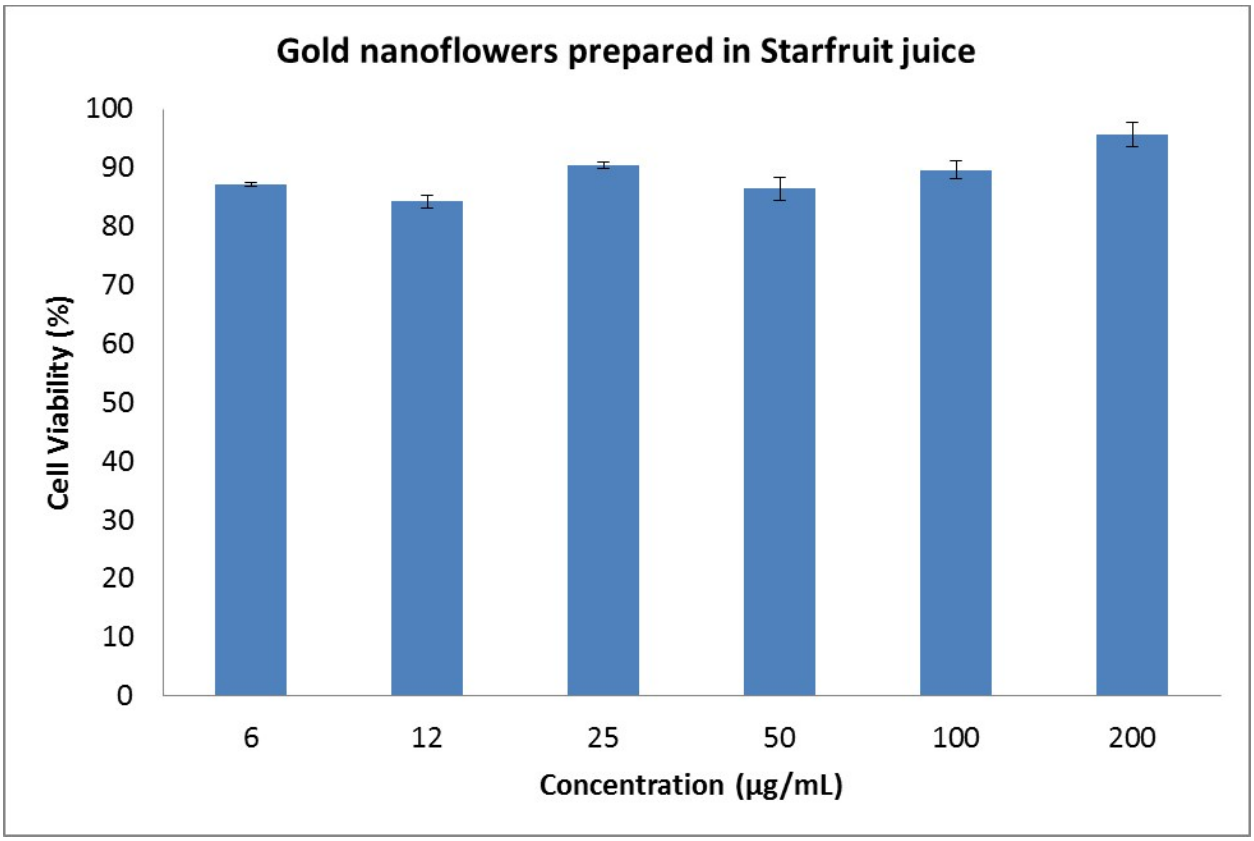

Figure S4. Viability test of gold nanoflowers on MCF-7 cancer cells by colorimetric MTT assay. As is shown gold nanoflowers did not impart any negative effects on proliferation of MCF-7 cancer cells even after 4 days of treatment at 37 °C, suggesting their excellent biocompatibility. In a typical experiment, MCF-7 cancer cells were cultured in a 96-well plate in DMEM, then they were incubated with 0.1 mL DMEM solution with different concentration of gold nanoflowers for 4 days. After removing excessive gold nanoflowers by rinsing with PBS for 3 times, MCF-7 cancer cells were further incubated with MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) in 0.1 mL DMEM for 3h. The color of the solution was then quantified by spectrophotometric method using a Tecan Genios microplate reader to determine the optical density at 570 nm with a reference at 630 nm. The optical density reading was directly related to the number of viable cells. The cell viability was calculated by comparing the optical density of the gold nanoflowers treated cells to that of the control cells without the gold nanoflowers.

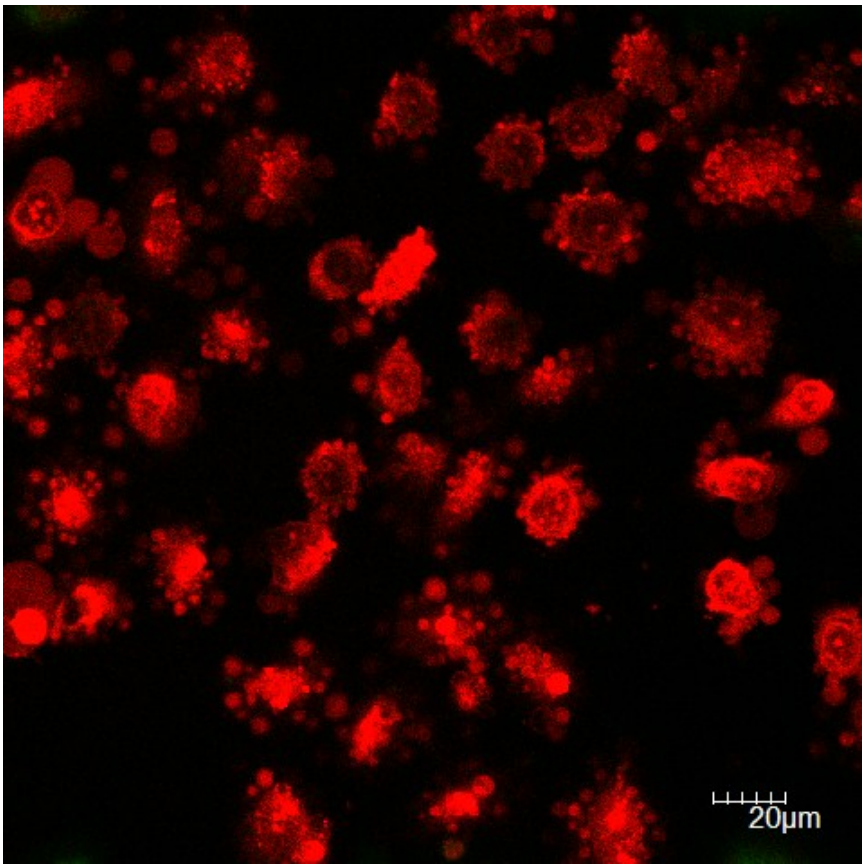

Figure S5. Confcoal image of the cells after 808 nm NIR laser irradaion showing all cancer cells were killed evidenced by the live/dead assay.