Supporting Information

Preparing of Aptamer Responsive DNA Functionalized Hydrogels for the Sensitive Detection of AFP Using SERS Method

Qi Wang, Yongjun Hu*, Ningjing Jiang, Junjie Wang, Meng Yu, Xiumei Zhuang

MOE & Guangdong Province Key Laboratory of Laser Life Science & Institute of Laser Life Science, Guangzhou Key Laboratory of Spectral Analysis and Functional Probes, College of Biophotonics, South China Normal University, Guangzhou, 510631, P R China

* Corresponding author. Tel: +8685211920; Fax: +8685216052

Email: yjhu@scnu.edu.cn

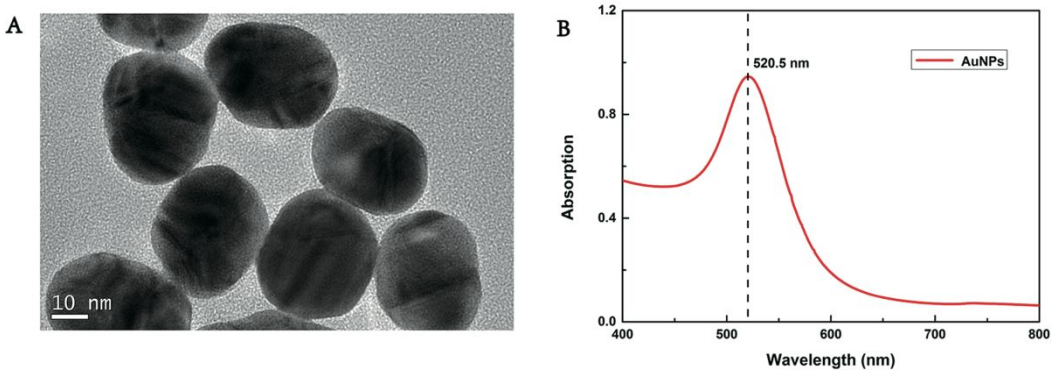

Figure S1. The TEM image (A) and UV-vis spectra (B) of AuNPs.

As shown in Figure S2, DNA strands 1, 2, and AFP-aptamer could be easily distinguished by electrophoresis because of their different lengths (lanes 1, 2, 3). Strand 1 or 2 can hybridize with part of AFP-aptamer after incubation (lanes 7 and 8). AFP-aptamer, strand 1, and strand 2 form a cross-link complex, which dissociates after AFP is added (lane 5, 6).

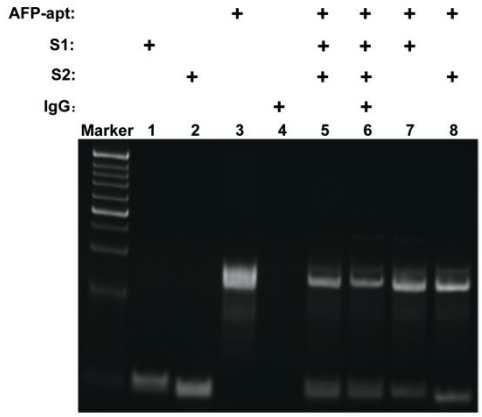

Figure S2. Feasibility of disrupting three-strand complex (AFP-apt, Strand 1, Strand 2) by AFP was confirmed by native PAGE. The concentrations of all DNA were 1 μM and the concentration of AFP was 0.5 μg/mL.

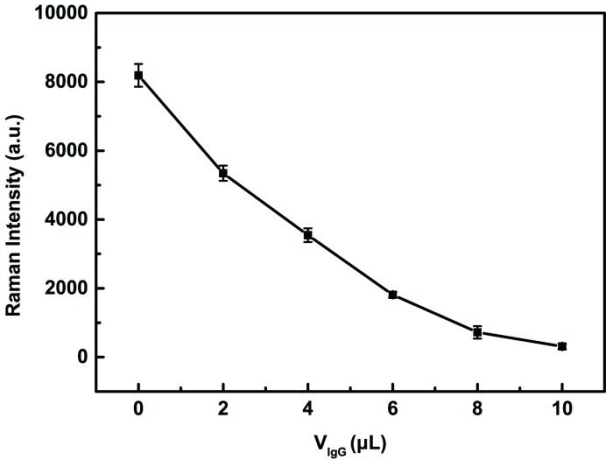

Figure S3. The effects of volume of the embedded IgG on the signal of SERS platform while the volume of embedded IgG is less than 10 μL.

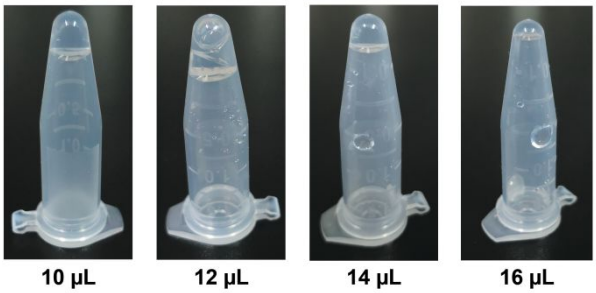

Figure S4. The effects of volume of the embedded IgG on the cross-linking degree of hydrogel while the volume of embedded IgG is more than 10 μL.

Colorimetric Assay of AFP.

The AFP-responsive DNA hydrogels maintains its stability and integrity of structure in the absence of AFP, the added SERS tags and hydrogels are obviously layered. On the contrary, in the presence of a large amount of AFP, the ruptured hydrogels changed its flow state and integrity, leading to the SERS tags to be mixed with the hydrogels without delamination. AuNPs (deep red) as similar to an indicator to indicated the dissociated degree of the hydrogels and achieved visual application conveniently. When the concentration of AFP was more than 0.5 μg/mL, the hydrogels almost completely dissociated. Therefore, we can qualitatively and quantitatively read out the rough concentration of AFP with naked eyes. It has broad application prospects for portable and rapid diagnosis of AFP in real samples.

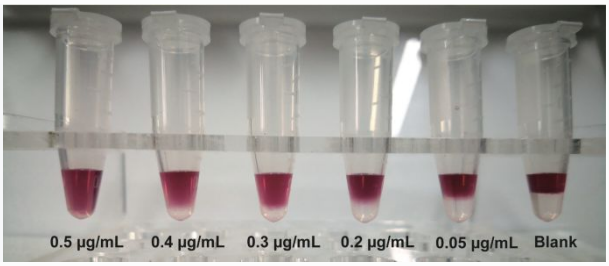

Figure S5. Colorimetric comparison of AFP-responsive DNA hydrogel with different concentrations of AFP.

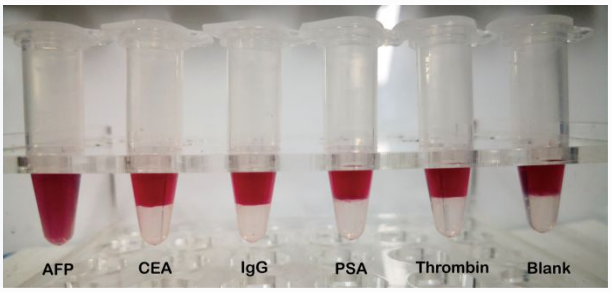

Figure S6. Colorimetric comparison of the selectivity of the AFP-responsive DNA hydrogel with AFP and other antigen. The hydrogel in AFP sample has dissociated, and no obvious changes were found in other samples.