Electronic Supporting Information

for

Adenosine and its aptamer recognition induced-assembly of gold nanorods and a highly sensitive plasmon resonance coupling based assay of adenosine in model SD rat†

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Experimental details

Synthesis of AuNRs

A seed-mediated method was referenced to prepare Au-NRs.[1] Firstly, in the presence of CTAB (7.5×10^{-2} M), 5.0 mL gold seeds solution was prepared by reducing $HAuCl_4\cdot4H_2O$ (2.5×10^{-4} M) with ice-cold $NaBH_4$ (9.0×10^{-4} M). Mixed vigorously for about 30 s, the mixture rapidly changed from yellow into light brown and then aged for 2-24 h at 25 °C before AuNRs synthesis. Then, 25.0 mL AuNRs were made by adding 0.15 mL 0.01 M $AgNO_3$ into the growth solution containing 5.0 mL 2.0×10^{-3} M $HAuCl_4\cdot4H_2O$, 7.7 mL H_2O, 11.9 mL 0.20 M CTAB, which was characterized by the color changing from light yellow into orange quickly and then got colorless immediately after the addition of 0.16 mL 0.10 M L-AA. Finally, the color gradually got red when 0.11 mL above Au seed was placed into the mixture, indicating the formation of AuNRs. After undisturbed further growth overnight, the longitudinal PRA band of the mixture was at 776 nm with the aspect ratio about 3.38 and the concentration about 0.80 nM.[2]

Extraction of adenosine phosphates **in the brain of SD model rat** *(Statement, all experiments involve the use of live animals were performed in compliance with the relevant laws and institutional guidelines. Besides, the institutional committee(s) that have approved the experiments.)*

Considering the importance of adenosine phosphates in neural system, the real samples of adenosine phosphate**s** were extracted from SD model rats brains (Experimental Animal Section, Southwest University College of Pharmaceutical Sciences). The brains of SD model rats were taken out from the skull and put into ice to breeze. After weighing accurately, the brains were put into cooled vessels for grinding, followed by the centrifugation at 20000 g for 10 min at -4 ^{o}C. After that, the acidity of supernatant solutions was adjusted to pH 6.0-7.0 by dropping 0.5 M KOH. Centrifuged again, and the supernatant solutions were diluted to 10.0 mL and filtered with 0.45 μm filter membrane before detection.

HPLC analysis of adenosine phosphates

For HPLC detection of adenosine phosphate**s** in the SD model rats brains, an L-2000 Hitachi high-performance liquid chromatography was employed with the equipment of an L-2450 diode array detector (DAD), an L-2000 series organizer box, and an L-2300 column oven. UV spectra were recorded with DAD from 220 nm to 400 nm, and the monitor wavelength was set at 259 nm. Into a Hypersil octadecylsilane (ODS) analytical column (5μm, 4.0×250mm) with temperature at 20 °C, the mobile phase containing 0.05 M phosphate buffer (pH 6.5) was delivered at a flow rate of 0.90 mL/min. At last, 20 μL samples were injected for HPLC analysis. And data acquisition and processing were performed with an EZChrom Elite data analysis system.

References

1 X. C. Jiang, A. Brioude and M. P. Pileni, *Colloid. Surf. A*, 2006, **277**, 201.

2 C. J. Orendorff and C. J. Murphy, *J. Phys. Chem. B*, 2006, **110**, 3990.

Figures

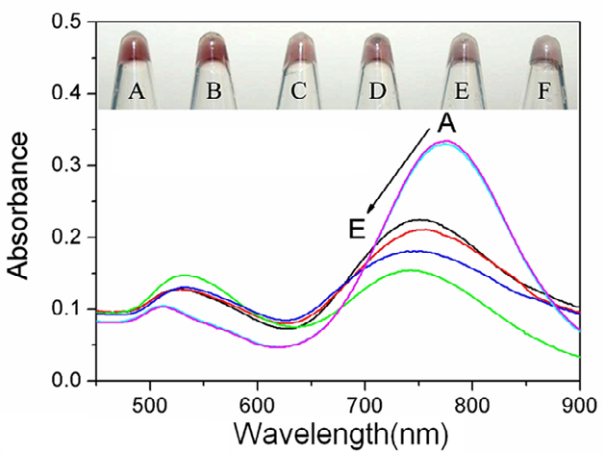

Fig. S1 PRA spectra and the corresponding photos of AuNRs in the presence of adenosine and aptamer. Curve A, AuNRs+ adenosine; Curve B, AuNRs; Curve C, AuNRs + aptamer; Curve D, AuNRs + adenosine + aptamer; Curve E, AuNRs + denatured aptamer; Curve F, AuNRs + adenosine + denatured aptamer. c_{AuNRs}, 0.16 nM; $c_{aptamer}$, 40 nM; $c_{adenosine}$, 80 nM; c_{NaCl}, 0.10 M; c_{MgCl2}, 5.0 mM; pH 7.4.

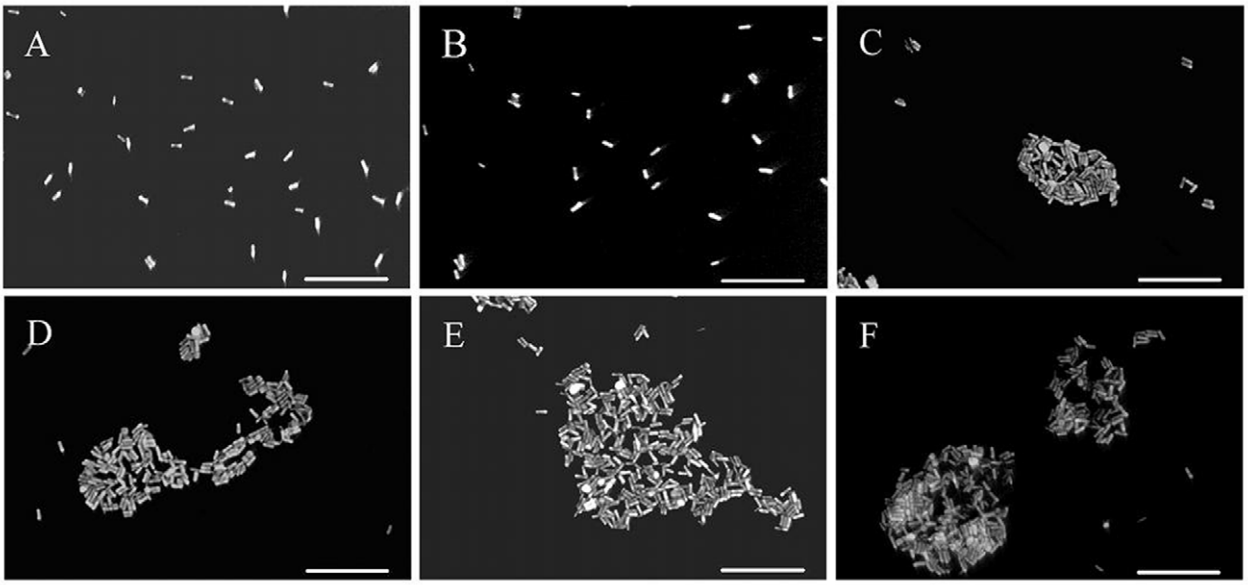

Fig. S2 SEM images of AuNRs in the presence of adenosine and aptamer. A, AuNRs; B, AuNRs + adenosine; C, AuNRs + aptamer; D, AuNRs + adenosine + aptamer; E, AuNRs + denatured aptamer; F, AuNRs + adenosine + denatured aptamer. c_{AuNRs}, 0.16 nM; $c_{aptamer}$, 40 nM; $c_{adenosine}$, 80 nM; c_{NaCl}, 0.10 M; c_{MgCl2}, 5.0 mM; pH 7.4. Scale bar: 250nm.

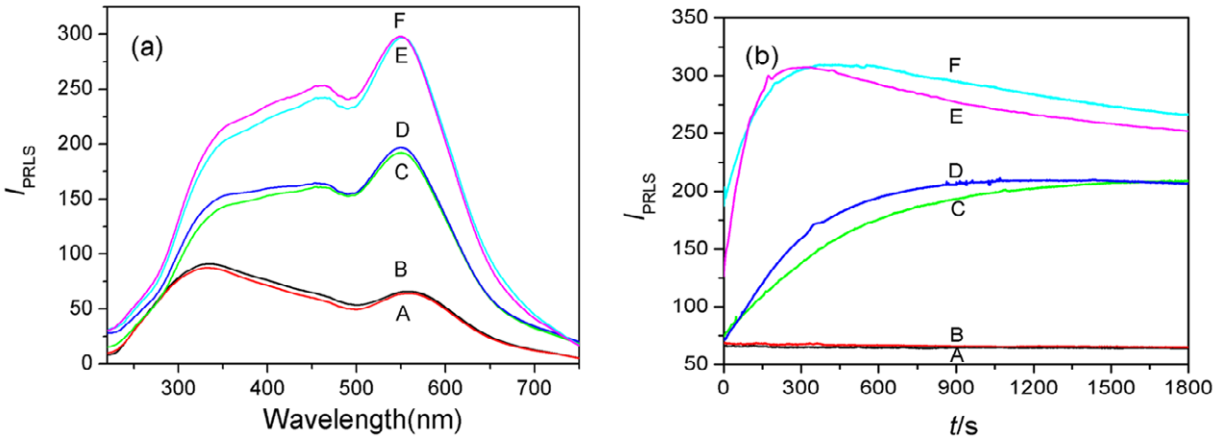

Fig. S3 PRLS spectra (a) and time course of the aggregation (b). Curve A, AuNRs + adenosine; Curve B, AuNRs; Curve C, AuNRs + aptamer; Curve D, AuNRs + adenosine + aptamer; Curve E, AuNRs + denatured aptamer; Curve F, AuNRs + adenosine + denatured aptamer. c_{AuNRs}, 0.16 nM; $c_{aptamer}$, 40 nM; $c_{adenosine}$, 80 nM; c_{NaCl}, 0.10 M; c_{MgCl2}, 5.0 mM; pH 7.4.

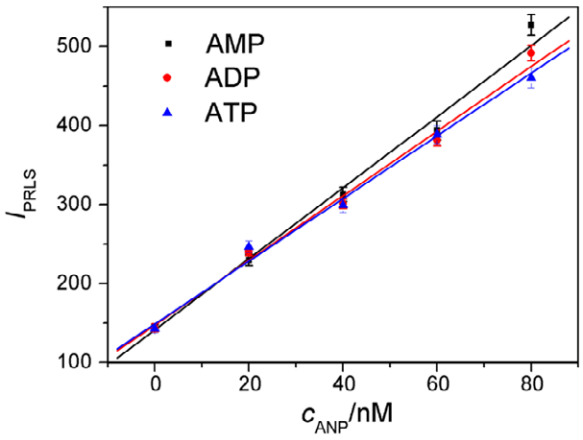

Fig. S4 The PRLS signals with the concentration of adenosine phosphate**s**. And the linear relationship can be expressed as $\Delta I = -8.5 + 4.66c$ (nM, r, 0.9945) for AMP, $\Delta I = 0.3 + 4.19c$ (nM, r, 0.9957) for ADP, and $\Delta I = 9.5 + 3.98c$ (nM, r, 0.9962) for ATP. c_{AuNRs}, 0.16 nM; $c_{aptamer}$, 40 nM; c_{NaCl}, 0.10 M; c_{MgCl2}, 5.0 mM; pH 7.4.