Electronic Supplementary Material (ESI) for Analytical Methods.

Lysozyme-stabilized bimetallic gold/silver nanoclusters as a turn on fluorescent probe for determination of ascorbic acid and acid phosphatase

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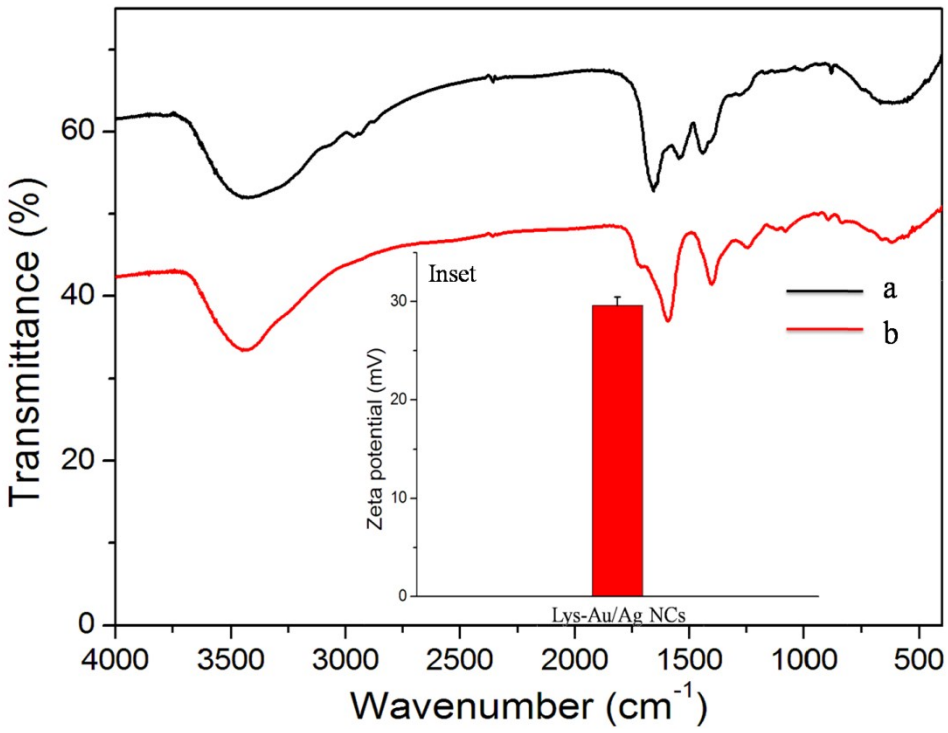

Fig.S1 FT-IR of the free template lysozyme (curve a) and Lys-Au/Ag NCs (curve b) Inset：Zeta potential measurement of Lys-Au/Ag NCs solution.

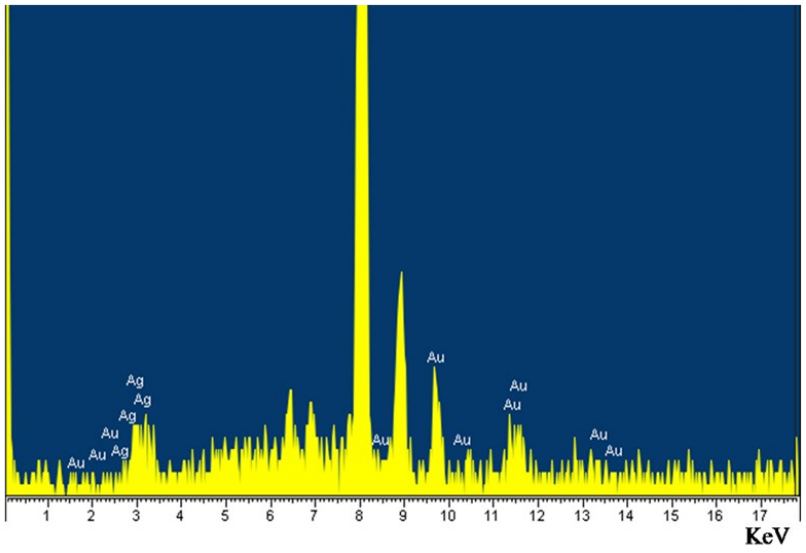

Fig.S2 EDX spectrum collected for as-prepared Lys-Au/Ag NCs.

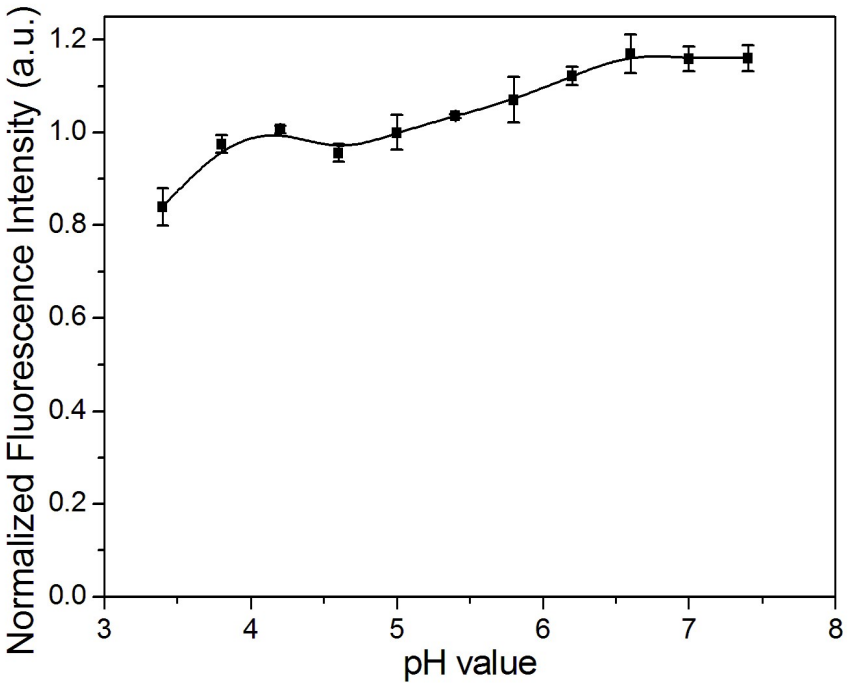

Fig.S3 The fluorescence emission intensity of Lys-Au/Ag NCs in different pH environments incubated for 30 minutes.

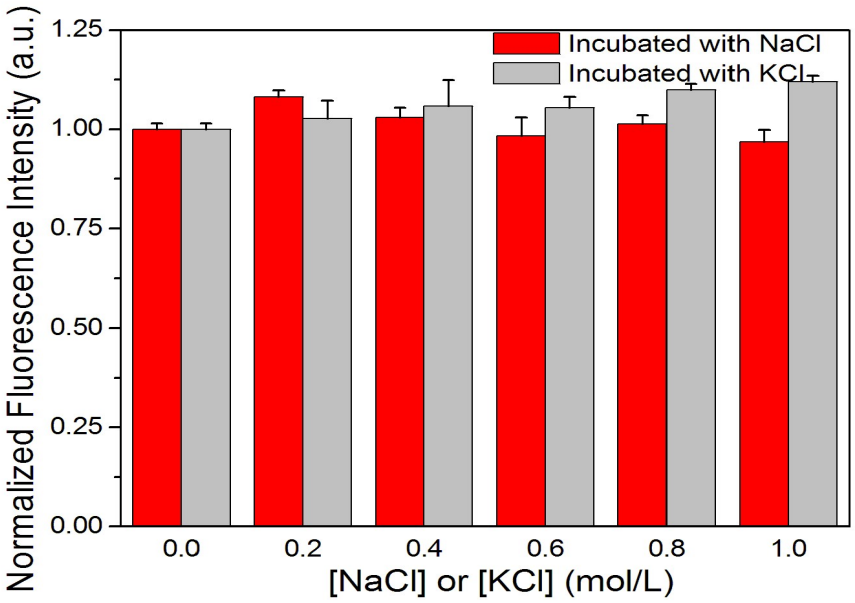

Fig.S4 The fluorescence emission intensity of Lys-Au/Ag NCs incubated with various NaCl or KCl concentrations for 30 minutes. (10 mmol/L citrate-citric acid buffer solution pH 5.0)

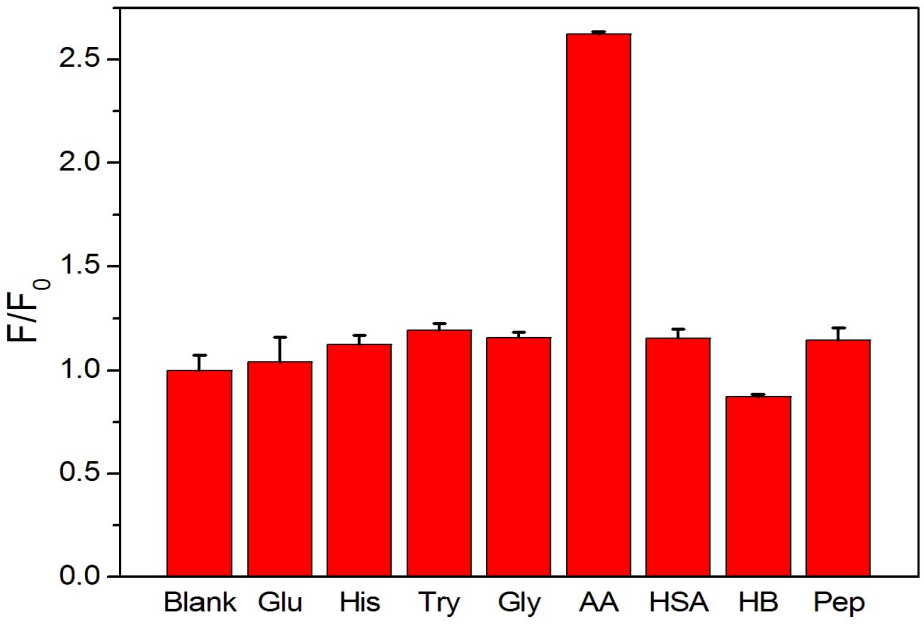

Fig.S5 The fluorescence emission intensity of Lys-Au/Ag NCs in the presence of various kinds of biomolecules (200 μmol/L Glu, His, Try, Gly, 100 μmol/L AA, 0.4 mg/mL HAS, HB or Pep). (10 mmol/L citrate-citric acid buffer solution pH 5.0)

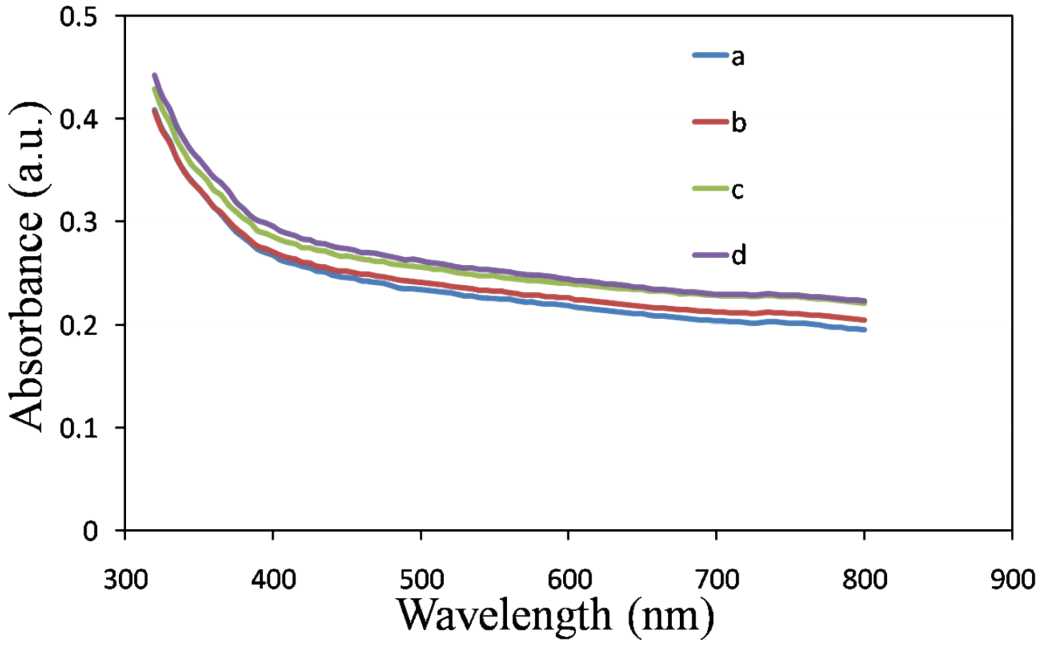

Fig.S6 The UV-Vis absorption spectra of Lys-Au/Ag NCs respectively incubated with 0 μmol/L(curve a), 50 μmol/L(curve b), 100 μmol/L (curve c) or 200 μmol/L AA (curve d) for 10 minutes.

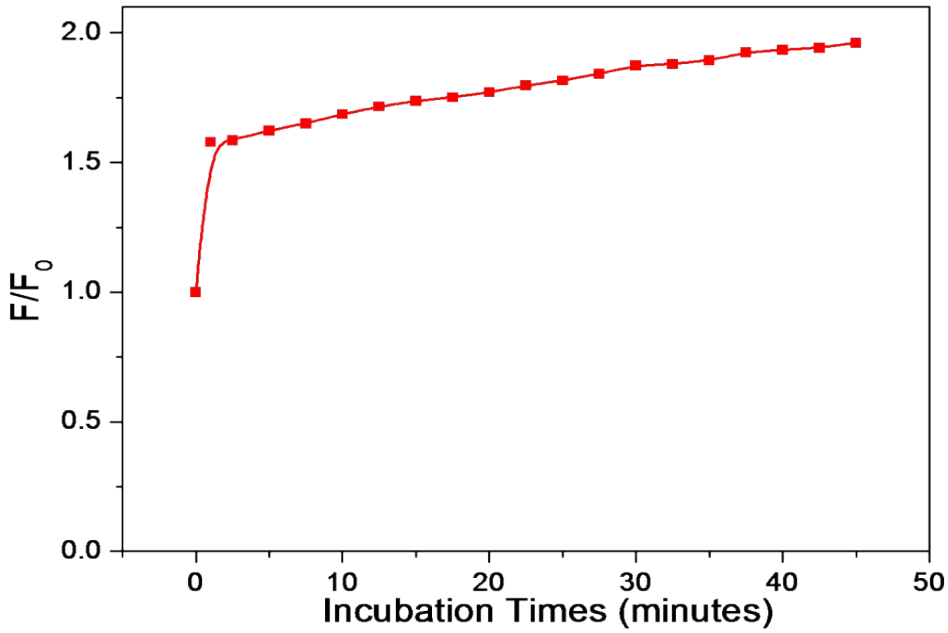

Fig.S7 The temporal evolution of fluorescence emission intensity of Lys-Au/Ag NCs incubated with of 500 μmol/L PAA and 10 μg/mL ACP.

Table S1 Performance comparison of various fluorescent sensors for AA detection

Fluorophore	Sensing system	Dynamic range	Detection limit	Reference
Carbon quantum dot	Turn off-on/ Cr(VI)ions-AA	5-200 μmol/L	1.35 μmol/L	33
Carbon dots	Turn off/ Cu^{2+} ions-AA	0.057-4.0 μmol/L	18 nmol/L	34
Graphitic carbon nitride nanosheets	Turn off-on/ Cr(VI)ions-AA	0.6-300 μmol/L	0.15 μmol/L	35
Carbon dots	Turn off/ Fe^{3+} ions-AA	24-40 μg/mL	−	36
Carbon quantum dots /AuNCs nanohybrid	Turn off-on/ Cd^{2+} ions-AA	0.15-15 μmol/L	0.105 μmol/L	37
Silver/carbon nanohybrid	Turn off-on/ Fe^{3+} ions-AA	0.2-60 μmol/L	25 nmol/L	38
Gold nanoclusters	Turn off-on/ I^- ions-AA	0.1-10 μmol/L	22 nmol/L	39
Au nanoclusters -PbS quantum dot	Turn off/ AA-quenching	3-40 μmol/L	1.5 μmol/L	40
CdTe quantum dot	Turn off-on/ 4-AP-AA	0.022-0.44mmol/L	4.33 μmol/L	41
Lyz-Au nanoclusters	Turn-on/ AA-enhancing	0.2-200 μmol/L	0.12 μmol/L	This method

Table S2 Performance comparison of various fluorescent sensors for ACP detection

Fluorophores	Sensing systems	Dynamic range	Detection limit	Reference
$CuInS_2$ quantum dots	Turn off-on-off/ Cu^{2+}-ATP-ACP	6.4-192 nU/ mL	3.1nU/mL	24
Carbon quantum dots	Turn off-on-off/ Ni^{2+}-pyrophosphate-ACP	18.2-1300 U/L	5.5 U/L	25
Gold nanoclusters	Turn off-on-off/ Fe^{3+} -pyrophosphate-ACP	1-30 nmol/L	1 nmol/L	26
Copper nanoclusters	Turn on-off/ pH-Fe(III) pyrophosphate ($FePPi_2$) complex-ACP	3.1-100 U/L	0.8 U/L	27
Anionic polymer	Turn off-on-off/ Fe^{3+} -pyrophosphate-ACP	4-28 nmol/L	−	28
Lyz-Au/Ag NCs	Turn-on/ PAA-ACP	100-12500ng/mL	53ng/mL	This method

Table S3 Determination of ACP in fetal bovine serum samples according to equation (2)

Serum samples	Added ACP (ng/mL)	Detected ACP (ng/mL)	Recovery (%)	RSD (n=3, %)
1	100	94	94	4.8
2	500	532	106	3.9