Supporting Information

Fast, sensitive and selective colorimetric gold bioassay for dopamine detection

Sivakumar Palanisamy, [a,b] Xuehua Zhang, *[a] and Tao He *[a]

[a] Key Laboratory of Nanosystem and Hierarchical Fabrication, National Center for Nanoscience and Technology, Beijing 100190, China

[b] University of Chinese Academy of Sciences, Beijing 100049, China

The respective DA response with citrate capped Au NPs, only PDBA modified Au NPs (Au@PDBA), only MPBA modified Au NPs (Au@MPBA), only DSP modified Au NPs (Au@DSP), only ABCE modified Au NPs (Au@ABCE), probe 1 (Au@PDBA-DSP), probe 2 (Au@PDBA-ABCE) and probe 3 (Au@MPBA-ABCE) was investigated by adding 300 nM of DA.

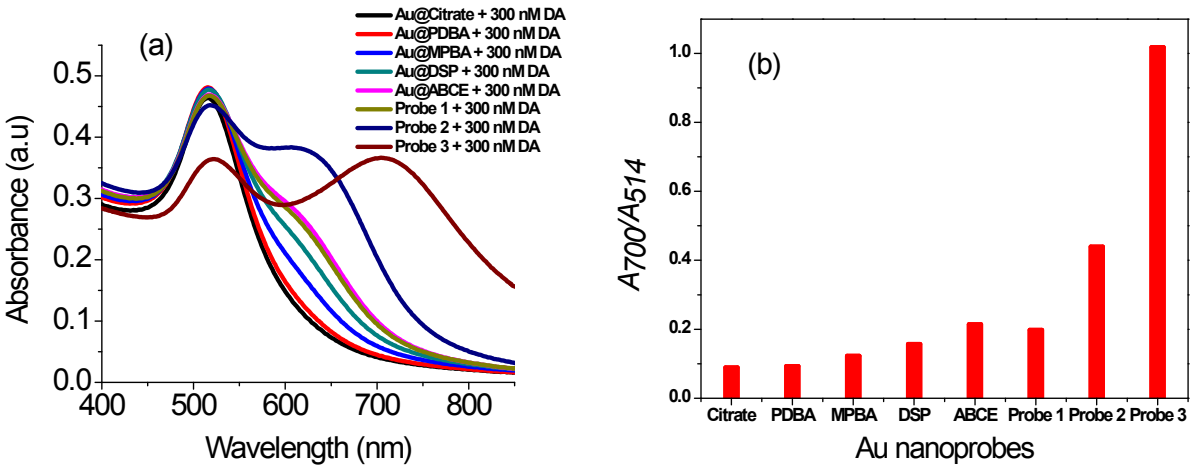


Figure S1 (a) UV-vis absorption spectra and (b) A_{700}/A_{514} peak ratio of different nanoprobes in the presence of 300 nM DA.

FT-IR result

Au@PDBA-DSP

Table S1 FT-IR spectra results of PDBA, DSP, Au@PDBA-DSP and citrate capped Au NPs, derived from Figure 1 in the main text.

Citrate capped Au NPs		**PDBA**		**DSP**		**Au@PDBA-DSP**
Wavenumber (cm^{-1})	Functional group	Wavenumber (cm^{-1})	Functional group	Wavenumber (cm^{-1})	Functional group	All peaks from PDBA and DSP was appeared
1644 1400	C=O (str) C–O (asym str)	1633	C_5NH_4 (vib)	720 1260	S-C N–O	

Au@PDBA-ABCE

Table S2 FT-IR spectra results of PDBA, ABCE, Au@PDBA-ABCE and citrate capped Au NPs, derived from Figure 1 in the main text.

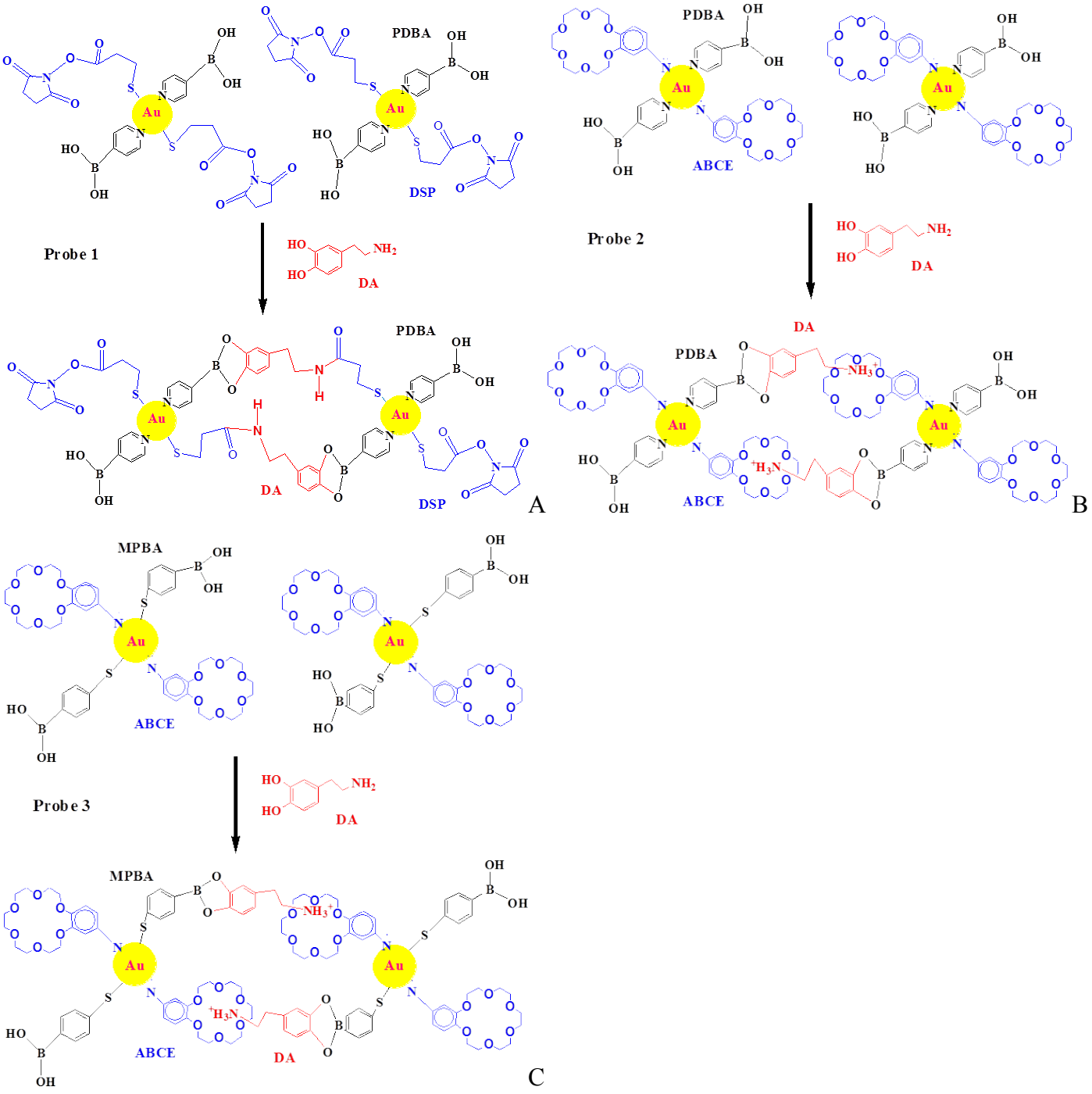
Citrate capped Au NPs		**PDBA**		**ABCE**		**Au@PDBA-ABCE**
Wavenumber (cm^{-1})	Functional group	Wavenumber (cm^{-1})	Functional group	Wavenumber (cm^{-1})	Functional group	All peaks from PDBA and ABCE was appeared
1644 1400	C=O (str) C–O (asym str)	1633	C_5NH_4 (vib)	1633 1073	C_6H_3 (vib) CH_2CH_2O (vib)	

Au@MPBA-ABCE

Table S3 FT-IR spectra results of MPBA, ABCE, Au@MPBA-ABCE, and citrate capped Au NPs, derived from Figure 1 in the main text.

Citrate capped Au NPs		**MPBA**		**ABCE**		**Au@MPBA-ABCE**
Wavenumber (cm^{-1})	Functional group	Wavenumber (cm^{-1})	Functional group	Wavenumber (cm^{-1})	Functional group	All peaks from MPBA and ABCE was appeared
1644 1400	C=O (str) C–O (asym str)	1633 2560	C_6H_4 (vib) S–H (str)	1633 1073	C_6H_3 (vib) CH_2CH_2O (vib)	

DA detection mechanism



Scheme S1 Colorimetric detection of dopamine using functionalized Au NPs, (A) probe 1, Au@PDBA-DSP, (B) probe 2, Au@PDBA-ABCE and (C) probe 3 Au@MPBA-ABCE.

End Concentrations of DA used in Figure 2 (Unit, nM)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
[DA]	Only Au	Control	1	2	4	6	8	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200	220	240	260	280	300

Sensitivity measurements

Au@PDBA-DSP

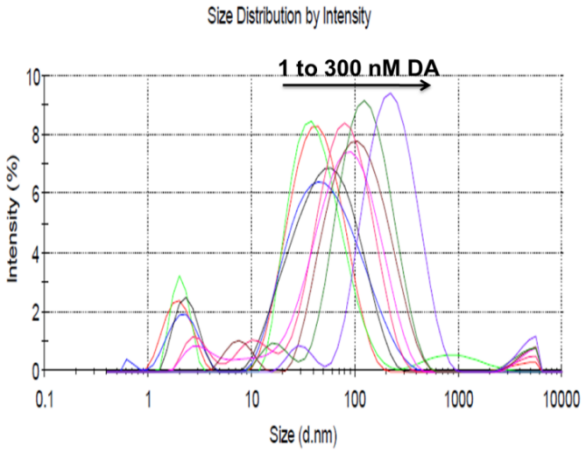


Figure S2 DLS size distribution for Au@PDBA-DSP probe with and without addition of 1 to 300 nM DA.

Au@PDBA-ABCE

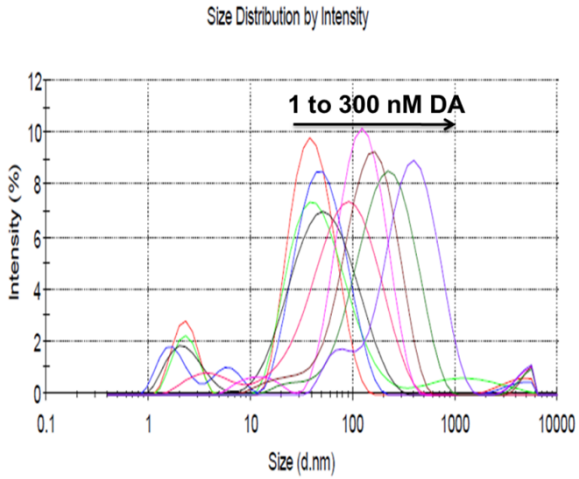


Figure S3 DLS size distribution for Au@PDBA-ABCE probe with and without addition of 1 to 300 nM DA.

Au@MPBA-ABCE

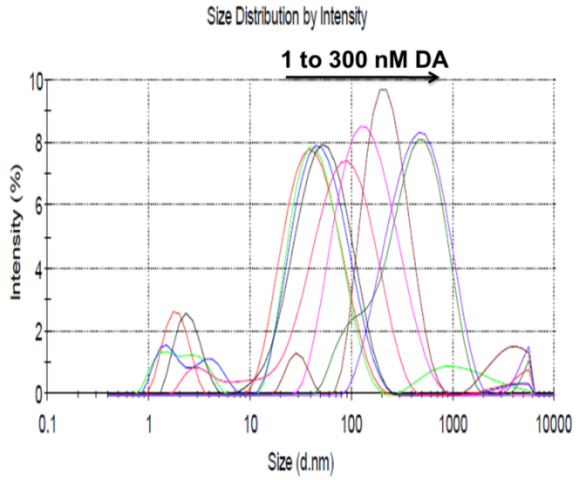


Figure S4 DLS size distribution for Au@MPBA-ABCE probe with and without addition of 1 to 300 nM DA.

Selectivity measurements

Au@PDBA-DSP

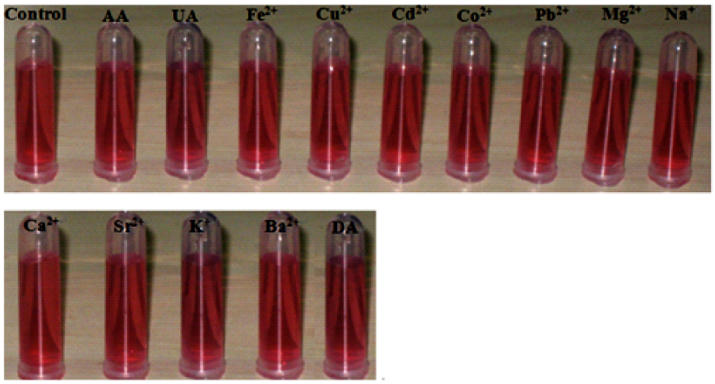


Figure S5 Colorimetric visualization of Au@PDBA-DSP probe by adding 100 μL of 0.003 mM DA and 1 mM of some other foreign molecules.

Au@PDBA-ABCE

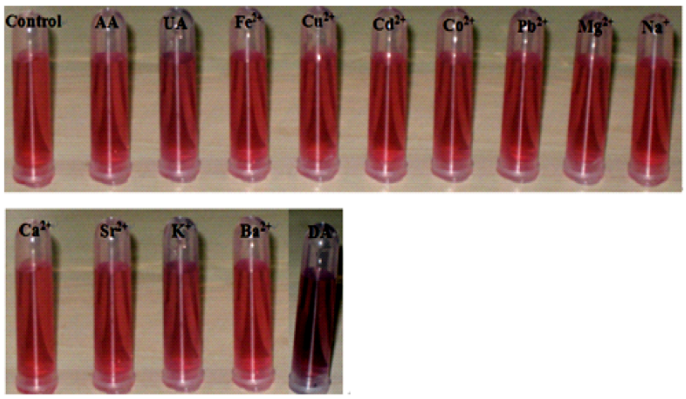


Figure S6 Colorimetric visualization of Au@PDBA-ABCE probe by adding 100 μL of 0.003 mM DA and 1 mM of some other foreign molecules.

Au@MPBA-ABCE

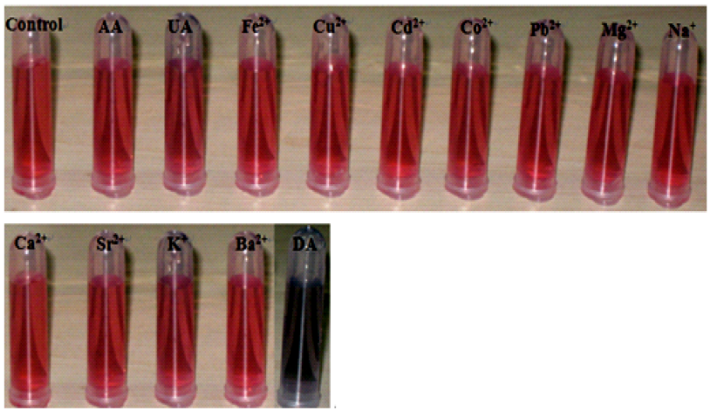


Figure S7 Colorimetric visualization of Au@MPBA-ABCE probe by adding 100 μL of 0.003 mM DA and 1 mM of some other foreign molecules.