

Supporting Information

Diagnosis by simplicity: An aptachip for dopamine capture and accurate detection with a dual colorimetric and fluorometric system

Tzu-Yang Lin¹, Kuo-Chen Wei¹, Shin-Pon Ju, Chiung-Yin Huang, Hung-Wei Yang*

¹ T. Y. Lin and K. C. Wei contributed equally to this work

* Address correspondence to H.-W. Yang

Tel: (+886) -7-5252000#5842; E-mail: howardyang@mail.nsysu.edu.tw

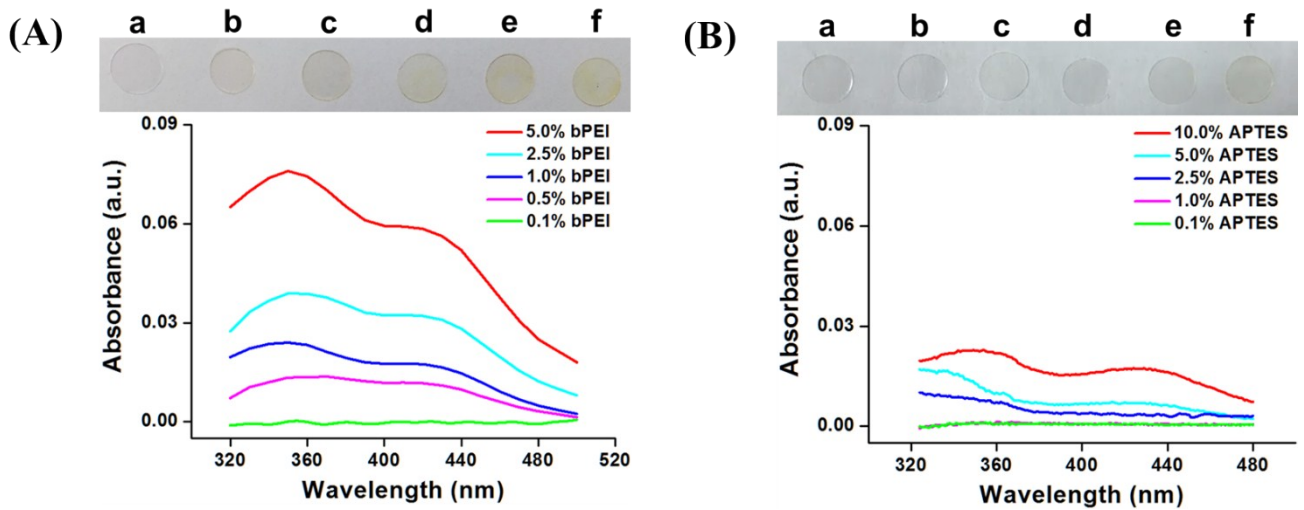


Figure S1. (A) Quantification of amine groups ($-\text{NH}_2$) on $\text{chip}_{\text{bPEI}}$ by TNBS staining modified with (a) 0% (negative control), (b) 0.1%, (c) 0.5%, (d) 1.0%, (e) 2.5% (f) 5.0% bPEI, respectively. (B) Quantification of amine groups ($-\text{NH}_2$) on $\text{Chip}_{\text{bPEI}}$ by TNBS staining modified with (a) 0% (negative control), (b) 0.1%, (c) 1.0%, (d) 2.5%, (e) 5.0% (f) 10.0% APTES, respectively.

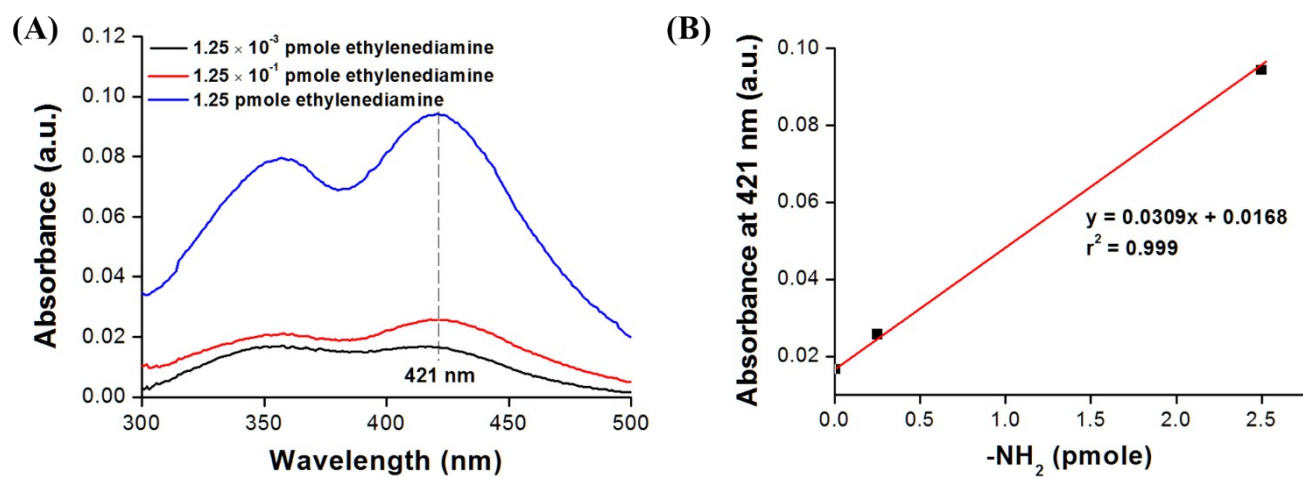


Figure S2. (A) The UV-Vis spectra of different concentrations of ethylenediamine reacted with TNBS.

(B) Derived calibration curve of the adsorption at 421 nm versus concentration of amine groups.

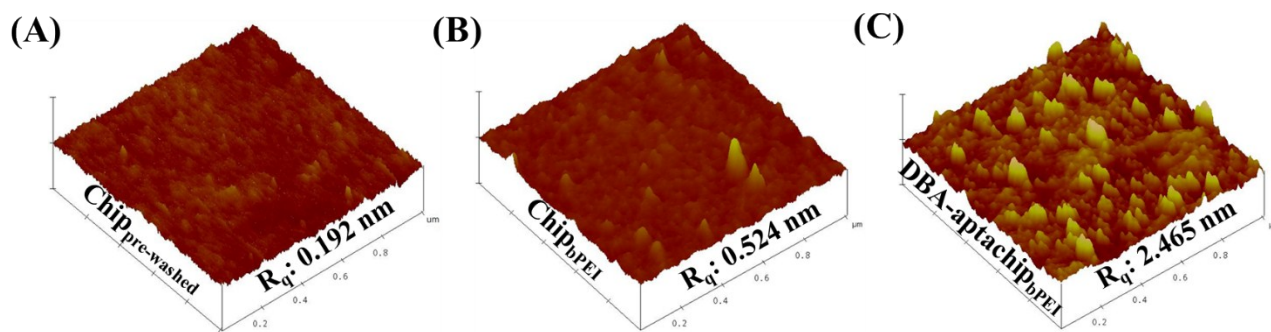


Figure S3. AFM images of (A) $\text{Chip}_{\text{pre-washed}}$, (B) $\text{Chip}_{\text{bPEI}}$, and (C) $\text{DBA-aptachip}_{\text{bPEI}}$.

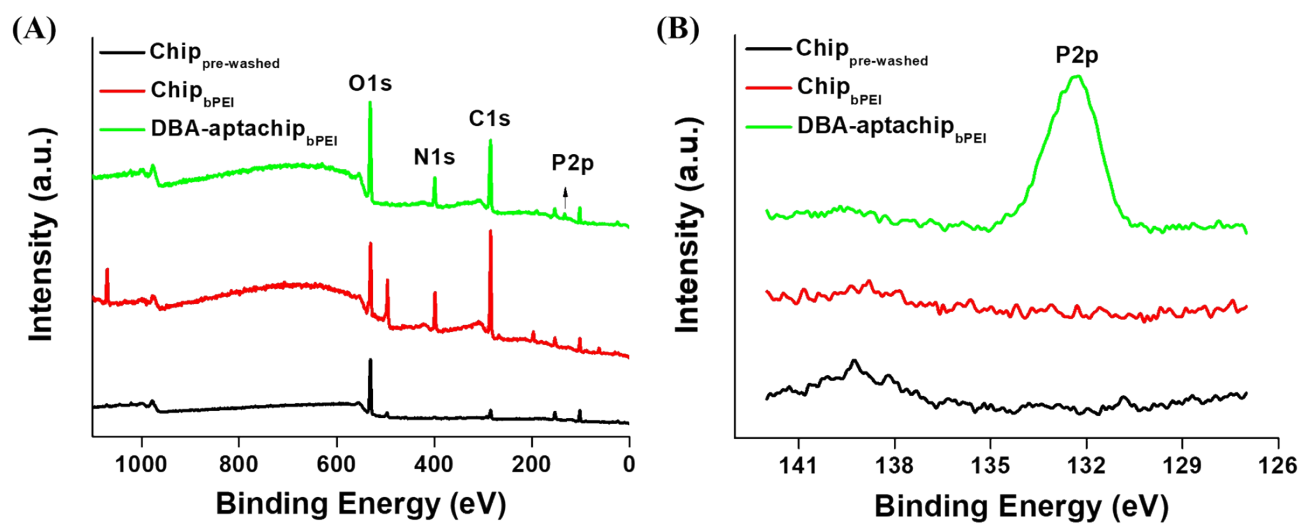


Figure S4. (A) XPS survey spectra of $\text{chip}_{\text{pre-washed}}$, $\text{chip}_{\text{bPEI}}$, and $\text{DBA-aptachip}_{\text{bPEI}}$. (B) Detailed analysis of XPS survey spectra for P2p of $\text{DBA-aptachip}_{\text{bPEI}}$.

w/o NaOH

w/ NaOH

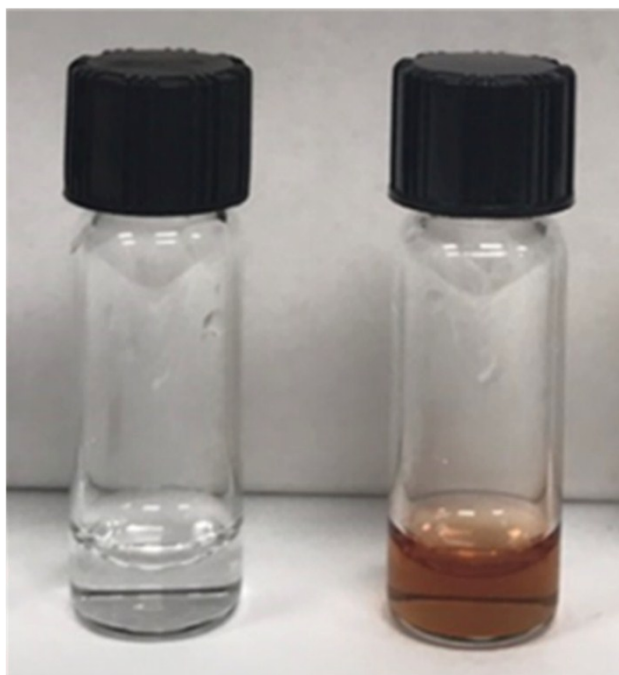


Figure S5. The picture of DA oxidization in the presence or absence of NaOH solution for colorimetric detection.

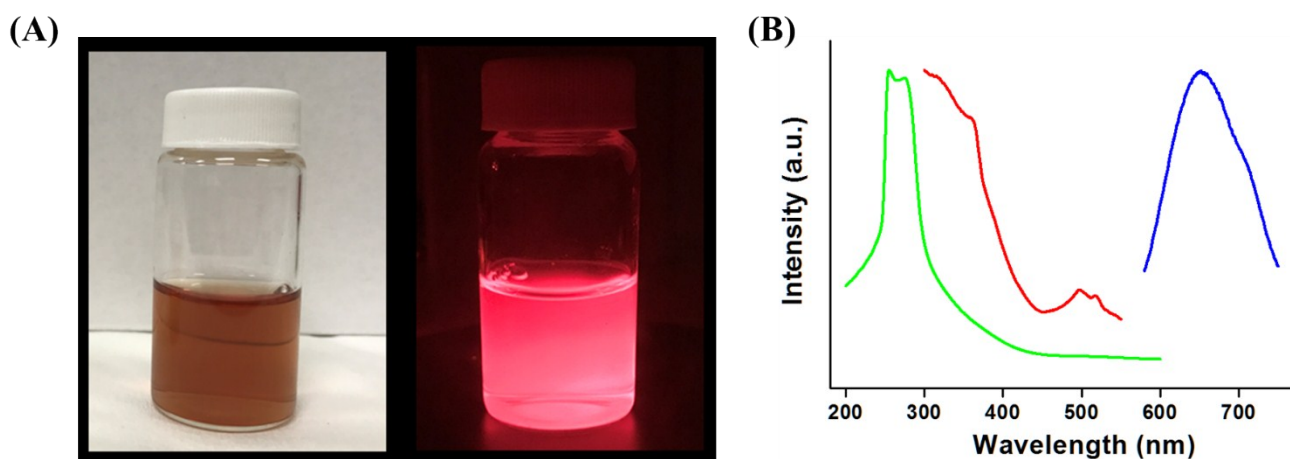


Figure S6. A) The left image shows BSA-AuNCs without excitation. The right images show BSA-AuNCs with excitation at 500 nm. (B) The image shows the absorbance spectra (green line), excitation spectra (red line) and emission spectra (blue line) of BSA-AuNCs. Peaks at 500 nm and 650 nm were employed as excitation and emission in this project.

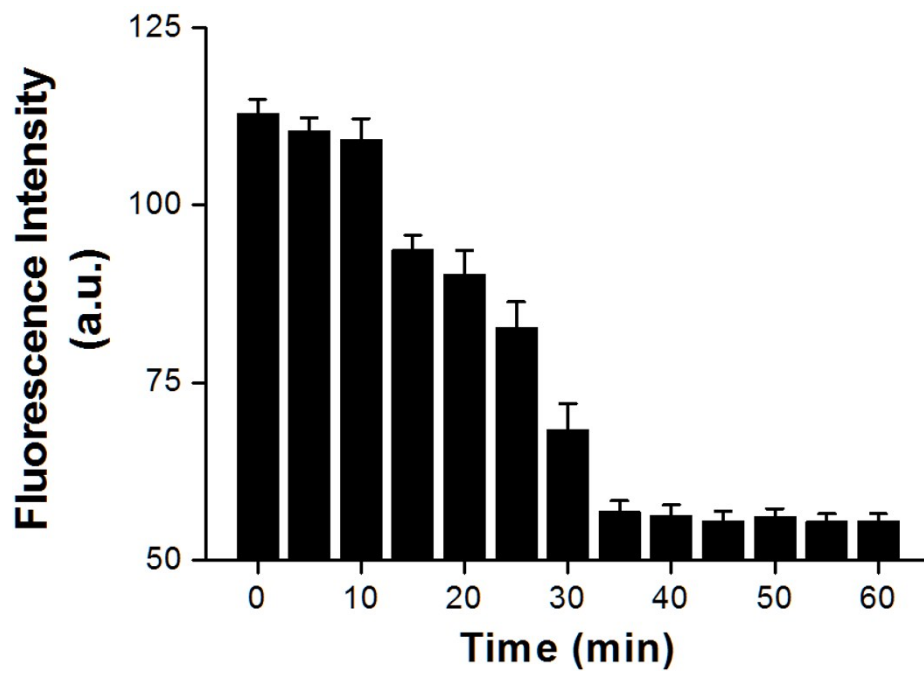


Figure S7. Quenching time of BSA-AuNCs interacting with 1 mg/mL DA on DBA-aptachip_{bPEI}. Each data point is presented as mean \pm SD (n = 3).

Table S1. Comparison with some reported methods for the detection of dopamine.

Detection method	Linear detection range (μM)	Detection limitation (μM)	Reference
Colorimetric	0.2-1.1	0.07	14
Colorimetric	0.54-5.4	0.36	25
Colorimetric	0.2-12	0.047	4
Photoluminescence	0.5-9	0.1	33
Colorimetric	0.01-1	0.01	11
Fluorescence	0.01-1	0.01	
Colorimetric	0.65-65300	0.065	This work
Fluorescence	0.0065-65300	0.0033	