

Supplementary Information

A novel Fe₃O₄/CdTe fluorescence probe for sialic acid detection based on phenylboronic acid- sialic acid recognition system

Jinna Wang, Guanhong Xu, Fangdi Wei, Jing Yang, Ping Zhou, Qin Hu*

School of Pharmacy, Nanjing Medical University, Nanjing, Jiangsu 211166, PR China

CdTe QDs were conjugated with amino-modified Fe₃O₄ nanoparticles through bonding between carboxyl groups on QDs and amino groups on amino-modified Fe₃O₄ nanoparticles. As shown in Fig. S1. (a), when the amount of APTES was 70 μl, the fluorescence intensity of PBA-functionalized Fe₃O₄/CdTe nano probe was the highest. Fig. S1. (b) showed that the fluorescence of nano probe enhanced significantly with the increase of the reaction time, and decreased after 4 h. So, 4 h was selected as the optimized time for the reaction of the CdTe QDs and amino-modified Fe₃O₄ nanoparticles. As shown in Fig. S1. (c), the highest fluorescence intensity of the PBA-functionalized Fe₃O₄/CdTe nano probe was obtained when the concentration of EDC was 25 mg/ml. In this paper, PBA was used to recognize and detect the target SA. So the amount of PBA greatly affected the final sensing of SA. Fig. S1. (d) suggested that the best performance was achieved at 3 mg/ml of PBA.

* Corresponding author: Tel. / fax: +86-2586868468; E-mail: huqin@njmu.edu.cn

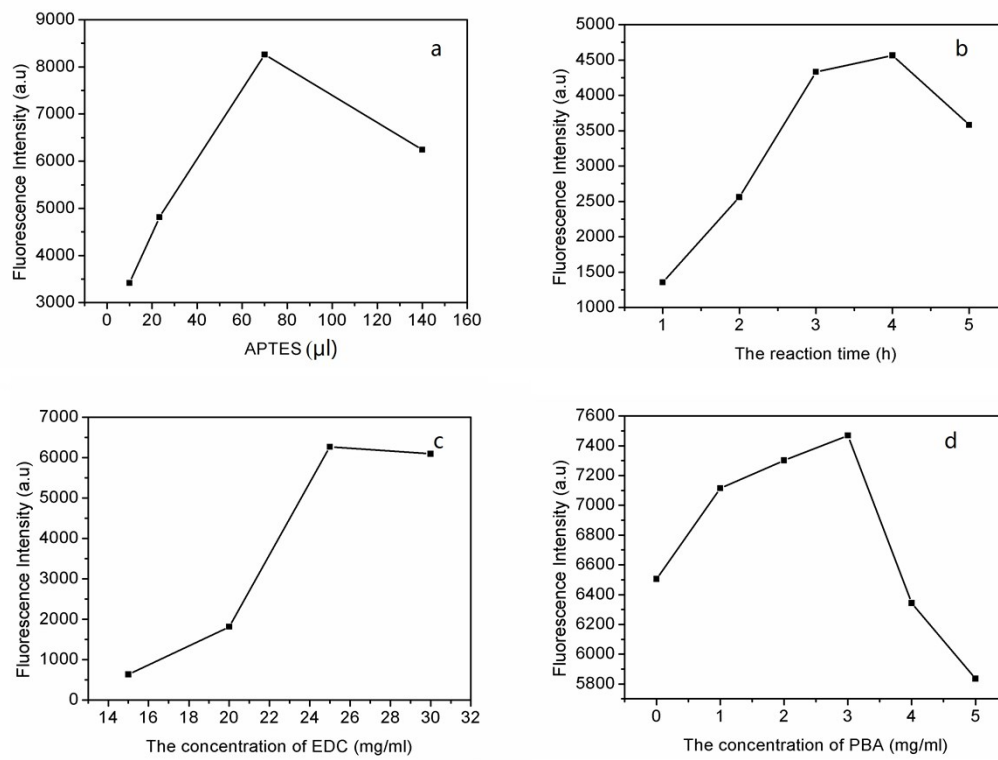


Fig. S1. Fluorescence emission spectra of PBA-functionalized $\text{Fe}_3\text{O}_4/\text{CdTe}$ nano probe under different amount of APTES (a), reaction time (b), amount of EDC (c), amount of PBA (d).

Table S1 Comparison of different methods for SA determination

Detection method	Linear range (mg mL ⁻¹)	LOD (mg mL ⁻¹)	References
UPLC-MS/MS	0.00375-0.375	0.75×10 ⁻³	S1
FIA	0.0031-1.55	0.62×10 ⁻³	S2
HPLC	0.05-0.5	0.01	S3
HPAEC-PAD	0.005-0.5×10 ⁻³	0.003×10 ⁻³	S4
Fluorescence	0.012-0.68×10 ⁻³	0.00067×10 ⁻³	S5
Amperometric detection	0.0031-1.08	0.0031	S6
Spectrophotometry	0.006-0.15	0.29×10 ⁻³	S7
HPLC	0.0125-0.25	0.03×10 ⁻³	S7
Fluorescence	0.05-1.5	0.016	This work

UPLC-MS/MS: ultra-performance liquid chromatography–tandem mass spectrometry.

FIA: flow injection analysis.

HPAEC-PAD: high-performance anion-exchange chromatographic-pulsed amperometric detection

References

- S1 C. Li, L. B. Liu, H. L. Xie and N. Liu, *Int. J. Dairy. Technol.*, 2015, 68(2): 166-173.
- S2 S. A. M. Marzouk, J. D. Haddow and A. Amin, *Sensor Actuat. B-Chem.*, 2011, 157(2): 647-653.
- S3 D. H. Li, *Food Sci. Biotechnol.*, 2012, 21(5): 1317-1320.
- S4 K. T. Tang, L. N. Liang, Q. Y. Cai and F. S. Mou, *Chin. J. Anal. Chem*, 2008, 36(11): 1535-1538.
- S5 Q. Wang, B. B. Wang, M. H. Ma and Z. X. Cai, *J. Food Sci.*, 2014, 79(12):C2434-C2440.
- S6 S. A. M. Marzouk, S. S. Ashraf and K. A. Al Tayyari, *Anal. Chem*, 2007, 79, 1668-1674.
- S7 J. Salcedo, R. Lacomba, A. Alegria, R. Barbera, E. Matencio and M. J. Lagarda, *Food Chemi.*, 2011, 127(4): 1905-1910.