

Table S1. Comparison of performance of different methods for lysozyme detection

| Type | Sensing system | Linear range (ng mL ⁻¹) | Detection limit (ng mL ⁻¹) | Reference |
|-------------------------------------|--|---|---|-----------|
| HPLC | Reversed-phase HPLC | 0~111 | 800 | [1] |
| ELISA | Competitive enzyme-linked immunosorbent assay using a commercially available monoclonal antibody against hen egg white lysozyme. | 3.125~800 | 2.73 | [2] |
| Resonance Rayleigh scattering (RRS) | Cd-doped ZnSe quantum dots as probe | 80~2000 | 0.65 | [3] |
| Voltammetric | Aptamer-Based Biosensors for Label-Free Voltammetric Detection of Lysozyme | 500~5 × 10 ⁴ | 200 | [4] |
| Colorimetric | Dual-readout sensor (colorimetric and fluorometric) with triazolylcoumarin molecules quenching by AuNPs | 50~2.5 × 10 ⁴ | 23 | [5] |
| | Gold nanoparticles (AuNPs) covalently bonded with human serum albumin (HSA) as sensor | 1.44 × 10 ³ ~1.4 × 10 ⁴ | 720 | [6] |
| | Fluorescence turn-on system based on fluorophore labeled aptamer | 0~1.44 × 10 ⁶ | 1.45 | [7] |
| Fluorescence | Fluorescence Turn-On system based on CuInS ₂ quantum dots | 0.6~4.6 | 288 | [8] |
| | Fluorescence probe based on L-cysteine-capped CdTe quantum dots | 0~1000 | 28.33 | This work |

Table S2. Comparison of performance of different methods for trypsin detection

| Type | Sensing system | Linear range (ng mL ⁻¹) | Detection limit (ng mL ⁻¹) | Reference |
|------------------|--|--|---|-----------|
| HPLC | HPLC method and Mass Spectrometry | — | 10 ⁶ | [9] |
| Colorimetric | Au-NPs incubating with Arg ₆ as sensor | 0~8.0 | 1.6 | [10] |
| Electrochemistry | Amperometric biosensor | 1~250 | 1.0 | [11] |
| | Fluorescence turn-on strategy based on conjugated polyelectrolyte PFP-CO ₂ Na | 120~960 | 40.8 | [12] |
| | Fluorescence “Turn-On” Detection Using Conjugated Polyelectrolyte | 0~8000 | 52.5 | [13] |
| Fluorescence | Graphene quantum dots based biosensor | 0~9.6 × 10 ⁶ | 33 | [14] |
| | Fluorescent probe based on BSA-stabilized gold nanoclusters | 10~1 × 10 ⁵ | 2.0 | [15] |
| | Optical nanoprobe based on Mn-doped ZnSe quantum dots | 0.100~1.2 × 10 ⁶ | 40 | [16] |
| | Fluorescence probe based on L-cysteine-capped CdTe quantum dots | 0~500 | 8.35 | This work |

Reference:

- [1] L. Pellegrino, A. Tirelli. A sensitive HPLC method to detect hen's egg white lysozyme in milk and dairy products. *Int Dairy J.* 10 (2000) 435-442
[http://dx.doi.org/10.1016/S0958-6946\(00\)00065-0](http://dx.doi.org/10.1016/S0958-6946(00)00065-0)
- [2] N. Schneider, I. Weigel, K. Werkmeister, M. Pischetsrieder. Development and Validation of an Enzyme-Linked Immunosorbent Assay (ELISA) for Quantification of Lysozyme in Cheese. *J Agr Food Chem.* 58 (2009) 76-81 10.1021/jf9025019
- [3] Z. Cai, G. Chen, X. Huang, M. Ma. Determination of lysozyme at the nanogram level in chicken egg white using Resonance Rayleigh-scattering method with Cd-doped ZnSe quantum dots as probe. *Sensors and Actuators B: Chemical.* 157 (2011) 368-373 <http://dx.doi.org/10.1016/j.snb.2011.04.058>
- [4] A.K.H. Cheng, B. Ge, H.-Z. Yu. Aptamer-Based Biosensors for Label-Free Voltammetric Detection of Lysozyme. *Anal Chem.* 79 (2007) 5158-5164
10.1021/ac062214q
- [5] H. Zheng, S. Qiu, K. Xu, L. Luo, Y. Song, Z. Lin, L. Guo, B. Qiu, G. Chen. Colorimetric and fluorometric dual-readout sensor for lysozyme. *Analyst.* 138 (2013) 6517-6522 10.1039/c3an01194a
- [6] Y.-M. Chen, C.-J. Yu, T.-L. Cheng, W.-L. Tseng. Colorimetric Detection of Lysozyme Based on Electrostatic Interaction with Human Serum Albumin-Modified Gold Nanoparticles. *Langmuir.* 24 (2008) 3654-3660 10.1021/la7034642

- [7] D. Liao, J. Chen, W. Li, Q. Zhang, F. Wang, Y. Li, C. Yu. Fluorescence turn-on detection of a protein using cytochrome c as a quencher. *Chem Commun.* 49 (2013) 9458-9460 10.1039/c3cc43985b
- [8] S. Liu, W. Na, S. Pang, F. Shi, X. Su. A label-free fluorescent detection strategy for lysozyme assay based on CuInS₂ quantum dots. *Analyst.* (2014) 10.1039/c4an00160e
- [9] M.M. Vestling, C.M. Murphy, C. Fenselau. Recognition of trypsin autolysis products by high-performance liquid chromatography and mass spectrometry. *Anal Chem.* 62 (1990) 2391-2394 10.1021/ac00220a025
- [10] W. Xue, G. Zhang, D. Zhang. A sensitive colorimetric label-free assay for trypsin and inhibitor screening with gold nanoparticles. *Analyst.* 136 (2011) 3136-3141 10.1039/c1an15224f
- [11] R.E. Ionescu, S. Cosnier, R.S. Marks. Protease Amperometric Sensor. *Anal Chem.* 78 (2006) 6327-6331 10.1021/ac060253w
- [12] Y. Wang, Y. Zhang, B. Liu. Conjugated Polyelectrolyte Based Fluorescence Turn-On Assay for Real-Time Monitoring of Protease Activity. *Anal Chem.* 82 (2010) 8604-8610 10.1021/ac101695x
- [13] L. An, L. Liu, S. Wang. Label-Free, Homogeneous, and Fluorescence “Turn-On” Detection of Protease Using Conjugated Polyelectrolytes. *Biomacromolecules.* 10 (2008) 454-457 10.1021/bm801036h

- [14] X. Li, S. Zhu, B. Xu, K. Ma, J. Zhang, B. Yang, W. Tian. Self-assembled graphene quantum dots induced by cytochrome c: a novel biosensor for trypsin with remarkable fluorescence enhancement. *Nanoscale*. 5 (2013) 7776 10.1039/c3nr00006k
- [15] L. Hu, S. Han, S. Parveen, Y. Yuan, L. Zhang, G. Xu. Highly sensitive fluorescent detection of trypsin based on BSA-stabilized gold nanoclusters. *Biosens Bioelectron*. 32 (2012) 297-299 10.1016/j.bios.2011.12.007
- [16] X. Gao, G. Tang, Y. Li, X. Su. A novel optical nanoprobe for trypsin detection and inhibitor screening based on Mn-doped ZnSe quantum dots. *Anal Chim Acta*. 743 (2012) 131-136 10.1016/j.aca.2012.07.007