

## Electronic Supplementary Information

# A universal glucometer-based biosensor for portable and quantitative detection of transcription factors

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## **Experimental Section**

### ***Preparation of gold nanoparticles (AuNPs)***

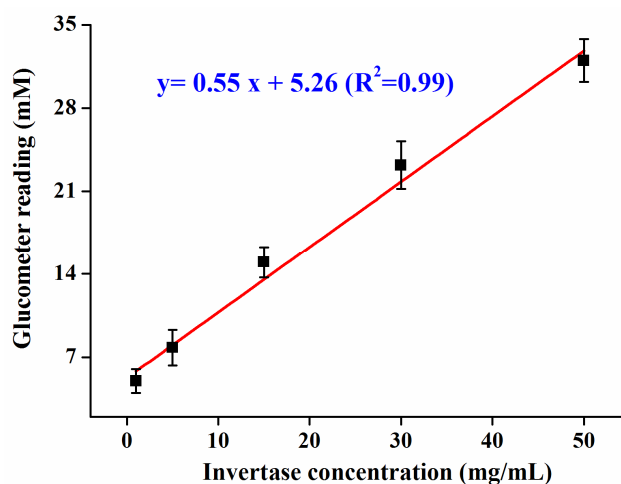
AuNPs with average diameter  $15 \pm 3.5$  nm were prepared according to the reported methods with slight modifications.<sup>1,2</sup> All glassware used in this preparation was thoroughly cleaned in aqua regia (three parts HCl and one part HNO<sub>3</sub>), rinsed in doubly distilled water, and oven-dried prior to use. In a 500 mL round-bottom flask, 250 mL of 0.01% HAuCl<sub>4</sub> in doubly distilled water were brought to boil with vigorous stirring, followed by the addition of 10 mL of 1% trisodium citrate. The solution turned deep blue within 20 s, and the final color changed to wine-red after 60 s. Boiling was pursued for an additional 10 min; the heating source was removed, and the colloid solution was stirred for another 15 min. The resulting AuNPs solution was stored in dark bottles at 4 °C and used to prepare the Ab/invertase-AuNPs conjugate.

### ***Cell culture***

Undifferentiated mouse embryonic stem cells (MP I) were donated by Dr. Duanqin Pei (Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences). The MP I cells were cultured in Dulbecco's modified Eagle's medium (DMEM) with 15% fetal bovine serum (FBS, Gibco), 2 mM L-glutamine, 0.1 mM 2-mercaptoethanol, 1 x non-essential amino acids (Gibco), 1 mM sodium pyruvate, 1,000 U/ml leukemia inhibitory factor (LIF, Chemicon), and 100 U/ml penicillin/streptomycin (Gibco) at 37 °C in a humidified atmosphere containing 5% CO<sub>2</sub>.

## Calculate the effective concentration of invertase immobilized on AuNPs

Different concentrations of invertase in free solution were used to catalyze the hydrolysis of sucrose (0.5 M) into glucose, which is monitored by a personal glucometer. A calibration curve of glucometer readings as a function of invertase concentration was plotted (Fig. S1) and revealed that the glucometer readout was linear with the concentration of invertase in the range from 1 to 50 mg/mL. The calibration equation obtained from this curve was  $y = 0.55x + 5.26$  ( $R^2 = 0.99$ ) (y, glucometer readings; x, invertase concentrations). From the calibration equation, we can deduce that the effective concentration of invertase adsorbed on the nanoparticles is about 34 mg/mL.



**Fig. S1** Detection of different invertase concentrations in free solution using a glucometer.

Reaction time: 30 min; Sucrose concentration: 0.5 M. The error bars represent the standard deviation of three independent measurements.

## References

- 1 J. Chen, X. Zhou and L. Zeng, *Chem. Commun.*, 2013, **49**, 984.
- 2 J. Chen, Z. Fang, P. Lie and L. Zeng, *Anal. Chem.*, 2012, **84**, 6321.