**Supporting Information**

# A glucose biosensor based on the polymerization of aniline induced by bio-interphase of glucose oxidase and horseradish peroxidase

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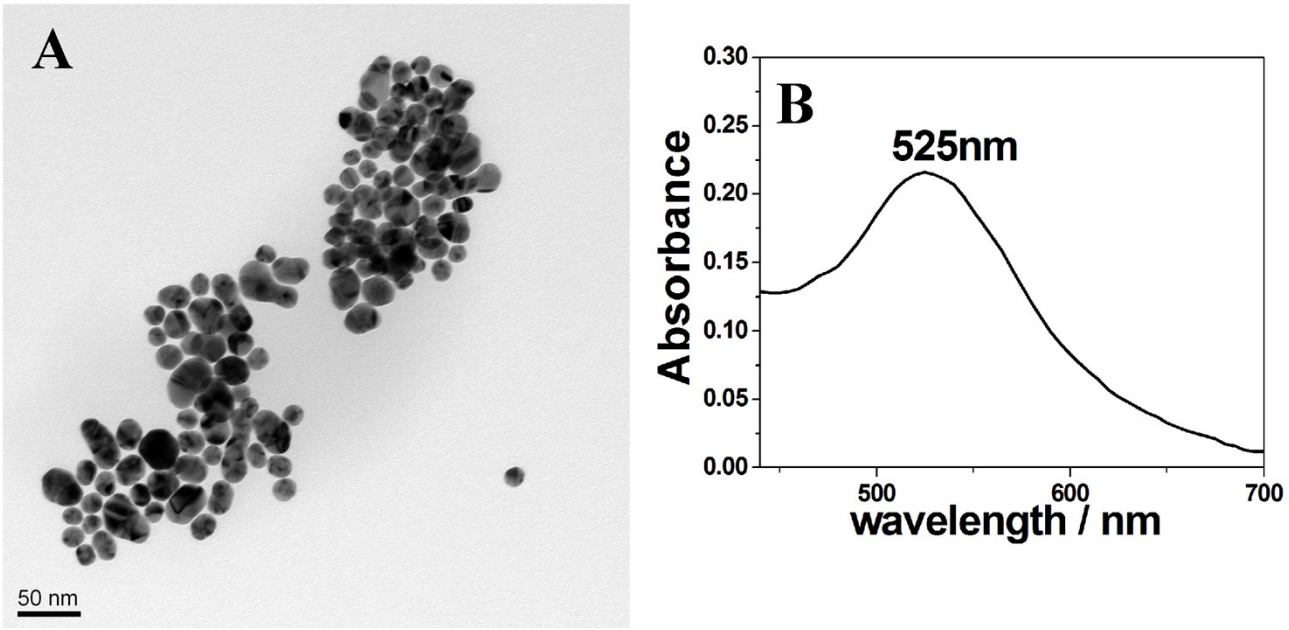


**Fig. S1.** TEM image (A) and UV-Vis absorption spectroscopy (B) of prepared AuNPs.

The prepared AuNPs was characterized by TEM and UV-Vis absorbance spectroscopy as shown in Fig. S1. The TEM image (Fig. S1A) indicated that AuNPs were almost spherical in shape with an average size of about 20 nm. The UV-Vis absorption spectroscopy of AuNPs (Fig. S1B) showed an obvious characteristic absorption peak around 525 nm, which proved that the AuNPs had been successfully prepared.

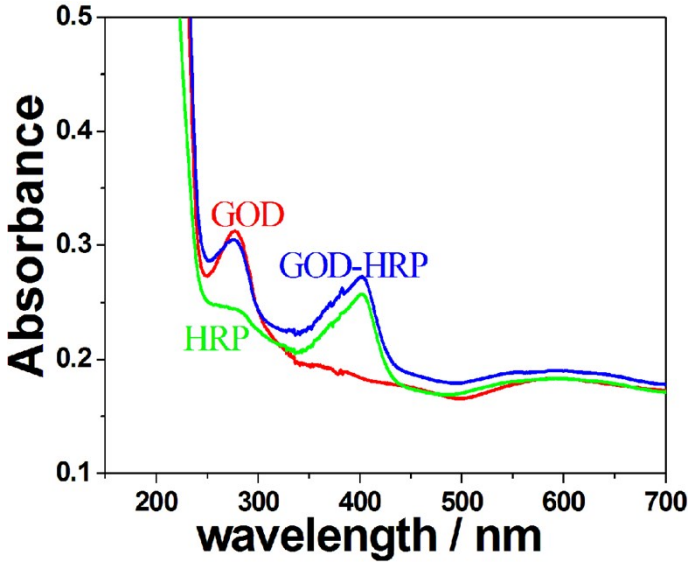


**Fig. S2.** UV-Vis spectra of GOD (red line), HRP (green line) and GOD-HRP (blue line) on the transparent quartz glass substrate.

UV-Vis absorbance spectroscopy is usually carried out to characterize the conformational change of proteins and the interaction between proteins and other compounds. Since the Au electrode was not transparent and not suitable for UV-Vis absorption spectroscopy measurement, the transparent quartz glass substrate was used as the working electrode to replace it. Fig. S2 shows UV-Vis absorption spectra of HRP, GOD and mixed GOD–HRP on the transparent quartz glass substrate. The HRP (green line) shows two obvious characteristic absorption bands at about 275 nm and 403 nm which were resulted from iron heme groups. The GOD has two characteristic absorption bands at about 268 nm and about 600 nm, respectively (red line). After the two proteins were mixed, two characteristic adsorption bands of HRP showed an obvious shift as compared with that of HRP (blue line). The result indicated that HRP was strongly adsorbed on GOD surface. In view of the isoelectric point is 8.9 for HRP and 4.8 for GOD, respectively, negatively charged GOD and positively charged HRP could combine through electrostatic interaction to form a positively charged complex.

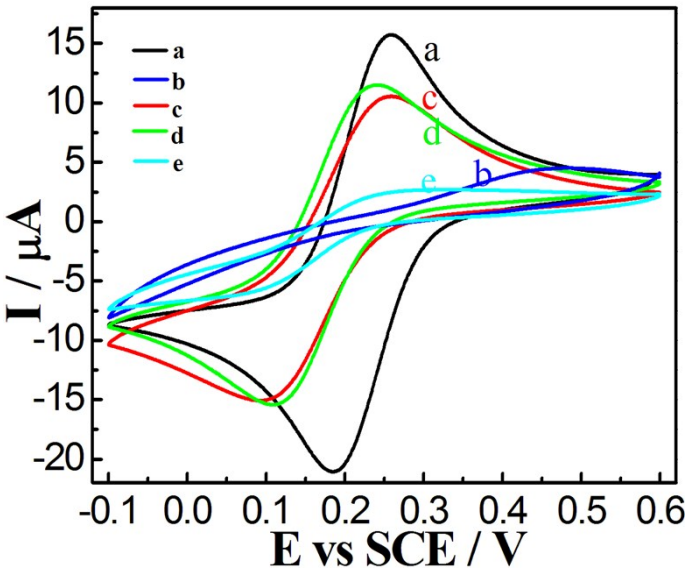


**Fig. S3.** CVs of the Au (curve a, black line), MUA-MCH/Au (curve b, blue line), GOD-HRP/MUA-MCH/Au (curve c, red line), AuNPs/GOD-HRP/MUA-MCH/Au (curve d, green line) and 4-amino thiophenol/AuNPs/GOD-HRP/MUA-MCH/Au electrode (curve e, cyan line) in 0.2 M PBS + 5 mM $Fe(CN)_6^{3-/4-}$ + 10 mM glucose at 100 mV $s^{-1}$.

The CVs of bare Au (curve a), MUA-MCH/Au (curve b), GOD-HRP/MUA-MCH/Au (curve c), AuNPs/GOD- HRP/MUA-MCH/Au (curve d), 4-amino thiophenol/AuNPs/GOD-HRP/MUA-MCH /Au (curve e) in 0.2 M PBS + 5 mM $Fe(CN)_6^{3-/4-}$ + 10 mM glucose at 100 mV $s^{-1}$ have been carried out as shown in Fig. S3. As compared with that in the absence of glucose, the CVs of Au (curve a) and MUA-MCH/Au (curve b) did not show any obvious changes. The peak currents of GOD-HRP/MUA-MCH/Au electrode (curve c, from 11.4985 μA to 10.5336 μA) and the AuNPs/GOD-HRP/MUA-MCH/Au electrode (curve d, from 13.2698 μA to 12.5049 μA) were decreased slightly. While, the peak current of 4-amino thiophenol/AuNPs/GOD-HRP/MUA- MCH/Au electrode (curve e) was greatly decreased from 14.0009 μA to 2.2045 μA. The results indicated that a large number of PANI formed on the surface of 4-amino thiophenol/AuNPs /GOD-HRP/MUA-MCH/Au electrode, which resulted in a great blocking

toward the electron transfer of $Fe(CN)_6^{3-/4-}$. Based on the results, the 4-amino thiophenol/AuNPs/GOD-HRP/MUA -MCH/Au electrode was used to detect glucose in the following experiments.

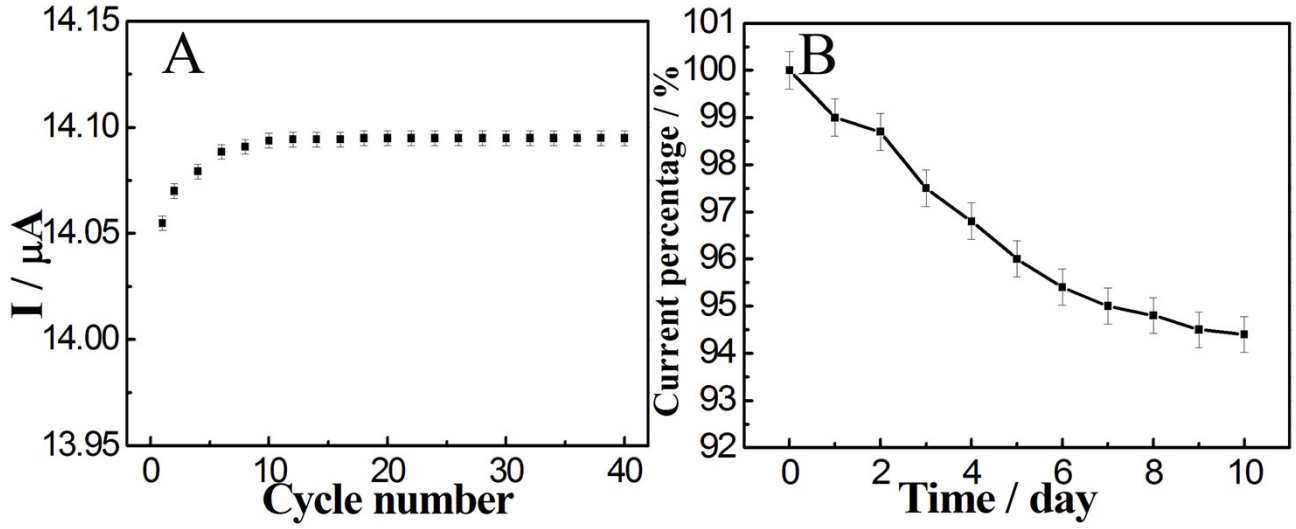


**Fig. S4**. (A) Peak current response of 4-amino thiophenol/AuNPs/GOD-HRP/MUA-MCH/Au electrode for forty continuous scanning in 0.2 M PBS + 5 mM $K_3Fe(CN)_6$ at 100 mV $s^{-1}$. (B) The peak current response of 4-amino thiophenol/AuNPs/GOD-HRP/MUA-MCH/Au electrode in 0.2 M PBS + 5 mM $K_3Fe(CN)_6$ at 100 mV $s^{-1}$ for 10 days.

Fig. S4 shows the stability test of the prepared electrode. As shown in Fig. S4A, the peak current was increased as the cycle number from 1 to 10, but the peak current kept constant after 10 cycle number. The electrode was stored in 4 ºC when not use. And in Fig. S4B, the peak current was gradually decreased as the storage time increased. After 10 days, the current kept constant. The result indicted that the 4-amino thiophenol/AuNPs/ GOD-HRP/MUA-MCH/Au electrode has a good stability.

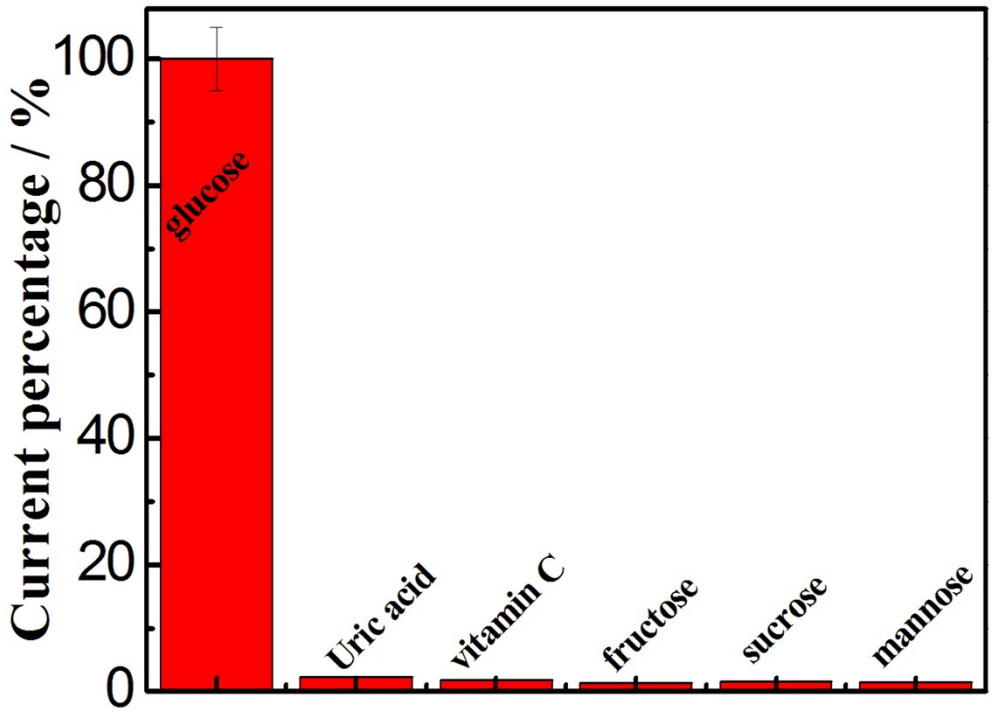


**Fig. S5.** Selectivity test of the new developed biosensor in 0.2 M PBS (pH 7.0) + 5 mM $K_3Fe(CN)_6$ in the presence of 2 mM glucose, or 6.0 mM uric acid, or 6.0 mM vitamin C, or 6.0 mM fructose, or 6.0 mM sucrose or 6.0 mM mannose.

Fig. S5 shows the result of the selectivity test of the new developed glucose biosensor. In the test, the 4-amino thiophenol/AuNPs/GOD-HRP/MUA-MCH/Au electrode was firstly immersed in a solution containing 10 mM aniline in the presence of 2.0 mM glucose, 6.0 mM uric acid, 6.0 mM vitamin C, 6.0 mM fructose, 6.0 mM sucrose or 6.0 mM mannose. After 10 min, the electrode was scanned in the potential range from -0.1 V to +0.6 V. As shown in Fig. S5, no obvious interference for the detection of glucose was found, suggesting that the sensor has a good selectivity for glucose detection.

**Table S1:** Determination of glucose concentration in blood serum samples using the 4-amino thiophenol/AuNPs/GOD-HRP/MUA-MCH/Au electrode.

| NO. | Added (mM) | Found (mM) | RSD (%) | Recovery (%) |
|---|---|---|---|---|
| 1 | 2.0 | 2.12 | 3.45 | 106 |
| 2 | 4.0 | 4.18 | 4.78 | 104.5 |
| 3 | 6.0 | 6.31 | 2.97 | 105.17 |
| 4 | 8.0 | 8.12 | 2.01 | 101.5 |