

# A Simple Graphene-functionalized Electrochemical Aptasensor for the Sensitive and Selective Detection of Glycated albumin

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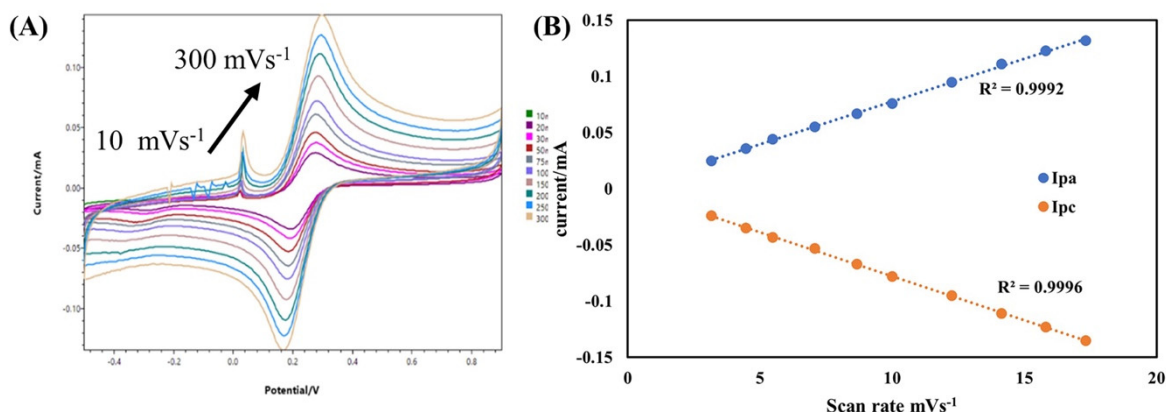


Figure S1 (A) Cyclic voltammograms of GO/SPCEs at different scan rates from 10 to 300 mVs<sup>-1</sup> using 5mM [Fe(CN)<sub>6</sub>]<sup>3-</sup>/[Fe(CN)<sub>6</sub>]<sup>4-</sup> in PBS as redox probe,(B) plot between anodic (I<sub>pa</sub>) and cathodic (I<sub>pc</sub>) peak current vs. square root of the scan rate (v).

### Optimization of the performance of the electrochemical aptasensor

Three electrochemical measurements including DPV, SWV and CV were performed for the detection of GA. Concentrations of GA ( 10, 100, 1000, and 10,000 µg mL<sup>-1</sup>) were prepared in the protein buffer. The aptasensor preparation was the same as in the protocol. The CV was performed with a potential of -0.5 V to 0.9 V at a scan rate of 100 mVs<sup>-1</sup> using 5 mM [Fe(CN)<sub>6</sub>]<sup>4-/3-</sup> as a redox indicator. The DPV measurements were performed in the potential range from -0.1 V to +3 V with pulse amplitude of 25 mV. SWV analysis was more sensitive than other detection methods (Figure S2).

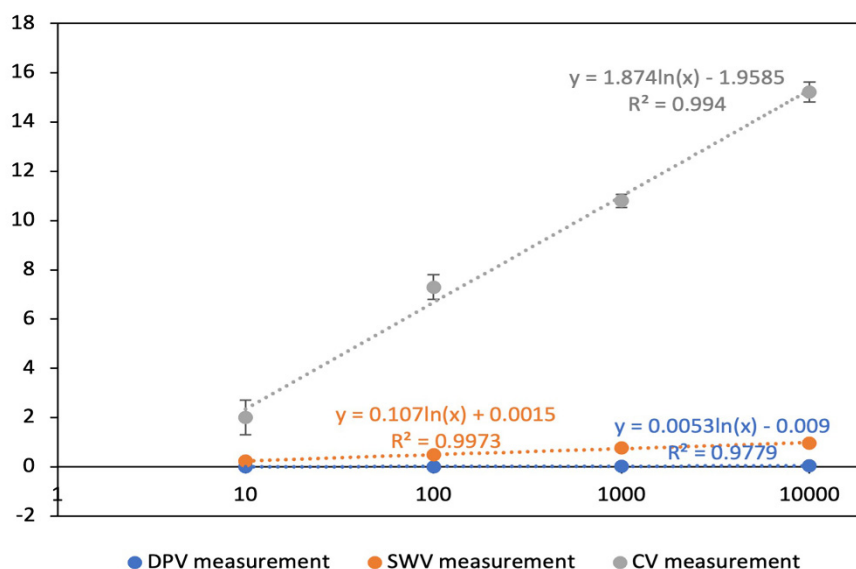


Figure S2 Different electrochemical measurements (DPV,SWV, CV) were applied for the detection of different concentrations of GA (10 - 10,000 µg mL<sup>-1</sup>).

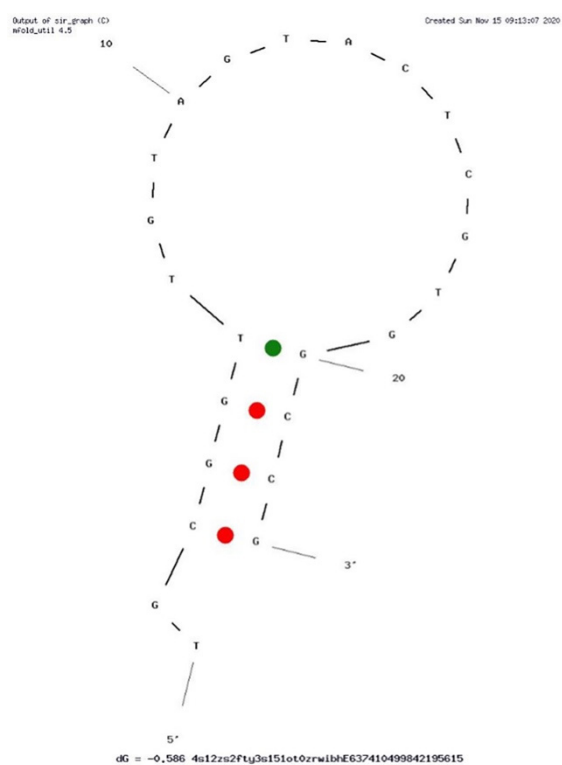


Figure S3 Secondary structure of GA binding aptamer with dG -0.586 kcal/mol predicted at 37°C, under 137 mM sodium (Na) and 1mM magnesium (Mg) concentration.

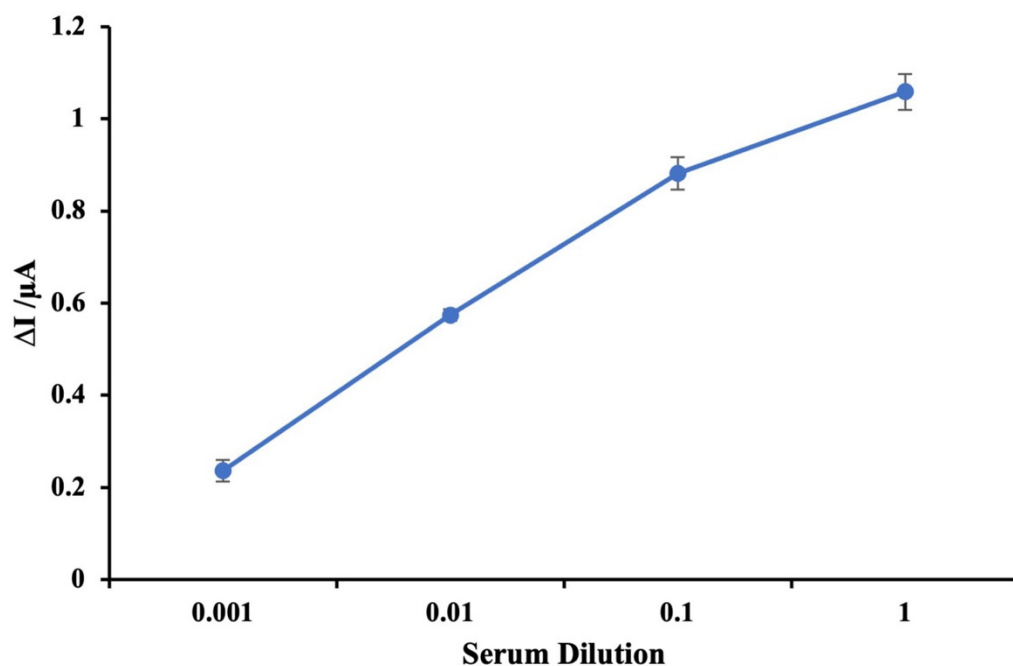


Figure S4 Application of the electrochemical aptasensor to human serum for determination of the optimal dilution of serum.

Table S1 Correlation between GA detected by aptasensor with other glycemic parameters including HbA1c, Fructosamines and Fasting blood sugar (FBS).

Correlation between parameters	All groups (n=30)		DM (n=10)		Non-DM (n=20)	
	r	p	r	p	r	p
GA (mg mL <sup>-1</sup> ) and HbA1c (%)	0.514	0.004	0.320	0.368	0.019	0.230
GA (mg mL <sup>-1</sup> ) and Fructosamine (μmol L <sup>-1</sup> )	0.914	<0.001	0.949	<0.001	0.684	<0.001
GA (mg mL <sup>-1</sup> ) and FBS (mg dL <sup>-1</sup> )	0.813	<0.001	0.804	0.005	0.473	0.035