

Supporting Information

Biocompatible Serine Functionalized Nanostructured Zirconia Based Biosensing Platform for Non-invasive Oral Cancer Detection

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Scheme, Figures and Tables Captions

Scheme S1: Schematic diagram of functionalization of Zirconia with (a) APTES and (b) serine molecules.

Figure S1: FT-IR spectrum of the serine amino acid.

Figure S2: Electrochemical response of BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrodes with various pH of PBS buffer containing 5 mM [Fe(CN)₆]^{3-/4-}.

Figure S3: Cyclic voltammetry response of ITO, serine/nZrO₂/ITO, anti-CYFRA-21-1/serine/nZrO₂/ITO and BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO electrode.

Figure S4: Scan rate studies of serine/nZrO₂/ITO [Inset (a) magnitude of oxidation and reduction current generated as response of scan rate (mV/s), Inset (b) potential as function of scan rate] electrodes.

Figure S5: Scan rate studies of BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO [Inset (a) magnitude of oxidation and reduction current generated as a function of scan rate (mV/s), Inset (b) potential as function of scan rate] electrode.

Figure S6: Response time studies for binding of CYFRA-21-1 with BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrode.

Figure S7: Interferents studies of BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrode in presence of various molecules present in saliva sample of oral cancer patients.

Figure S8: Cumulative Effects of ions present in artificial saliva on electrochemical response study of BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrode.

Figure S9: Electrochemical response studies of five different BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrodes (fabricated in same condition) as function of 0.01 ng mL⁻¹ concentration of CYFRA-21-1.

Figure S10: Shelf life studies of BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrodes.

Table S1: Determination of CYFRA-21-1 concentration in saliva samples using BSA/anti-CYFRA-21-1/serine/nZrO₂/ITO immunoelectrodes

Scheme S1:

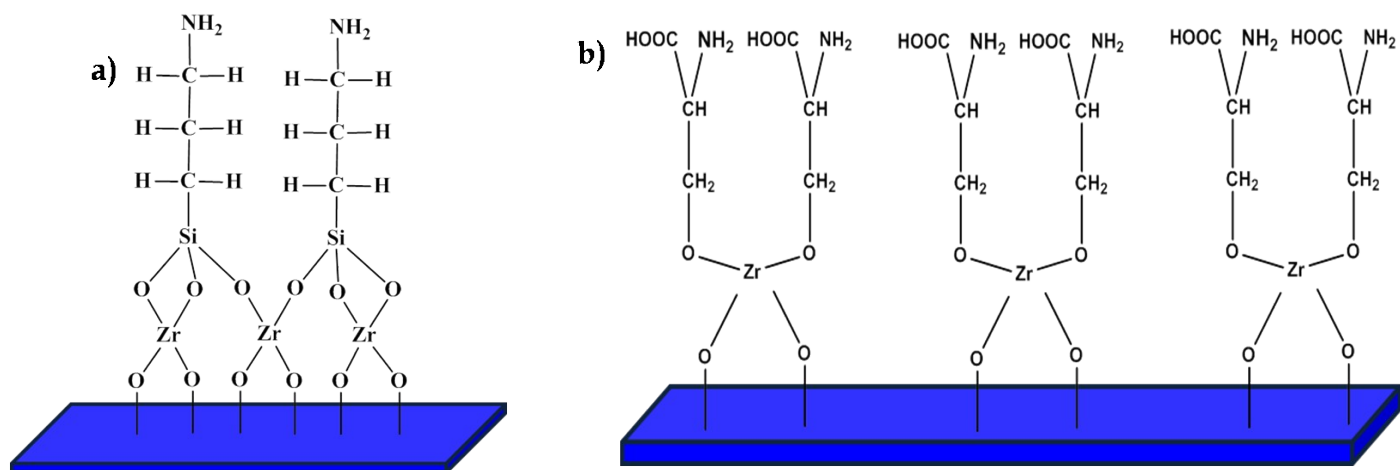


Figure S1:

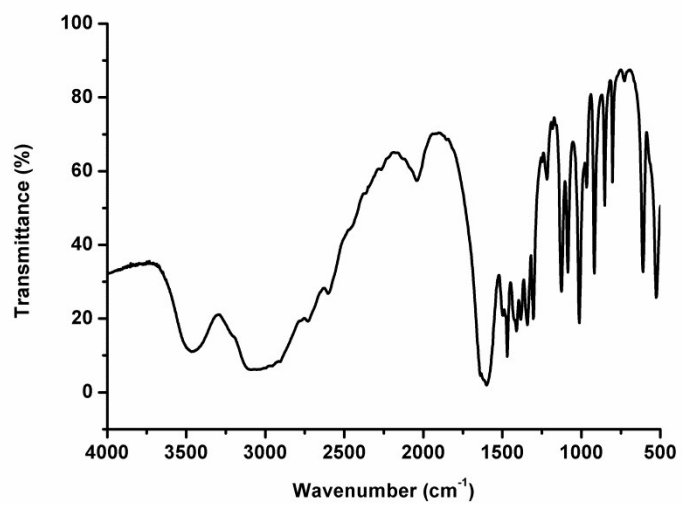


Figure S2:

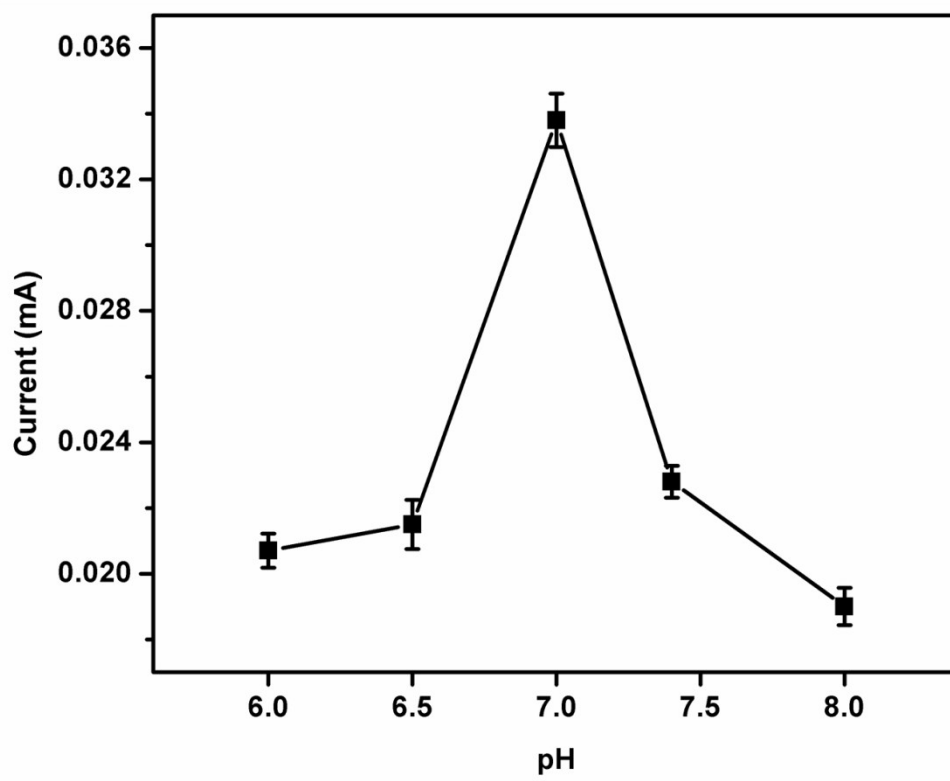


Figure S3:

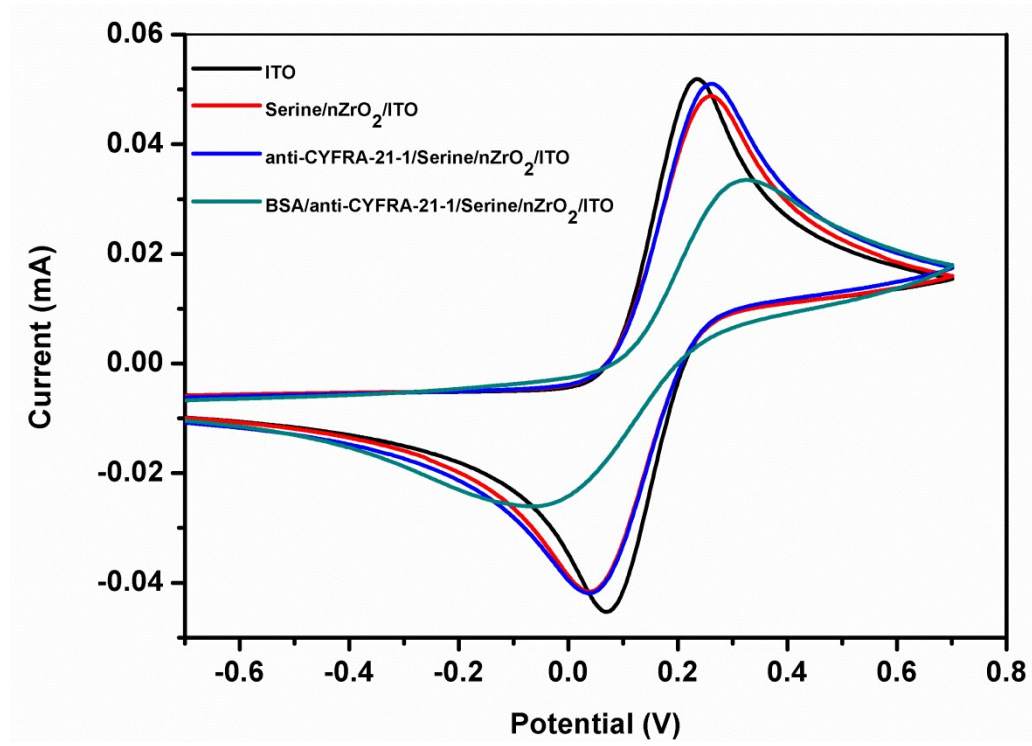


Figure S4:

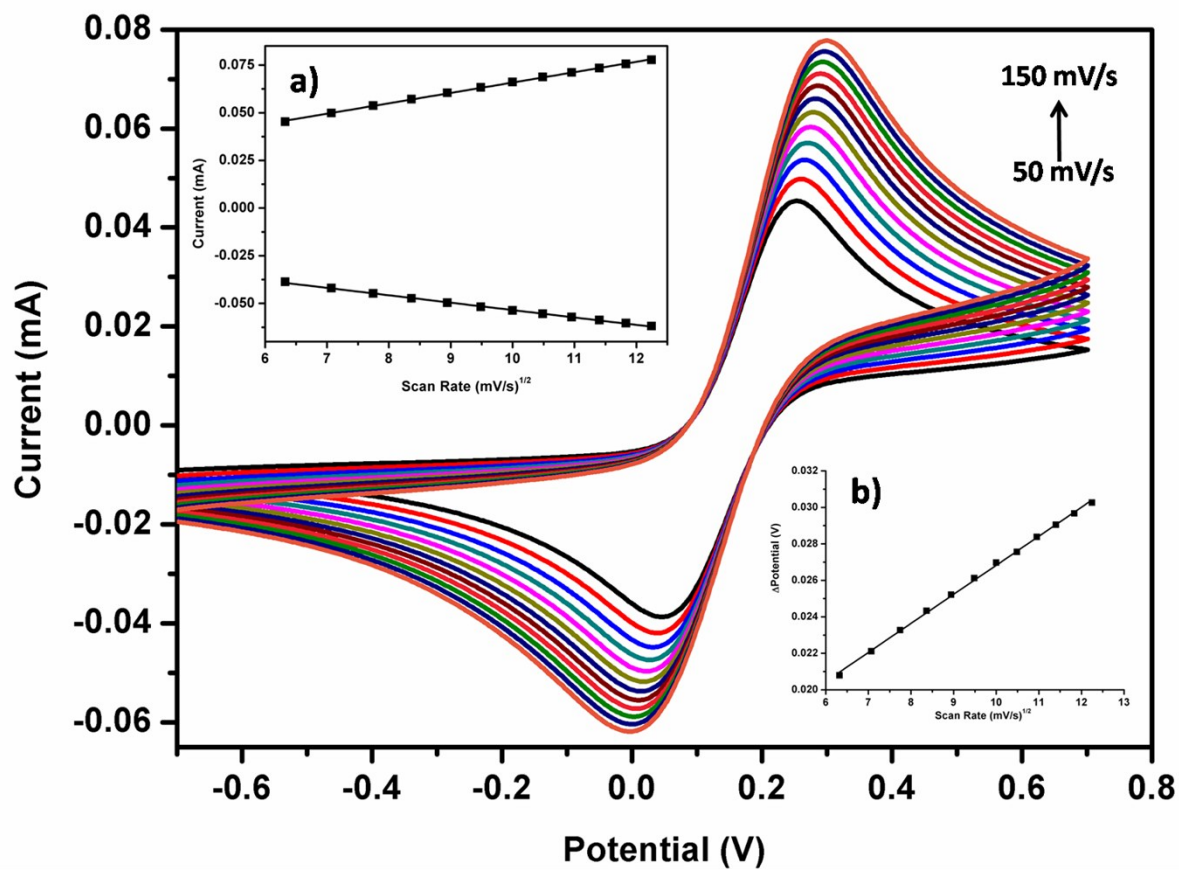


Figure S5:

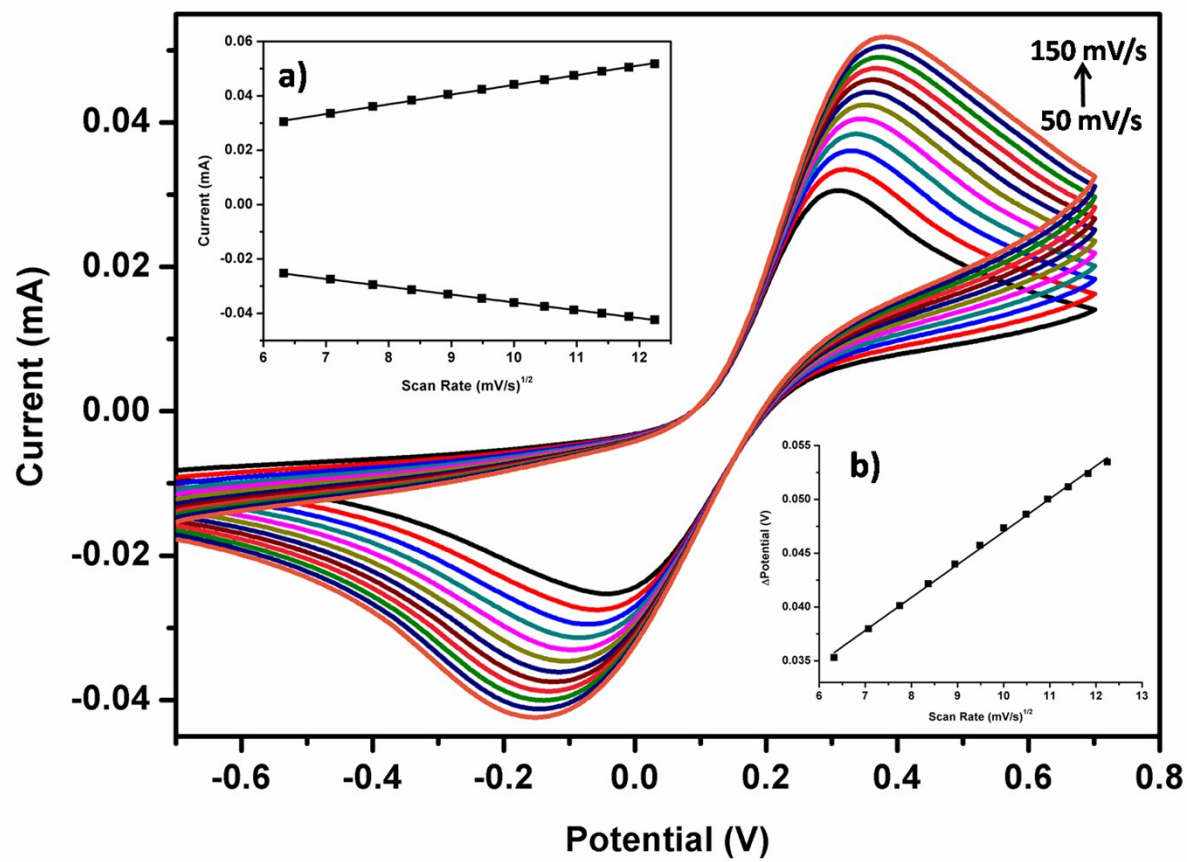


Figure S6:

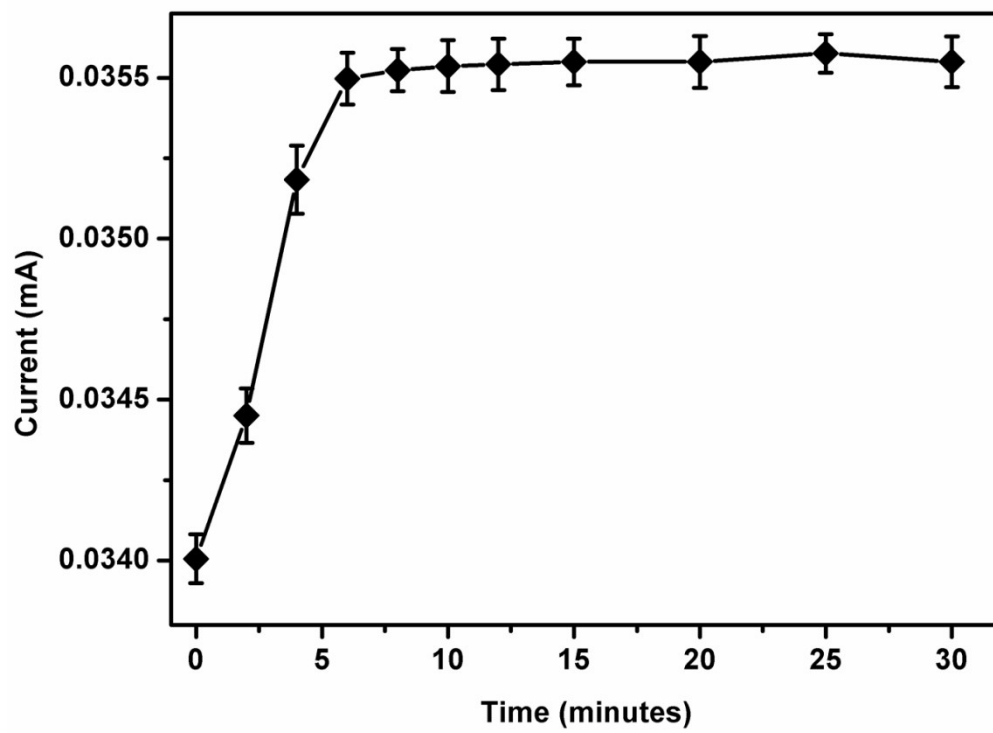


Figure S7:

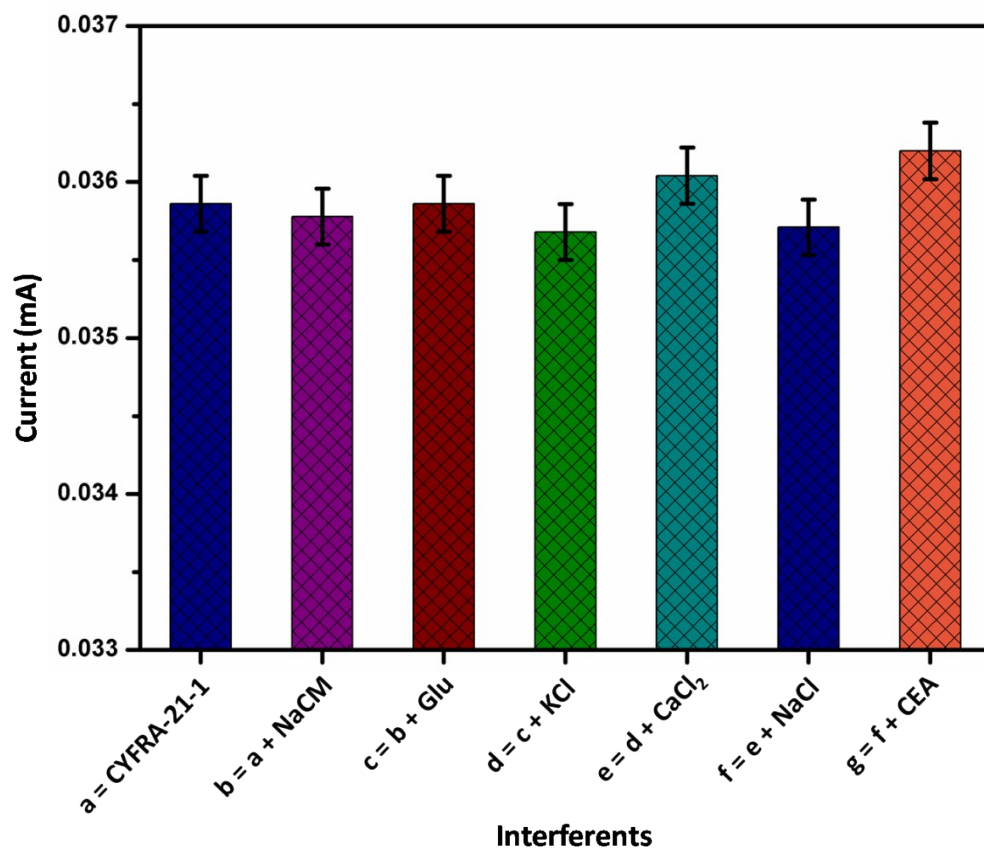


Figure S8:

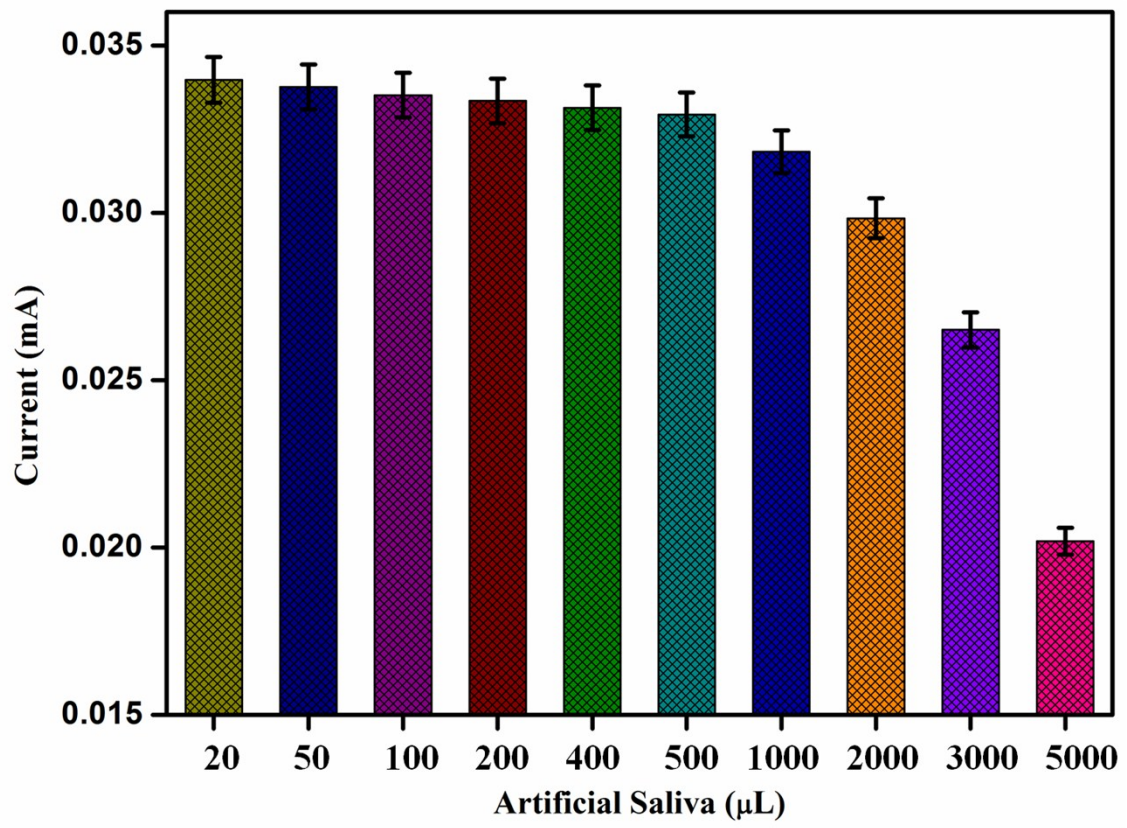


Figure S9:

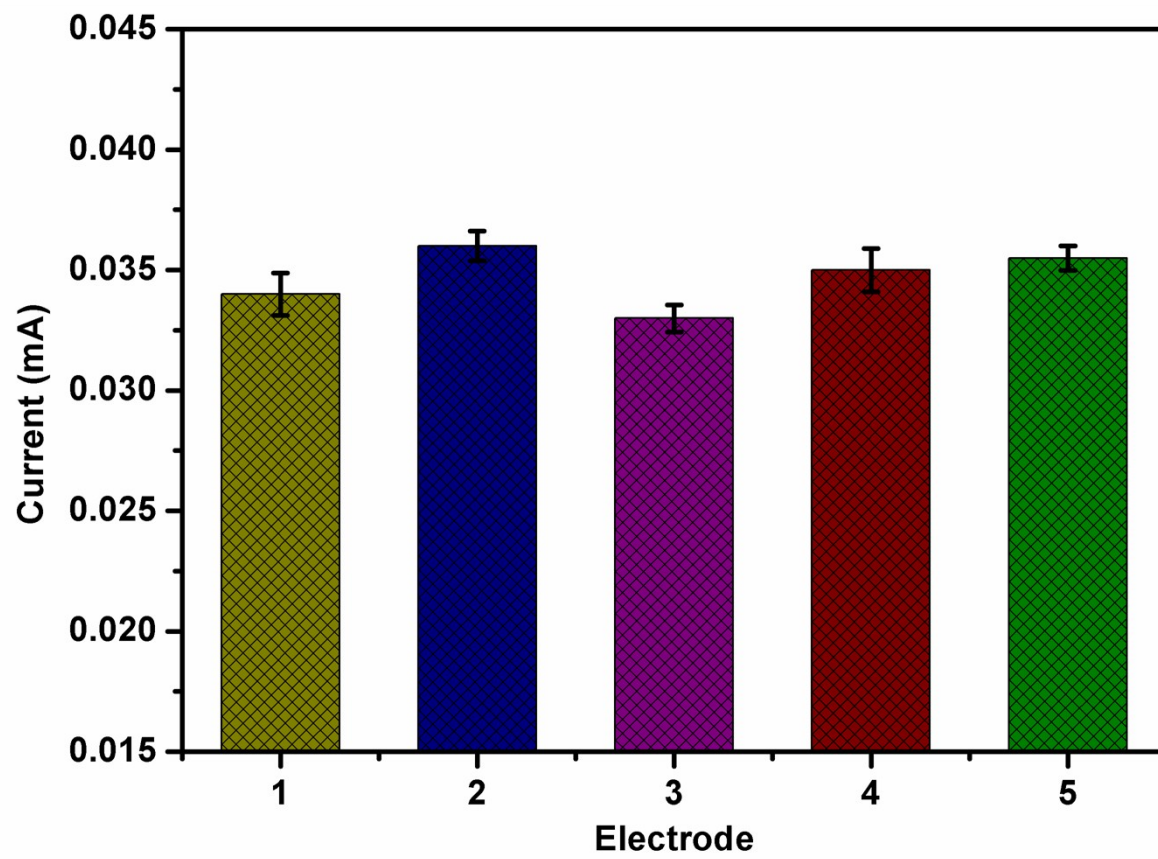


Figure S10:

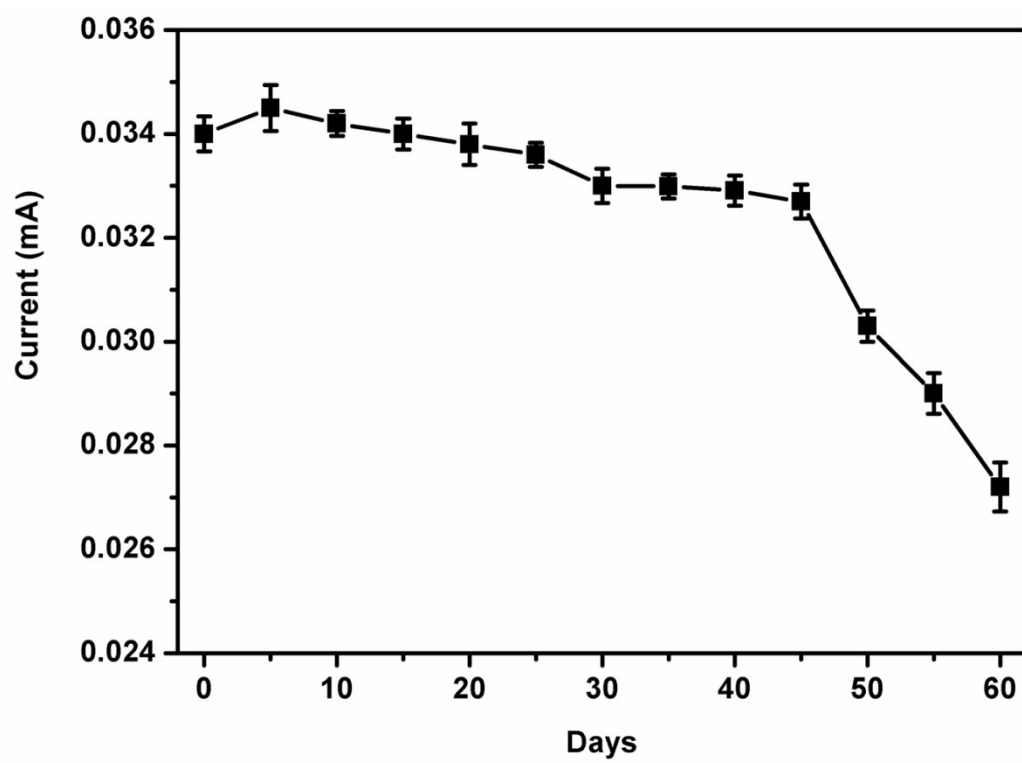


Table S1:

S. No.	CYFRA-21-1 concentration determined using ELISA (in ng mL⁻¹)	Peak current (mA) obtained for standard CYFRA-21-1 samples	Peak current samples (mA) obtained with in Patients saliva samples	% RSD
1.	13.35	0.0458	0.0440	2.83
2.	14.15	0.0461	0.0480	2.86
3.	12.10	0.0454	0.0445	1.42
4.	14.55	0.0461	0.0490	4.31
5.	12.50	0.0456	0.0400	9.25
6.	13.50	0.0458	0.0420	6.12
7.	15.55	0.0464	0.0491	4.00