Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

Immunosensing of prostate cancer in human plasma samples using immobilization of antibody on the surface of mesoporous silica modified silver nanoparticles and its immunocomplex with prostate specific antigen

Fatemeh Farshchi [a], Mohammad Hasanzadeh [a*], Elham Solhi [b]

[a] Pharmaceutical Analysis Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.

[b] Biotechnology Research Center, Tabriz University of Medical Sciences, Tabriz, Iran, Tabriz 51664, Iran.

Corresponding Author
E-mail address: (*) hasanzadehm@tbzmed.ac.ir
Tabriz University of Medical Sciences, Tabriz.
Tel: +98(41) 33363311; Fax: +98(41)33363231

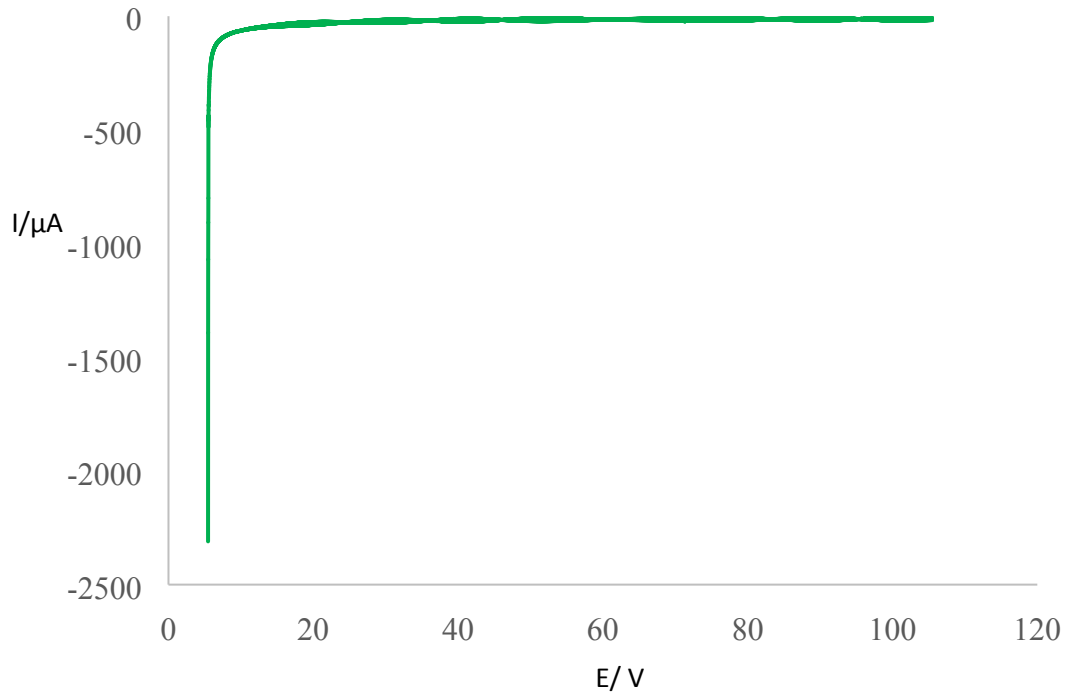


Fig S1. Chronoamperogram of Au electrode in the solution of (4.4 mM TEOS+0.1 M $NaNO_3$+1.4 mM CTAB). Time: 100 s and E= -1.3V.

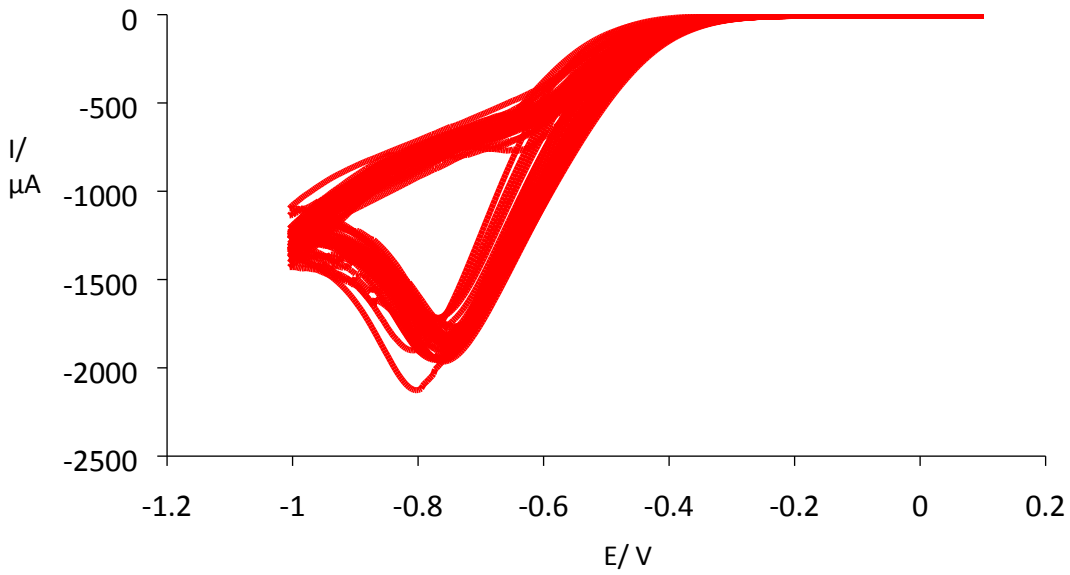


Fig. S2. CVs of Au electrode modified by SiO_2-NH_2 on the solution of $AgNO_3$ (0.1 M) + HNO_3 (0.1 M). Scan rate is 100 mV/s, number of cycle = 30 cycle.

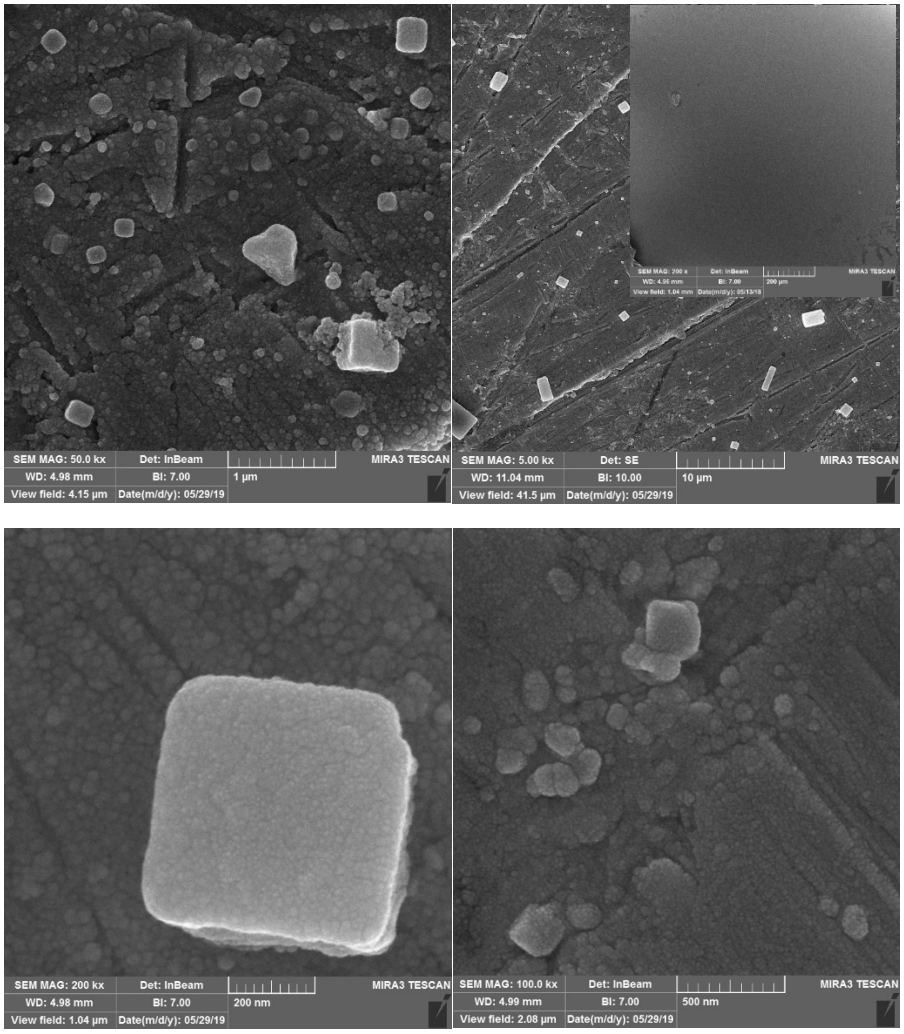


Fig. S3. A) FE-SEM imaging of SiO_2-Ag NPs/Au in different magnification. Inset is FESEM image of bare Au electrode.

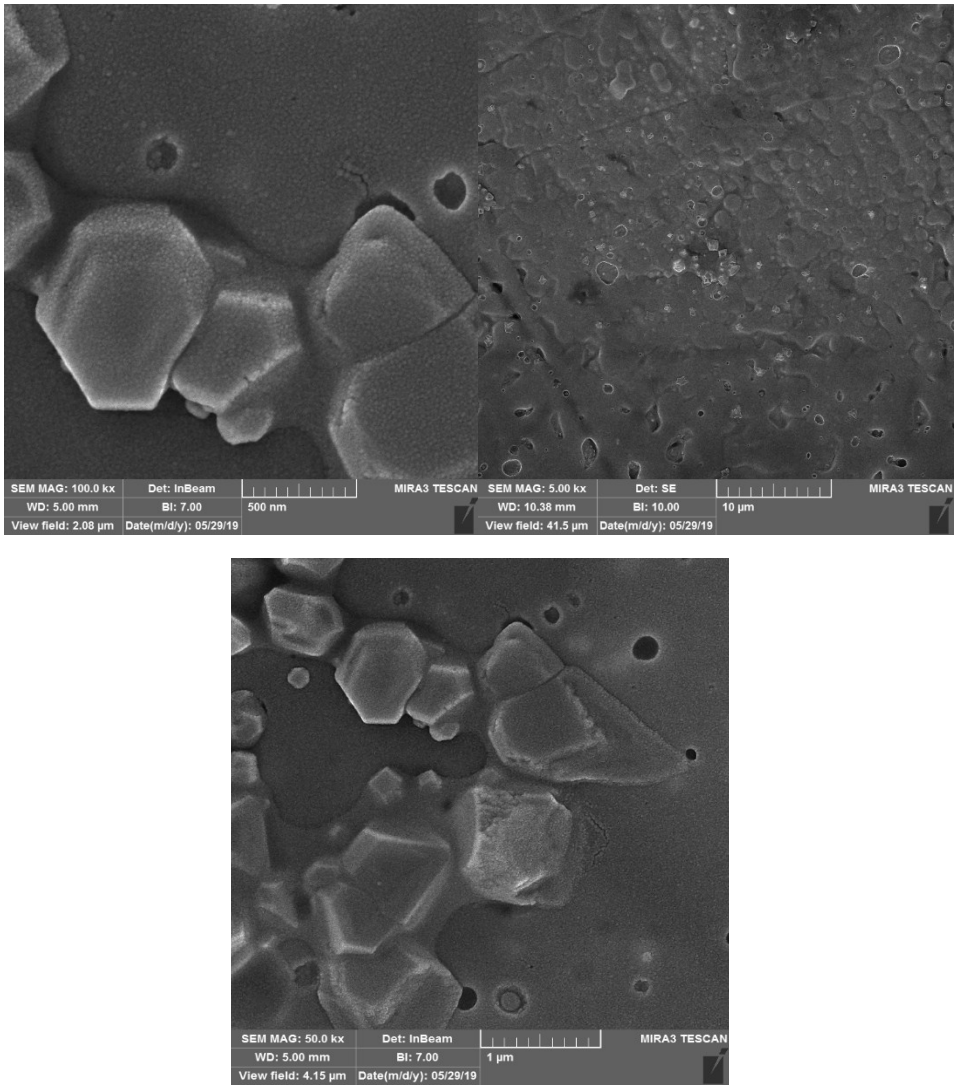


Fig. S3B) FE-SEM imaging of SiO_2- AgNPs /Ab/Au in different magnification.

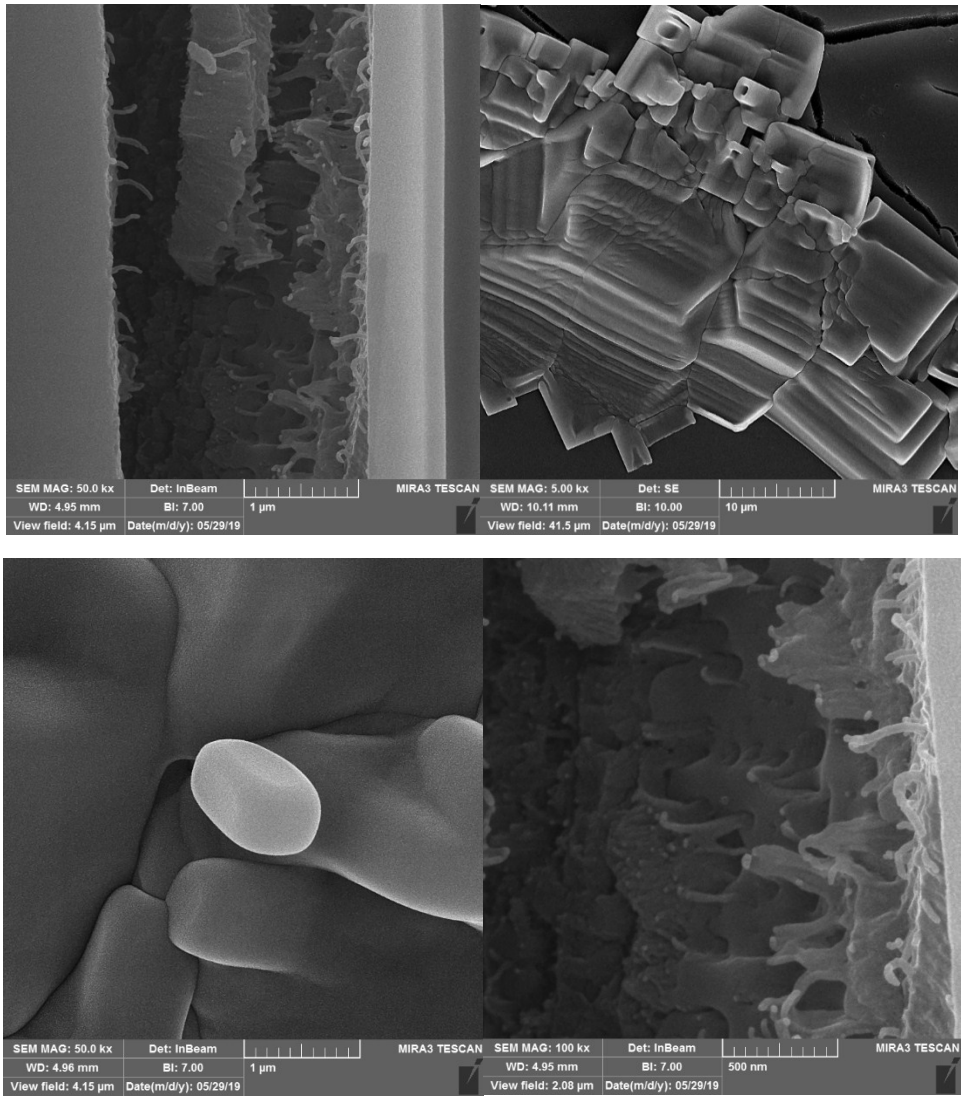
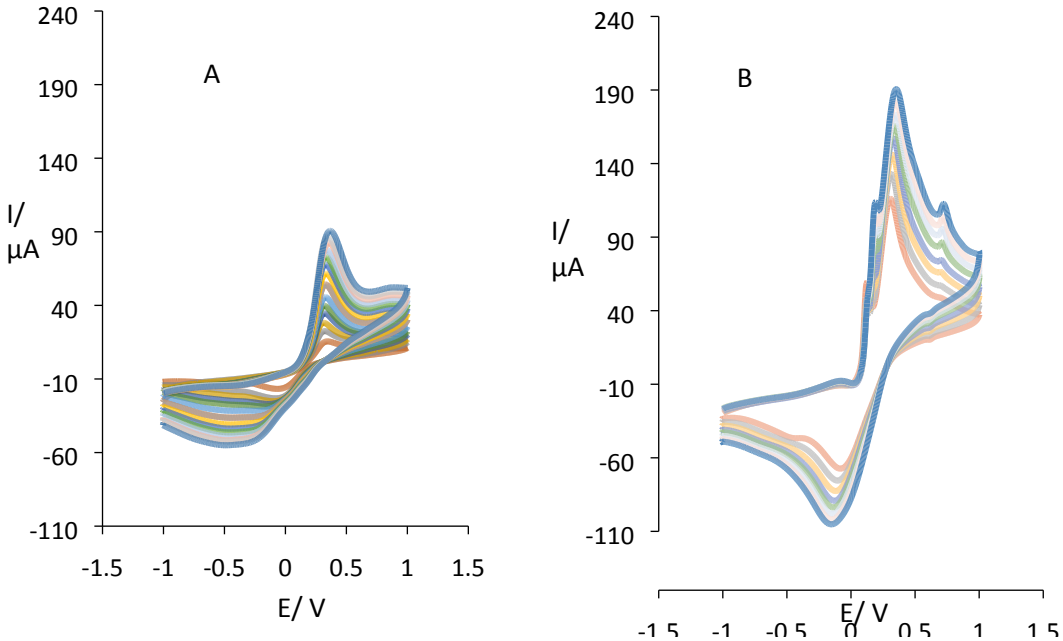
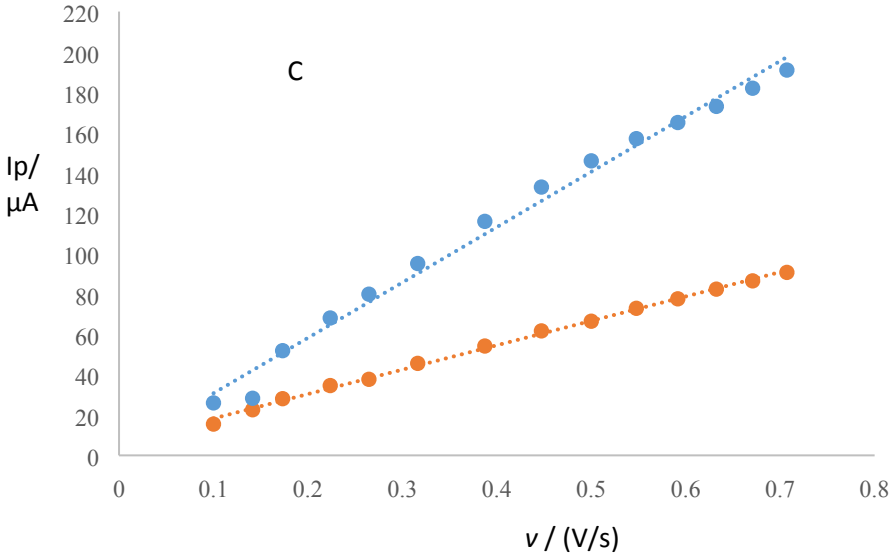


Fig. S3C) FE-SEM imaging of SiO_2-AgNPs /Ab/Ag/Au in different magnification.


A
240
190
140
90
40
-10
-60
-110
I/ µA
-1.5
-1
-0.5
0
0.5
1
1.5
E/ V
B
240
190
140
90
40
-10
-60
-110
I/ µA
E/ V


C
220
200
180
160
140
120
100
80
60
40
20
0
Ip/ µA
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
v / (V/s)

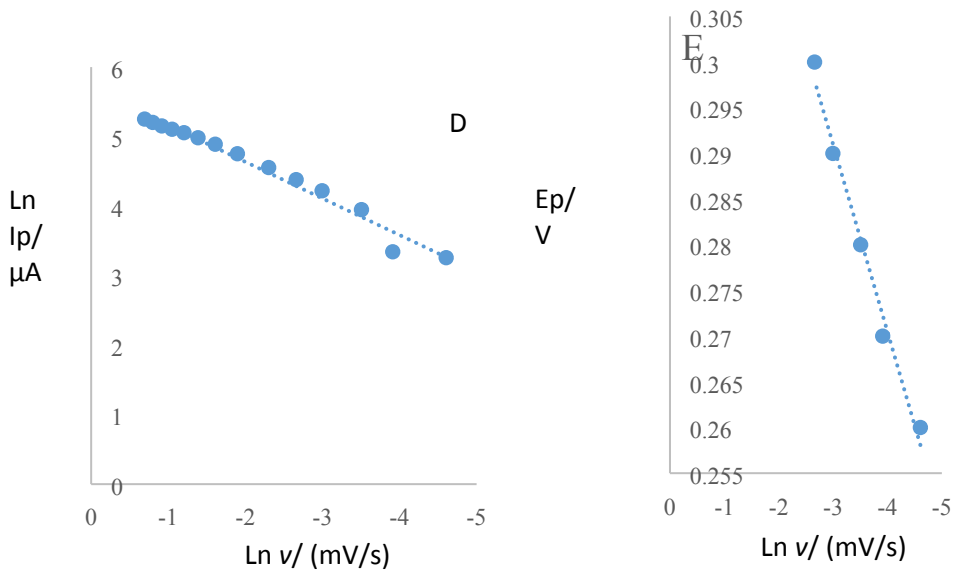


Fig. S4: CVs of Au electrode modified by SiO_2 (**A**) and (**B**) SiO_2-AgNPs. **C**) Dependency of oxidation peak currents versus square roots of sweep rates. **D**) Variation of Ln I_p *versus* Ln*v*. **E**) variation of Ep_a *versus* Ln*v*.

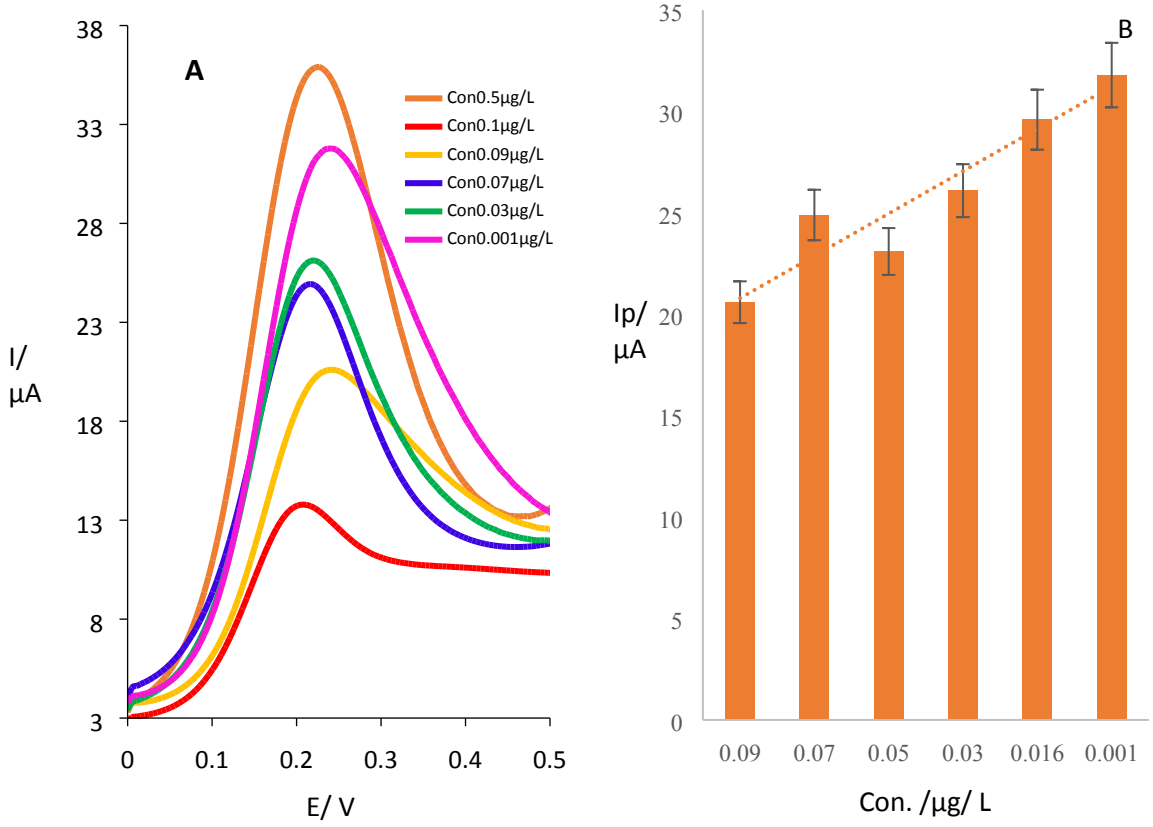


Fig. S5. **A)** DPVs of the engineered immunosensor for the detection of PSA biomarker in the concentration range of 0.03-0.001 µg L^{-1} in human plasma samples. **B)** Calibration curve.

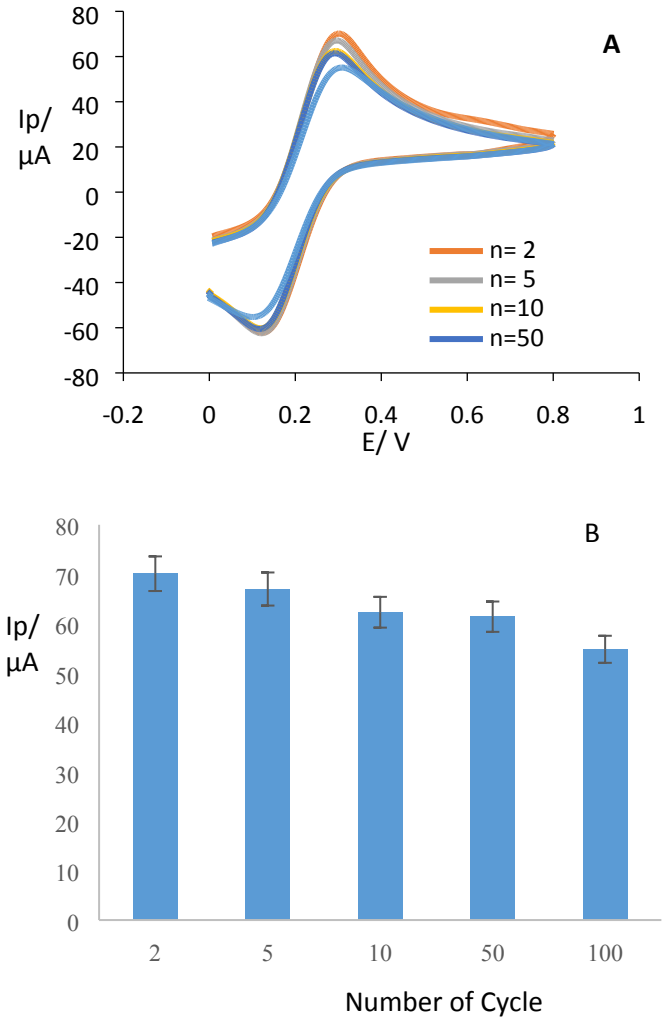


Fig. S6. A) CVs of the immunosensor in different cycle number (2, 5, 10, and 50 cycles). **B**) Histogram of the peak currents *versus* cycle number. Scan rate: 100 mV/s.

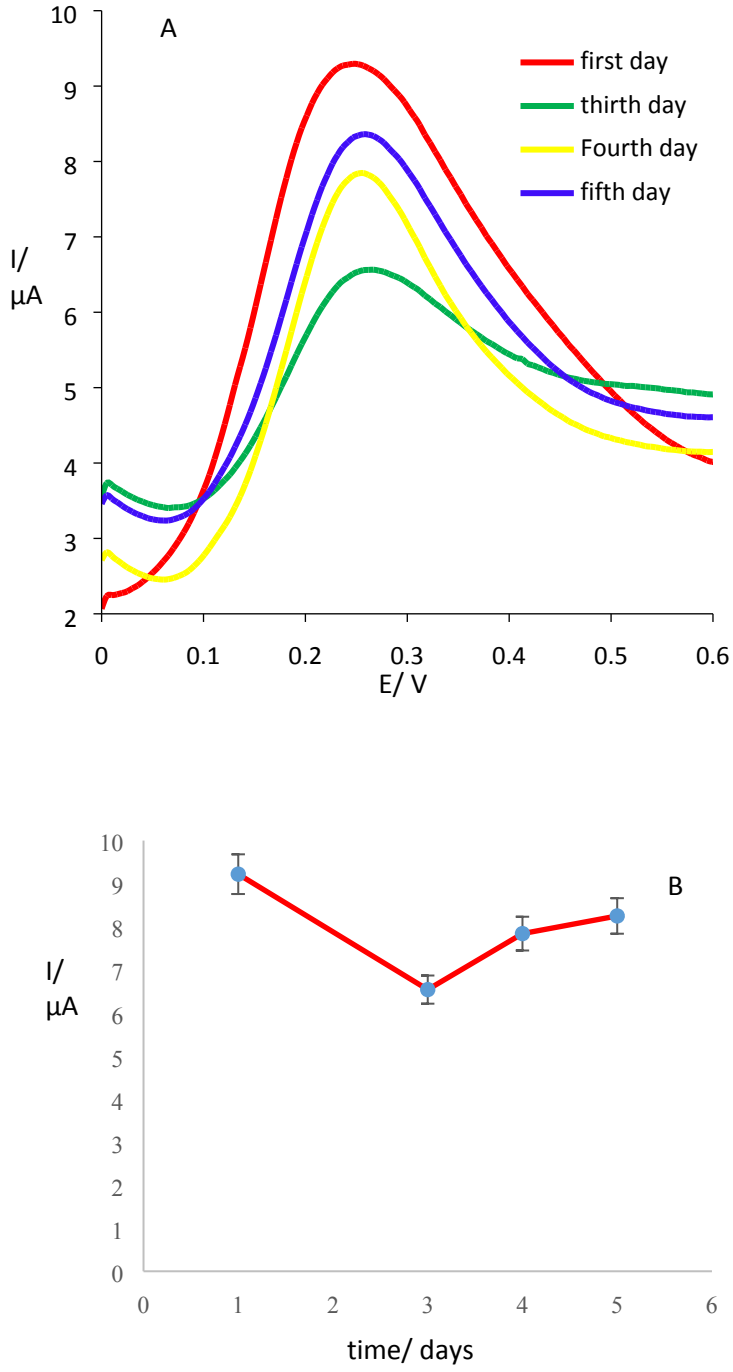


Fig. S7. DPVs (**A**) and histograms (**B**) for the stability study of SiO_2-AgNPs /Ab/BSA/Ag/Au in the potential range of 0 to 0.8 and sweep 50 mV/s in 1mM of Fe $(CN)_6^{-3/-4}$ periodic time (24,48,72, and 96 h).

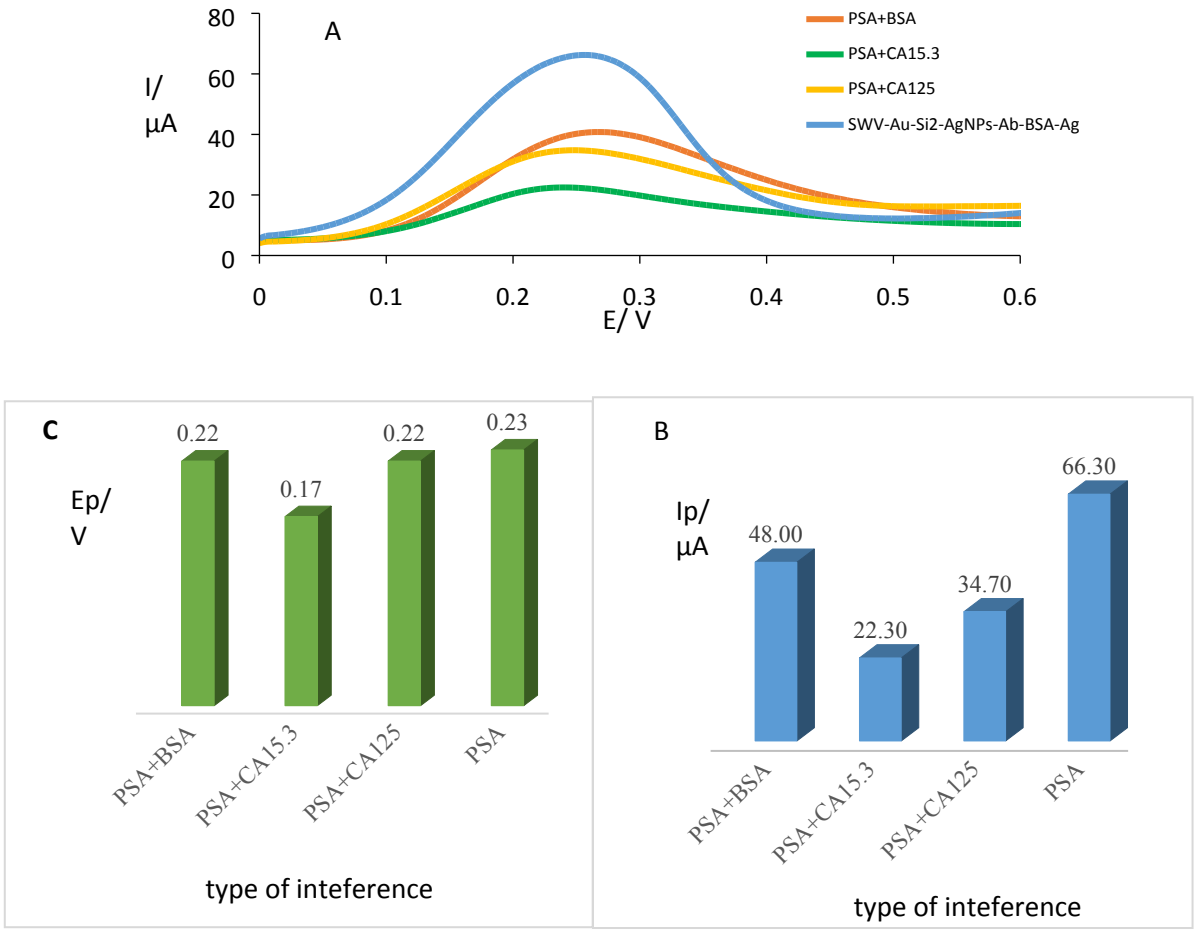


Fig. S8. A) DPVs SiO_2-AgNPs/Ab/BSA/Ag/Au in the presence of serum proteins (BSA, CA15.3, CA125). (**B** and **C**) Histogram of peak potential and currents *versus* type of interfering species.