Supplementary Materials

An Impedimetric Biosensing Strategy Based on Bicyclic Peptides as Bioreceptors for Monitoring h-uPA Cancer Biomarkers

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Table S1. Comparison of biosensing strategies developed recently for h-uPA detection spiked buffer solutions and biological fluids. .

Biorecognition layer components	Detection strategy	Matrices tested	Dynamic range (ng mL^{-1})	LOD (ng mL^{-1})	LOQ (ng mL^{-1})	Sample volumes (μL)	Assay time*	Reference
Bicyclic peptide	Impedimetric	PBS**	10–1x10^{2}	9	30	20	~ 45 min	Present
Bicyclic peptide	Votammetric (DPV)	PBS + Diluted human serum	0–5x10^{2}	32.5	-	10	~ 1 h	[1]
Antibody	Fluorescence	PBS + Fetal Bovin Serum +	3.3–3.3x10^{3}	3.3	-	20	~ 1 h	[2]
Antibody	Photoelectrochemical	PBS + Human serum	1x10^{-4}–1x10^{3}	3.3x10^{-5}	-	30	~ 1 h	[3]
Aptamer	Impedimetric Voltammetric	PBS + Diluted human serum	3.3x10^{-2}–33	3.3x10^{-2}	-	-	~ 30 min	[4]

*Assay time is referred to the time of incubation of h-uPA and analysis. ** Phosphate buffer saline

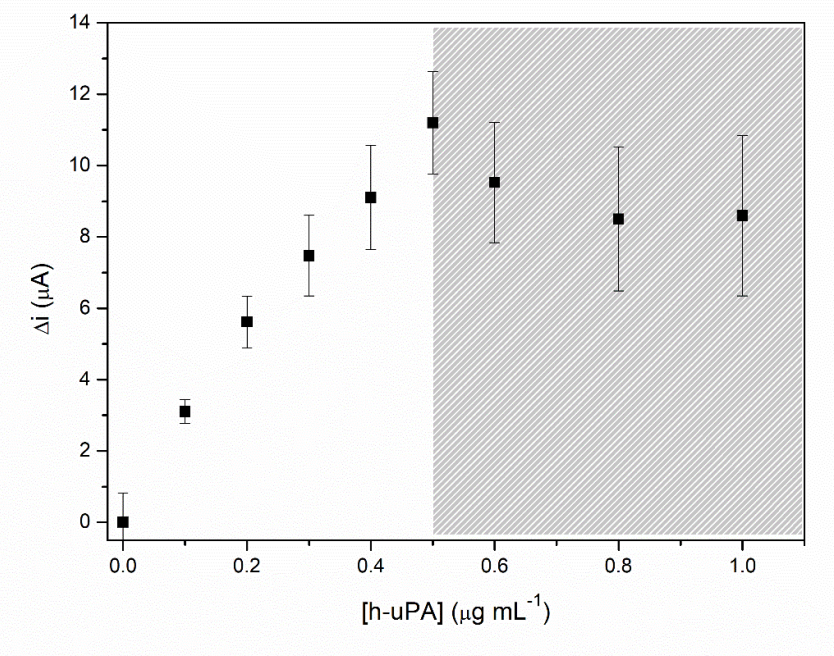


Figure S1. The response of P$_3$-based assay in presence of h-uPA concentrations ranging 0.1 to 1 μg mL^{-1}.

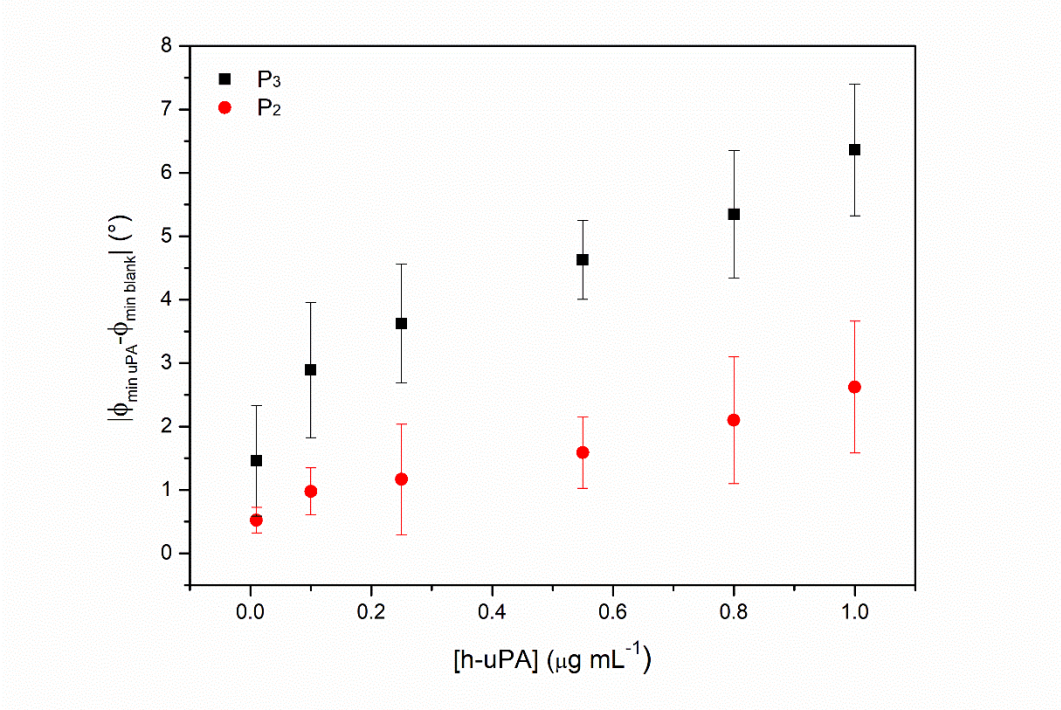
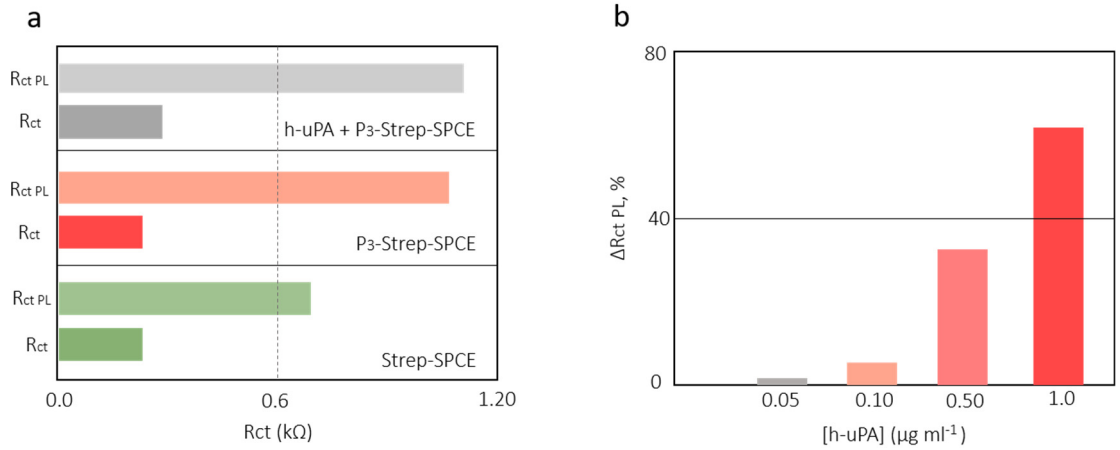


Figure S2. Comparison between the calibration plots obtained with P_2 (red circles) and P_3 (black squares) as bioreceptors in this impedimetric-based assay. The calibration curve of P_3-based assay shows a gretated linear slope compared to P_2 one. This trends are consistent with the ones observed for the voltammetric sandwich type assay presented in **Figure 3**. The choice of P_3 as bioreceptor provides a higher sensibility to the platform compared to P_2. The error associated to the response of the two platforms expressed as standard deviation has the same order of magnitude for both P_2 and P_3.



c

Type of SPCE	Rs, Ω	Rct, kΩ	Rct PL, kΩ
Bare-SPCE	41.2 ± 2.3	2.10 ± 0.07	-
Strep-SPCE	36.1 ± 0.7	0.25 ± 0.01	0.75 ± 0.05
P3-Strep-SPCE	31.2 ± 1.8	0.27 ± 0.01	1.17 ± 0.07
h-uPA (0.1 µg mL^{-1})	36.4 ± 2.4	0.34 ± 0.01	1.20 ± 0.08

Figure S3. (a) Comparison of the Rct and RctPL values of Strep-SPCE, P3-Strep-SPCE, h-uPA-P3-Strep-SPCE. The values were obtained fitting the Nyquist plots in Figure 4a with the EECs in Figure 4c–e described in the main text. **(b)** Relative variation of Rct PL upon incubation of samples spiked with increasing concentration of h-uPA. **(c)** Summary of the values of all resistance components present in the EECs used to fit the EIS data.

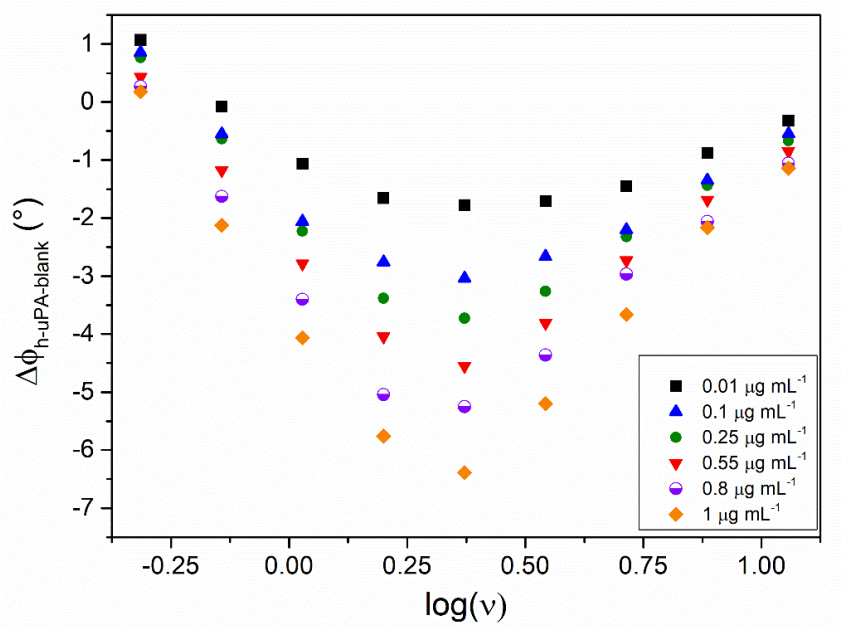


Figure S4. Bode phase peaks, subtracted from the respective blanks, of the 6 h-uPA concentrations tested in the impedimetric P3-based platform.

References

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