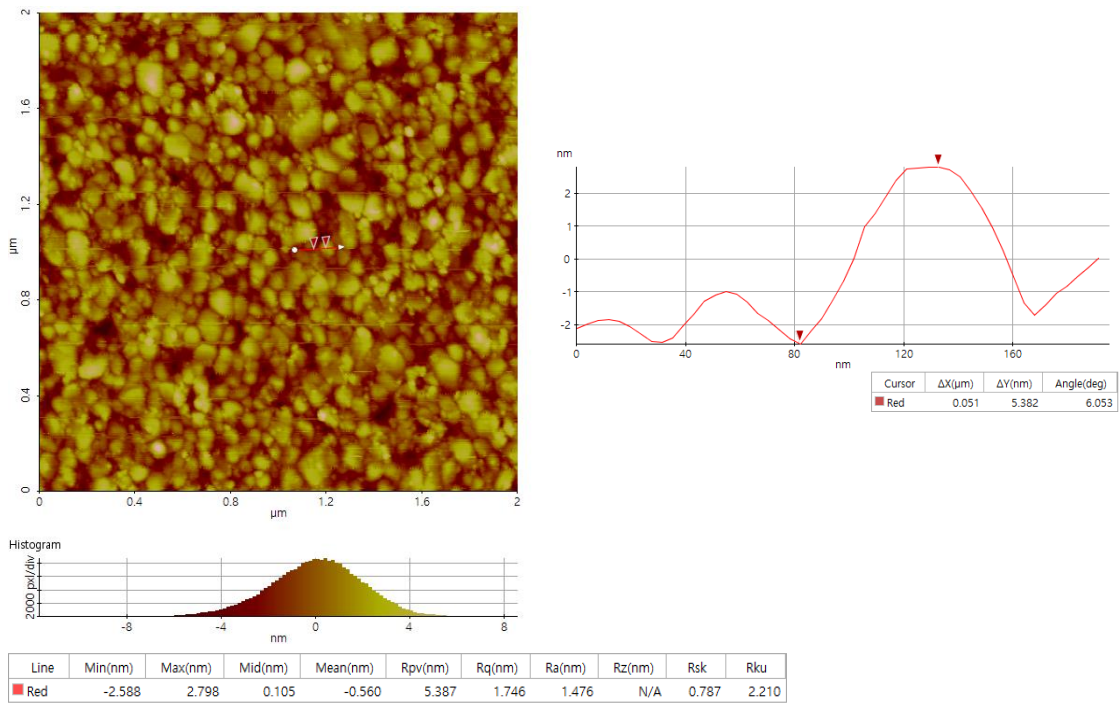


Supporting Information

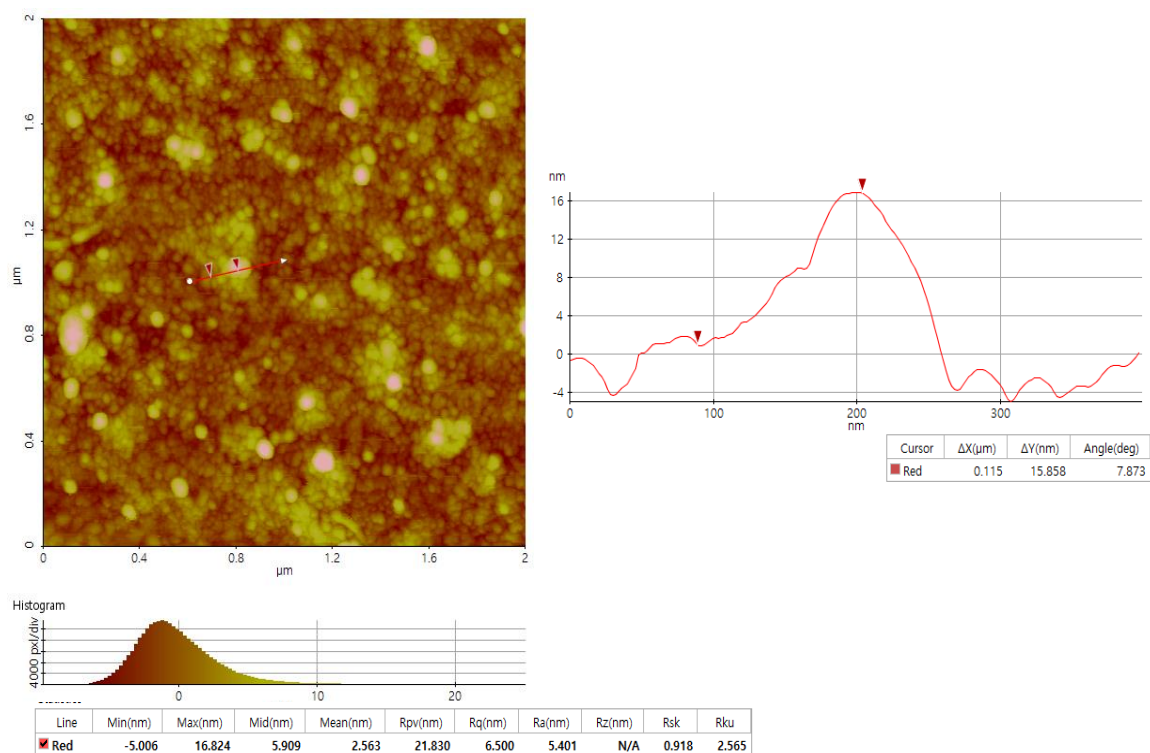
Fabrication of rapid electrical pulse-based biosensor consisted of truncated DNA aptamer for zika virus detection in clinical sample

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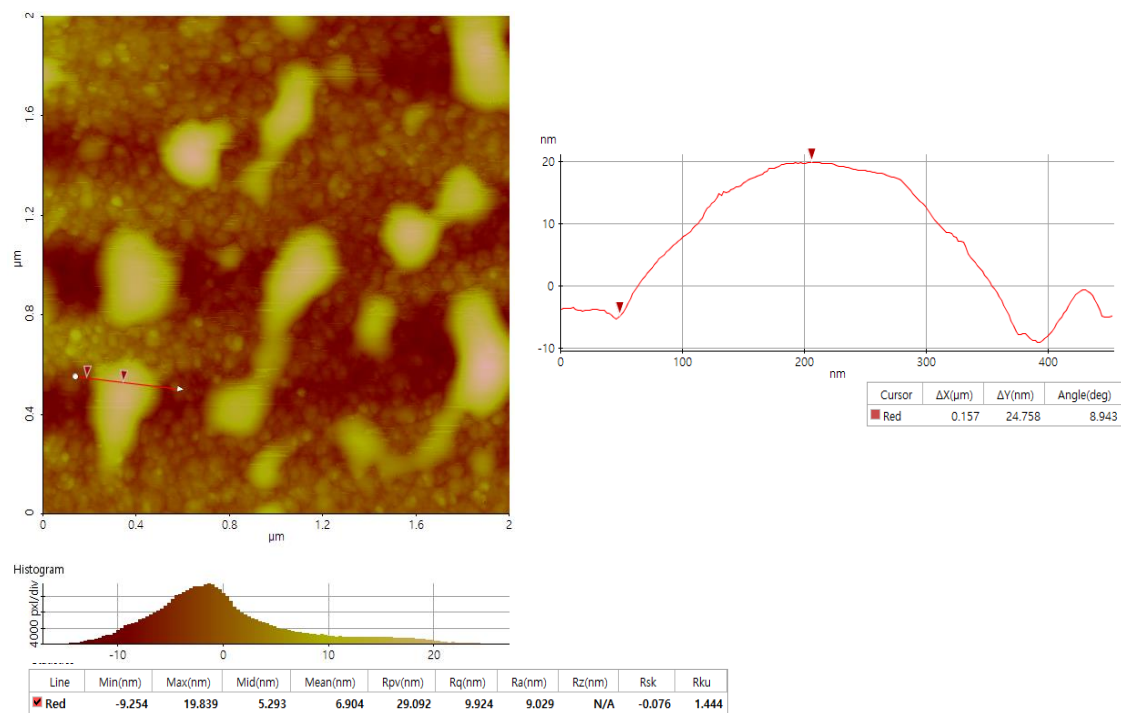
a)



b)



c)



**Figure. S1.** (a) Vertical analysis of Au substrate, (b) Vertical analysis of aptamer on the Au substrate, (c) Vertical analysis of aptamer and Zika envelope conjugate on the Au.

**Table. S1.** Signal change according to drying time after immobilization of truncated aptamer-Zika envelope protein.

Time	0 min	1 min	5 min	10 min	10 min	30 min
Voltage	0.92558 ± 0.02463	0.91969 ± 0.01541	0.91540 ± 0.01609	0.85085 ± 0.01779	0.35643 ± 0.01735	0.33775 ± 0.01779

**Table. S2.** Measured values after 10x cascade dilution to select the optimal truncated aptamer concentration.

Molarity	10 uM	1 uM	100 nM	10 nM	1 nM	100 pM
Voltage	0.60201 ± 0.01849	0.93367 ± 0.02096	0.51256 ± 0.01911	0.46901 ± 0.02328	0.44891 ± 0.02772	0.41206 ± 0.05707

**Table. S3.** The measurements result from various solutions to select the optimal buffer.

Buffer	KCl	NaCl	HEPES	PBS
Voltage	0.91942 ± 0.02463	0.73695 ± 0.01541	0.08174 ± 0.00928	0.03089 ± 0.00506

**Table. S4.** The measurement result of signal change according to the immobilized process of samples in the electrode.

Measurement conditions	Bare	Aptamer	Zika Protein
Voltage	0.99302 ± 0.07119	0.49832 ± 0.00101	0.70537 ± 0.03351

**Table. S5.** The measurement result of ACEF and self-assembly in the immobilization phase of Zika envelope protein at 1uM and 0.1uM concentrations.

immobilization condition	1uM ACEF	0.1uM ACEF	1uM	0.1uM
Voltage	0.91942 ± 0.02463	0.73695 ± 0.01541	0.08174 ± 0.00928	0.03089 ± 0.00506

**Table. S6.** Results of concentration-specific signal measurements of Zika envelope protein diluted in DIW on designed electrodes.

Concentration of Zika envelope protein in DIW	10 pM	100 pM	1 nM	10 nM	100 nM	1 uM
Voltage	0.95273 ±	0.87616 ±	0.80818 ±	0.72197 ±	0.66939 ±	0.60977 ±
	0.06910	0.06604	0.05508	0.04186	0.05986	0.06981

**Table. S7.** Results of concentration-specific signal measurements of Zika envelope protein diluted in 10% human serum on designed electrodes.

Concentration of Zika envelope protein in 10% human serum	10 pM	100 pM	1 nM	10 nM	100 nM	1 uM
Voltage	0.91108 ±	0.85186 ±	0.80819 ±	0.71641 ±	0.63582 ±	0.56750 ±
	0.03324	0.03144	0.04066	0.03632	0.03713	0.02657

**Table. S8.** The measurement result of the selectivity of Zika envelope protein with bio-derived materials and other virus proteins in the designed electrodes.

Types of immobilizing substances	Zika envelope protein	BSA	Fibrinogen	Myoglobin	Hemoglobin	Covid spike protein	Influenza A (H1N1)
Voltage	0.92558 ±	0.40531 ±	0.36075 ±	0.37656 ±	0.39811 ±	0.42585 ±	0.45430 ±
	0.02464	0.01541	0.01736	0.01780	0.01609	0.01614	0.01856