Supplementary Information

Fast and real-time electrical transistor assay for quantifying SARS-CoV-2 neutralizing antibodies

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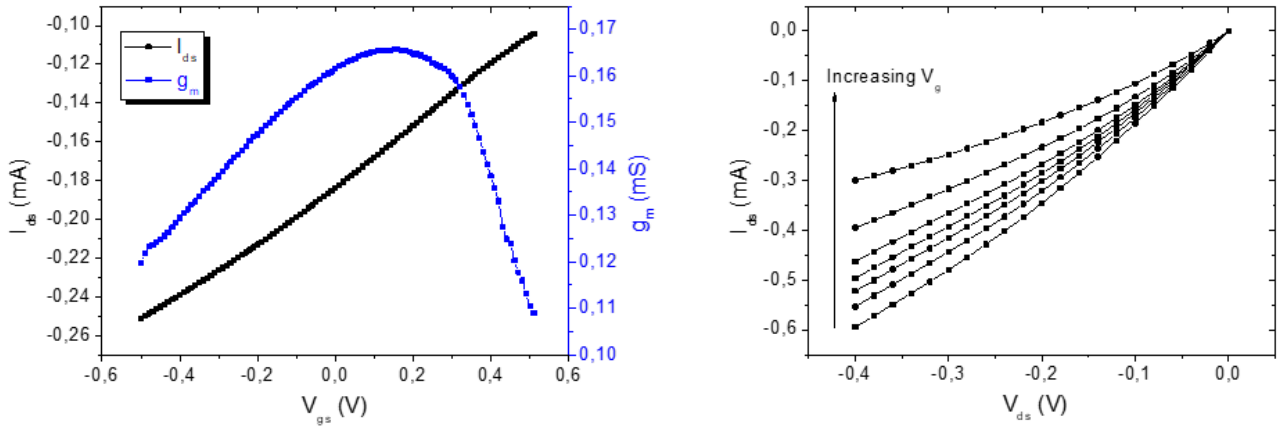
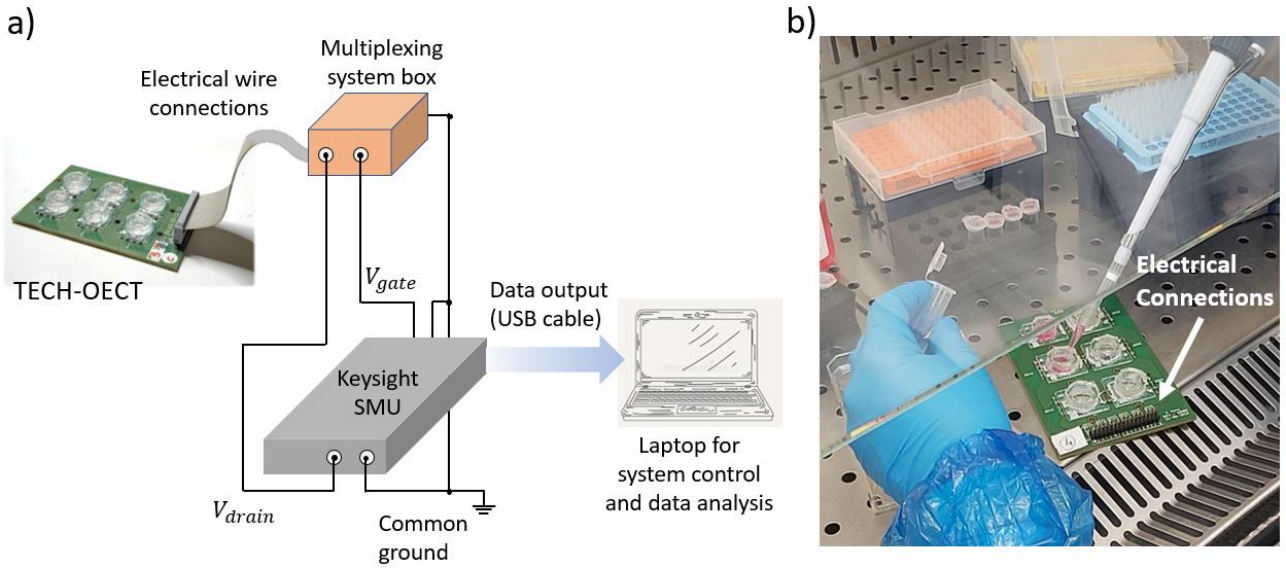


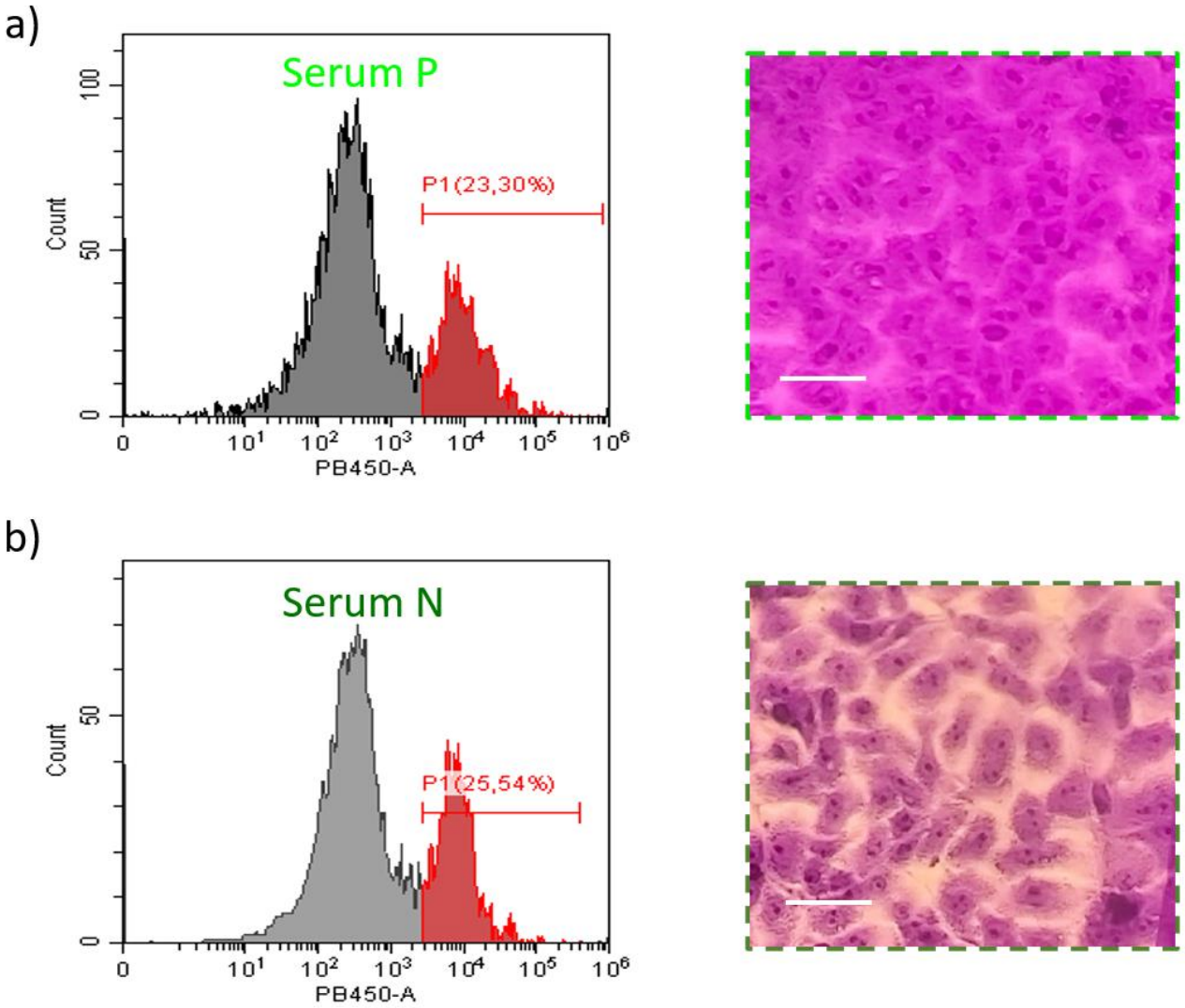
Supplementary Figure 1: OECT electrical characterization. Electrical characterization of the planar, Pedot:Pss-based OECT. a) Transfer (black) and transconductance (blue) for V_d = -0.1V. b) Output curves showing the device current modulation upon the gate voltage ranging from 0V to 0.6V.



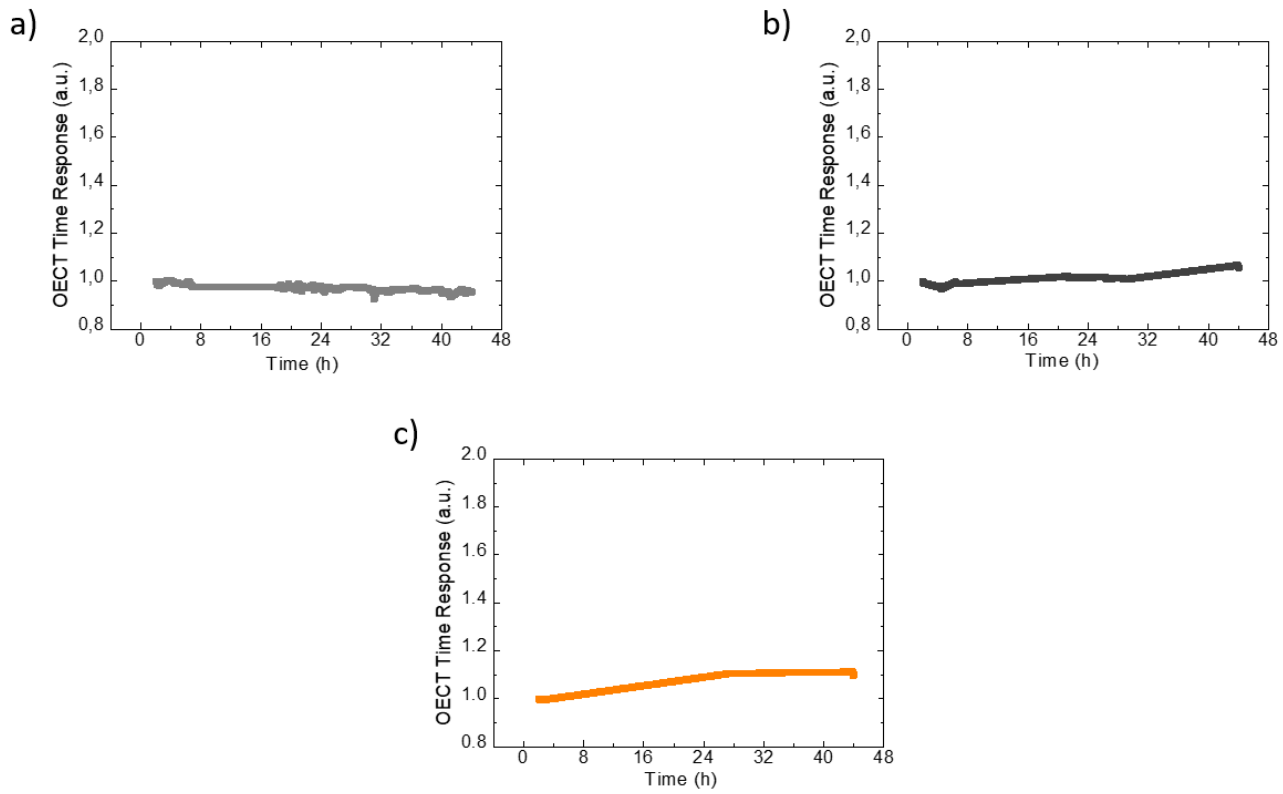
Supplementary Figure 2: Experimental setup and TECH-OECT. a) Schematic representation of the experimental setup and electrical wiring connections. b) TECH-OECT during seeding.

Supplementary Methods

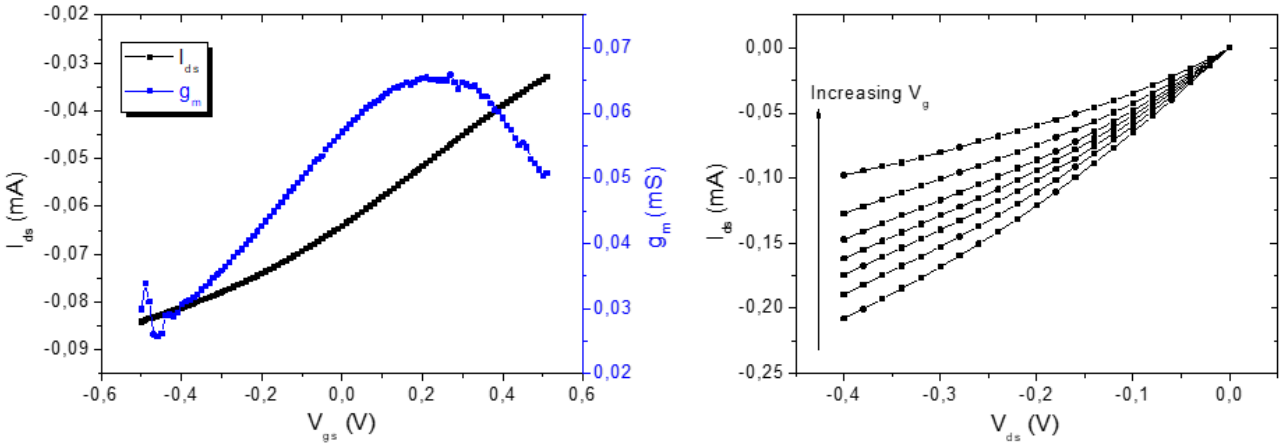
Supplementary Figure 2a shows the schematic circuitry of the electrical connections of the experimental setup. TECH-OECT platform allows for the monitoring of up to 6 cell cultures, placed on three rows. A flat multicable is used as electrical connector, extracting the signal from the OECTs in the incubator towards the multiplexing system, which is controlled by the Keysight Source Meter Unit (SMU) for channel and gate voltage polarization and device selection. All the system has a common ground and is controlled by a PC laptop software, afterwards used for data analysis. Supplementary Figure 2b reports a picture of the TECH-OECT during an experiment: dimensions are similar to standard petri multiwell plates and the wiring with the multicable could be done after the seeding, facilitating operator's work.



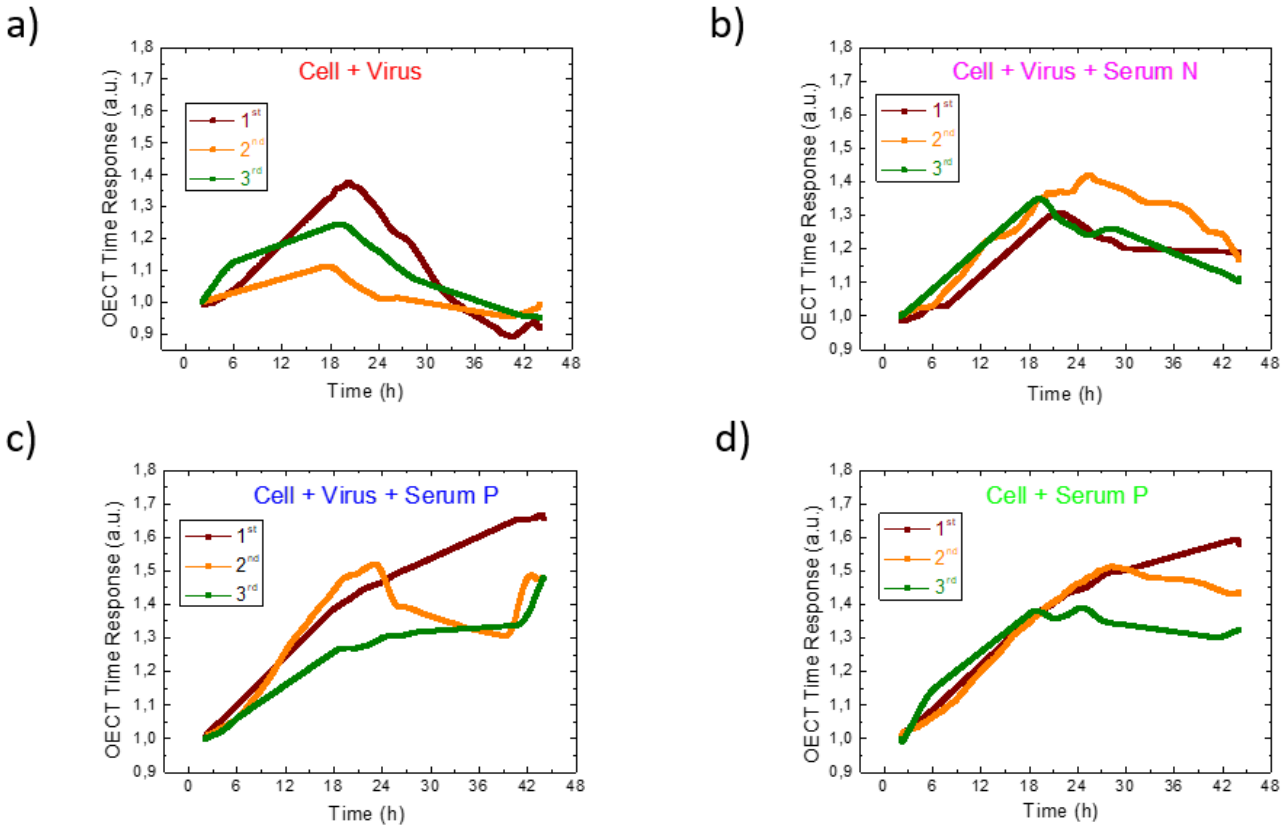
Supplementary Figure 3: Cytofluorimeter and optical images on control experiments. Cytofluorimeter analysis on cell population (left) and optical images on Crystal Violet stained cells, incubated (a) with neutralizing (Serum P) and (b) non-neutralizing antibodies (Serum N). The black histogram corresponds to unstained healthy cells whereas red histogram represents suffering cells characterized by membrane alterations that allow the DAPI to enter. White scale bars in the micrographs of 100 μm.



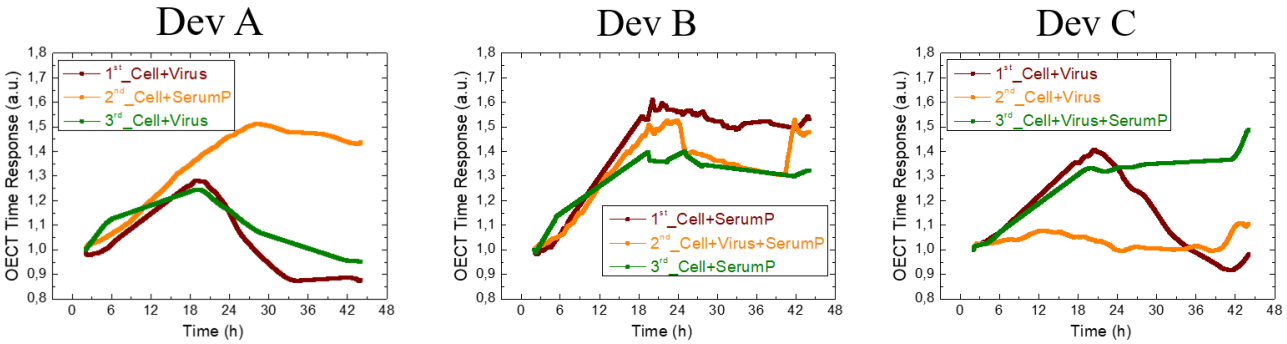
Supplementary Figure 4: Electrical OECT controls. Electrical controls (without cells) of the OECTs incubated with neutralizing (a), non-neutralizing antibodies (b), and infected with Sars-CoV-2. (c).



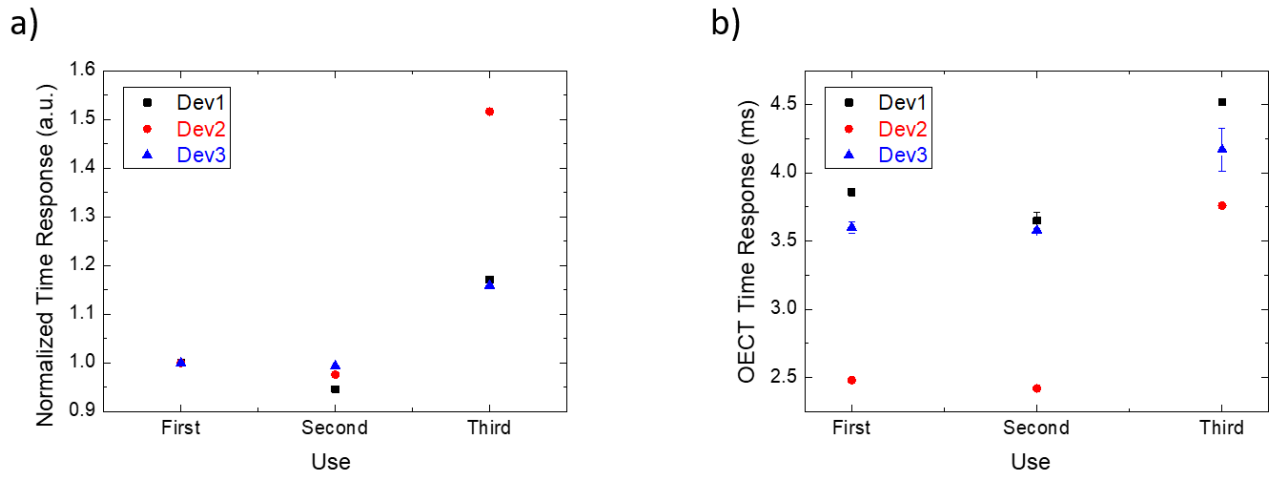
Supplementary Figure 5: OECT electrical characterization after *in-vitro* experiment. Electrical characterization of the OECT device after the *in-vitro* experiment and the revitalization protocol (to detach the cell line). a) Transfer (black) and transconductance (blue) for V_d = -0.1V. b) Output curves showing the device current modulation upon the gate voltage ranging from 0V to 0.6V.



Supplementary Figure 6: Device repeatable response on the defined "incubation mix". Three consecutive repeated measurements over revitalized devices to monitor viral-infected cell lines (a), with non-neutralizing (Serum N) (b) and (c) neutralizing (Serum P) (c) antibodies together with neutralizing serum control (Serum P) (d).



Supplementary Figure 7: Repeatability test on the devices, changing the "incubation mix". Three repeated measurements per device to assess OECT repeatability, switching the "incubation mix" on the same device to increase randomness in the experiment.



Supplementary Figure 8: OECT time response upon re-use. OECT normalized (a) and non-normalized (b) time response before each seeding during the repeatability.