Supplementary material

PEDOT:PSS Microelectrode Arrays for Hippocampal Cell Culture Electrophysiological Recordings

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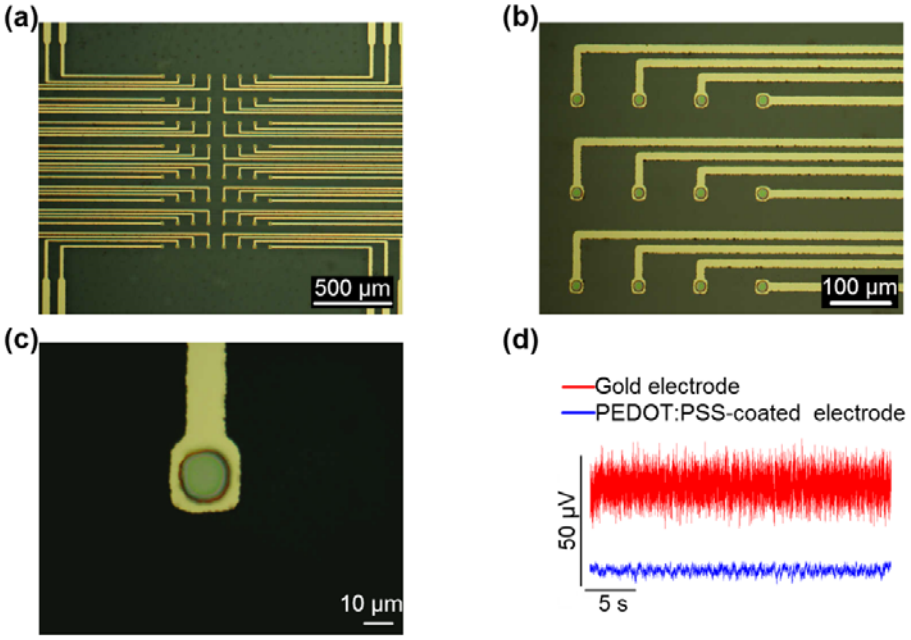

Figure S1. (a) Active area of the PEDOT:PSS-coated MEAs. Each device consists of two separately addressed grids of 32 electrodes. (b) A close-up of a part of the MEA and (c) an isolated 10 µm x 10 µm electrode (nominal dimensions). (d) Noise level of a PEDOT:PSS-coated electrode and a bare gold electrode of the same area (measurements in 0.1 M NaCl solution).

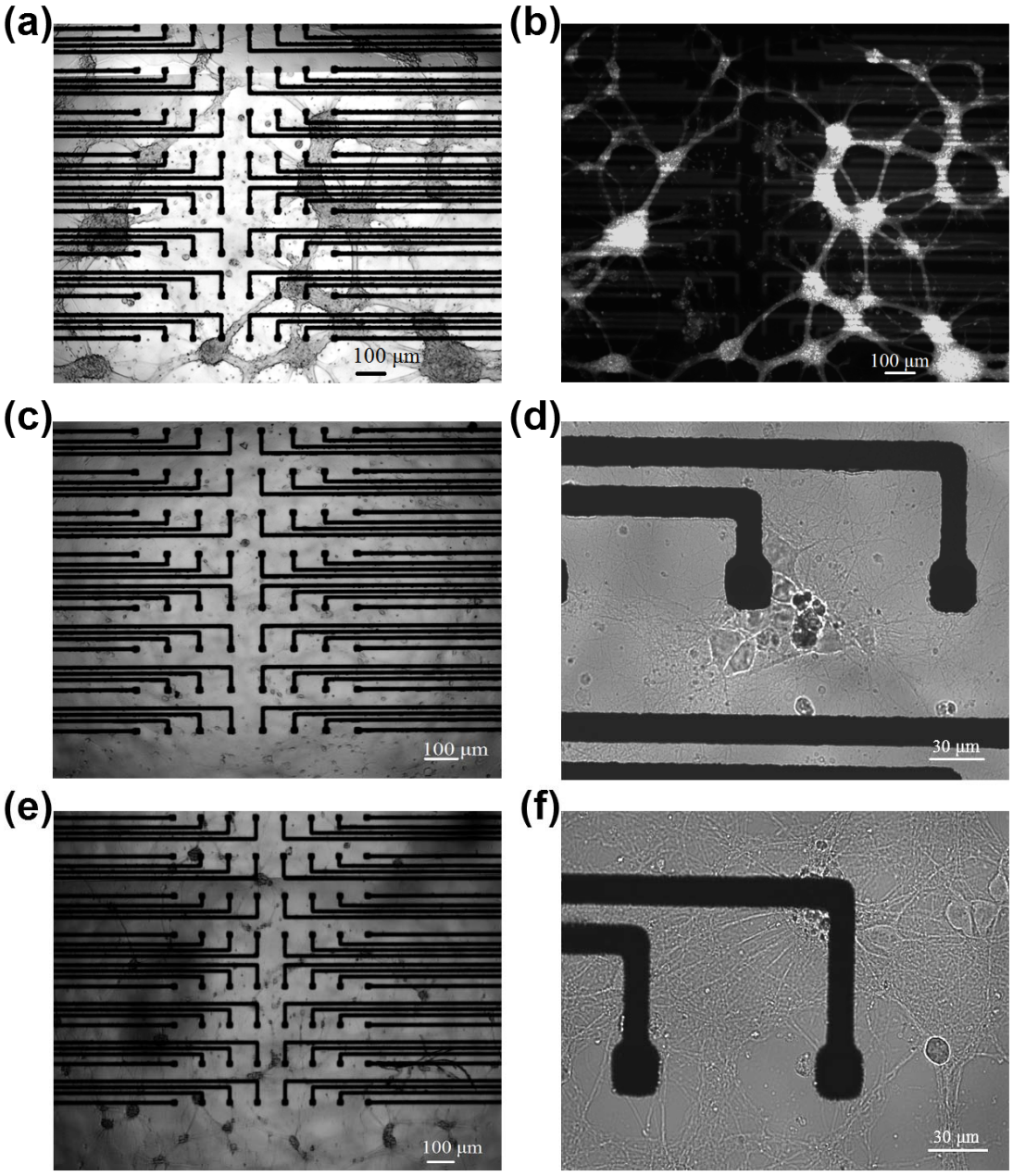

Figure S2. Biocompatibility assessment of the MEAs and the cells cultures used during the experiments. (a) Infrared DIC micrograph of hippocampal cell cultures on a MEA device and (b) a stained micrograph of the same culture (4-Di-2-ASP). (c) The neural cell culture used for the electrophysiological measurements presented in Figure 2d and (d) a close-up of electrode 5 of Figure 2d covered with neurons. (e) The neural cell culture used for the electrophysiological measurements presented in Figure 3 and (f) a close-up of the Figure 3 recording electrode.

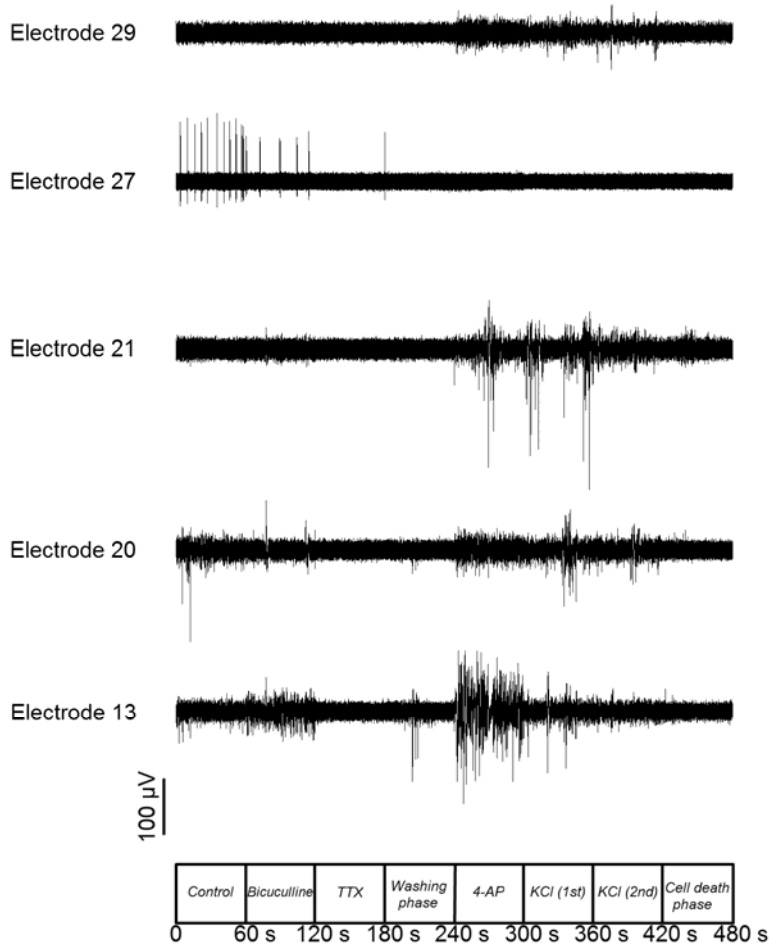

Figure S3. The initial spontaneous (control) firing activity on different channels was increased after bicuculline (4 µM) application (t=60 s) and was blocked in the presence of the neurotoxin TTX (300 nM) (t=120 s). The activity recovered after a washing phase with normal recording solution (t=180 s). Application of 3 µM of 4-Aminopyridine (4-AP) at t=240 s modified the general firing activity as observed from multiple recording sites. KCl solution (first dose 100 µM) also affected the recording activity until its high concentration level (second dose 200 µM) became toxic causing cell death. The toxic effect comes mainly from the influx of a large amount of calcium after prolonged depolarization of the cell membrane.