

Fast-Scan CV

AUTOMATED FAST-SCAN CYCLIC VOLTAMMETRY

Uptake and release of monoamine neurotransmitters from biological cells can be tracked by SECM employing carbon fiber microelectrodes.

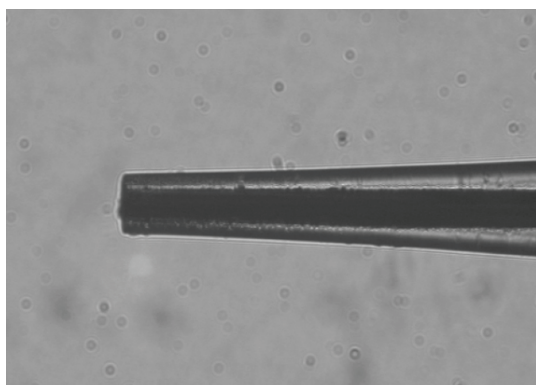


Figure 1:
Carbon fibre microelectrodes with $d = 4.7 \mu\text{m}$ insulated in glass sheath

Detection of Neurotransmitters

The detection of dopamine of defined concentrations between 250 nM and 1 μM was performed using Fast-Scan CV (Fig. 2). The calibration shows linear behavior of peak currents vs. concentration (Fig. 3).

The experimental data were obtained at HEKA Elektronik Dr. Schulze GmbH with an ELP 3 and PG 618 USB.

Electrodes

Carbon fiber microelectrodes ($d = 4.7 \mu\text{m}$) are fabricated by sealing a carbon fiber in a pulled glass microcapillary (Fig. 1). No glue or polymers are used to isolate the fiber. Stable CVs are obtained after mechanical polishing of the surface.

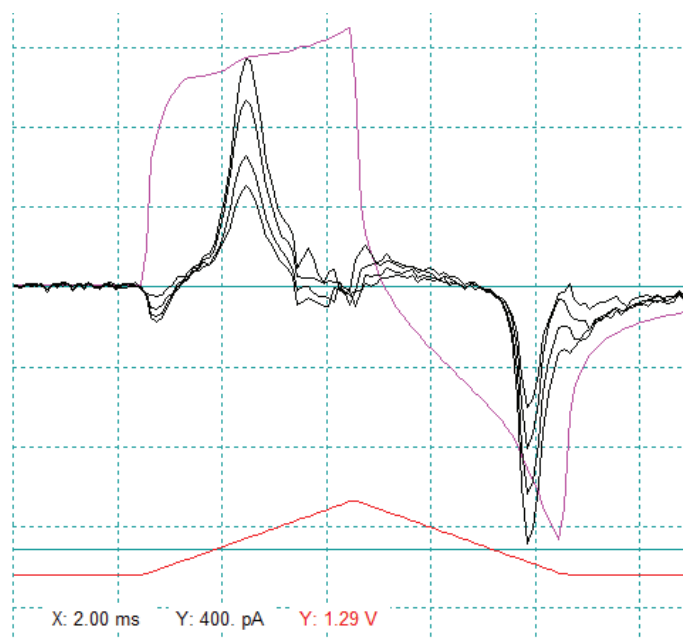
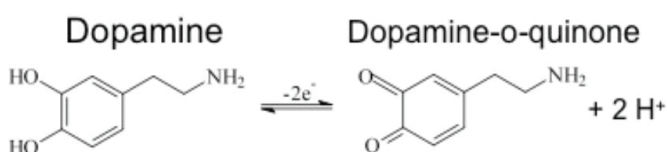


Figure 2:
CVs of dopamine in PBS buffer with background subtraction (black, $v = 300 \text{ V/s}$), subtracted background CV (pink) and potential program (red)



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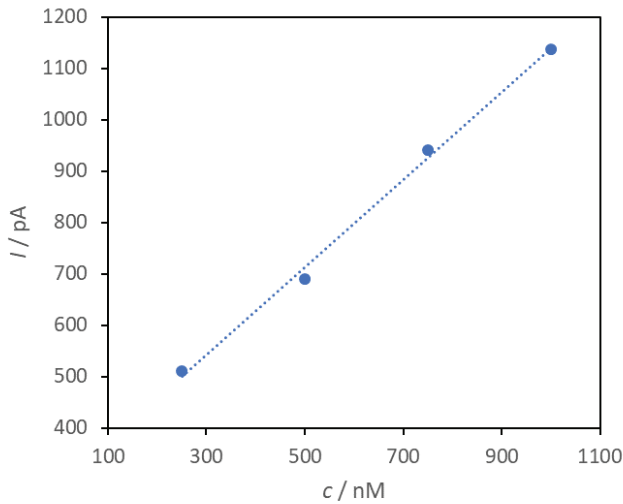


Figure 3:
Calibration of dopamine detection with known concentrations

Fast-scan CV protocol with

- automatic background subtraction
- online analysis
- live view of data
- scan rates up to several hundred Volts/s
- currents down to fA range
- detection in the nM range
- sampling rate of 5 Hz (with live view, faster without)
- easy positioning of microelectrode with 45° oblique imaging system or inverted microscope optics

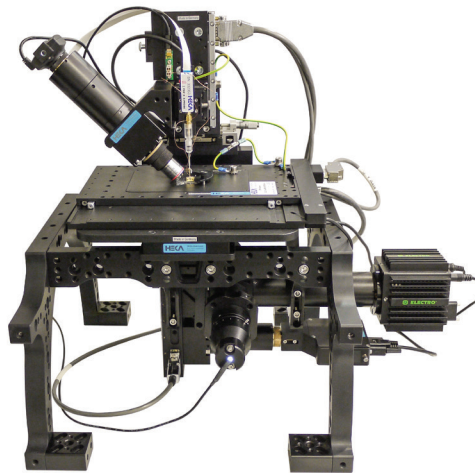


Figure 4:
Multifunctional scanning probe platform with inverted microscope optics for live cell imaging (ELP 3)

PRODUCT INFORMATION

CARBON MICRODISK ELECTRODE, 11 μ 895162
 CARBON MICRODISK ELECTRODE, 4.7 μ 895163
 PG 618 USB 895144
 EPC 10 USB 895277
 MICROELECTRODE POLISHING MACHINE MHK1A 895282