

Technical University of Denmark



## Application of versatile electrochemical sensor in cell culturing

**Bakmand, Tanya; Al Atraktchi, Fatima Al-Zahraa; Svendsen, Winnie Edith**

*Published in:*

Proceedings of the Fourth International Workshop on Analytical Miniaturization and NANOTECHNOLOGIES

*Publication date:*

2014

[Link back to DTU Orbit](#)

*Citation (APA):*

Bakmand, T., Al Atraktchi, F. A-Z., & Svendsen, W. E. (2014). Application of versatile electrochemical sensor in cell culturing. In Proceedings of the Fourth International Workshop on Analytical Miniaturization and NANOTECHNOLOGIES

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Application of versatile electrochemical sensor in cell culturing

Tanya Bakmand\*, Fatima Al-Zahraa Al Atraktchi\* and Winnie E. Svendsen\*

\* Technical University of Denmark (DTU), Department of Micro- and Nanotechnology (Nanotech), Nano Bio Integrated Systems (NaBIS) group

Culturing of organotypic brain tissues is a routine procedure in neural research. The visual inspection of the medium is the only way of determining the state of the tissue. At the end of culturing, post-processing techniques such as HPLC can be used to measure the concentration of the secreted metabolites in the waste products. Continuous measurements would enable improved monitoring as compared to the end-point assay. Here, we developed a sensor system capable of real time measurements of the analytes directly secreted from the tissue. The presented system can be readily integrated in the standard procedures allowing for better assessment of the progress of the culturing.

The sensor system was initially developed for monitoring of brain tissue cultures. However, in order to avoid unnecessary animal sacrifice and to simplify testing of the system a cell line was used in the development.

In this work we present two different designs of the sensor system along with results on characterization and dopamine detection. The detection of dopamine was performed both on spiked solutions and on PC12 cell cultures.

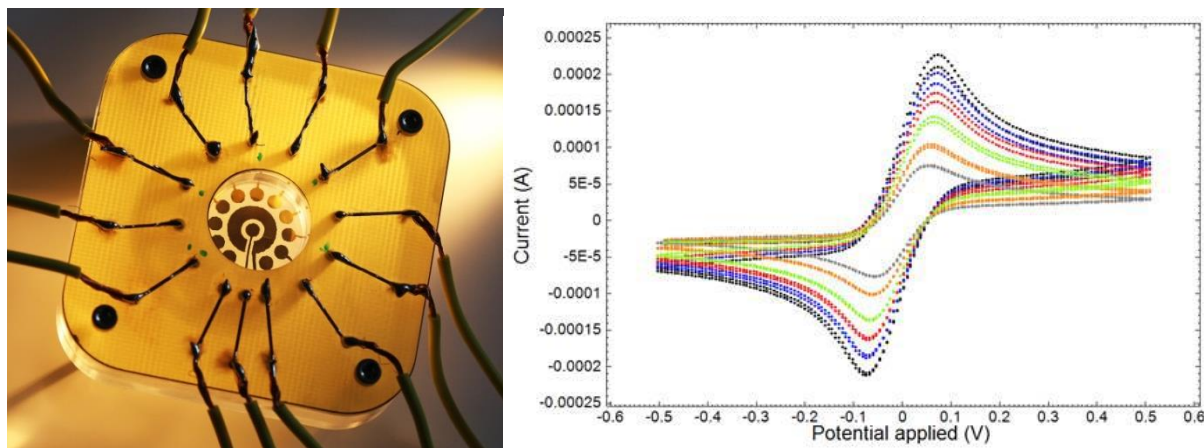


Figure 1. Left: Picture of a sensor prototype interfaced with PCB board. This setup has been used for characterization and analyte detection. Right: CV measurements in 10 mM ferri-ferrocyanide using sweep rates between 0.5 V/s and 0.05 V/s.