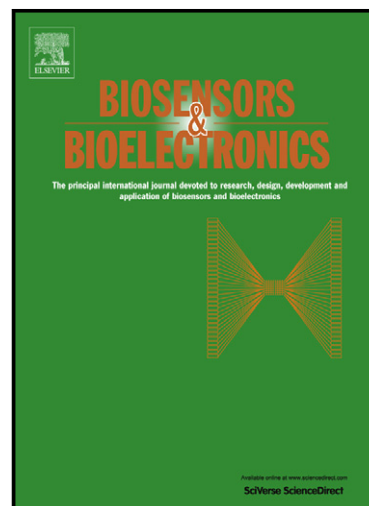


Author's Accepted Manuscript

A robust, state-of-the-art amperometric micro biosensor for glutamate detection

Donatella Sirca, Antonella Vardeu, Milo Pinna, Marco Diana, Paolo Enrico



www.elsevier.com/locate/bios

PII: S0956-5663(14)00321-2
DOI: <http://dx.doi.org/10.1016/j.bios.2014.04.054>
Reference: BIOS6758

To appear in: *Biosensors and Bioelectronics*

Received date: 25 January 2014
Revised date: 10 April 2014
Accepted date: 29 April 2014

Cite this article as: Donatella Sirca, Antonella Vardeu, Milo Pinna, Marco Diana, Paolo Enrico, A robust, state-of-the-art amperometric micro biosensor for glutamate detection, *Biosensors and Bioelectronics*, <http://dx.doi.org/10.1016/j.bios.2014.04.054>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Title: A robust, state-of-the-art amperometric micro biosensor for glutamate detection.

Authors: Donatella Sirca (1), Antonella Vardeu (1), Milo Pinna (1), Marco Diana (2) and Paolo Enrico (1)

Affiliation:

(1) Department of Biomedical Sciences, University of Sassari, Sassari, Italy

(2) "G. Minardi" Laboratory of Cognitive Neuroscience, Department of Chemistry and Pharmacy, University of Sassari, Sassari, Italy

Corresponding author:

Paolo Enrico - Department of Biomedical Sciences, University of Sassari. V.le S. Pietro 43/B, 07100 Sassari, Italy

Abstract:

Scientific knowledge of glutamate (GLU) neurobiology is severely hampered by the inadequacy of the available *in vivo* brain sampling techniques. Due to the crucial role of GLU in central nervous system function and pathology, the development of a reliable sampling device is mandatory. GLU biosensor holds potential to address many of the known issues of *in vivo* GLU measurement. We report here on the development and test of a labor- and cost-effective micro biosensor, suitable to be applied for measuring brain GLU. A glycerol-based cryopreservation method was also tested. Needle type Pt biosensors were coated with a permselective Nafion-Poly(o-phenylenediamine) layer and cross-linked to L-glutamate oxidase with poly(ethylene glycol) diglycidyl ether. Tested *in vitro*, the device shows high sensitivity and specificity for GLU, while being poorly influenced by common interfering substances such as ascorbate, dopamine and dihydroxyphenylacetic acid. Further, the cryopreservation procedure kept sensitivity unaltered for 30 days and possibly longer. We conclude that a highly efficient GLU biosensor of minimal dimensions can be consistently and affordably constructed with relative ease. Together with the possibility of cryopreservation this shall foster diffusion and exploitation of GLU biosensors technology.

Keywords:

Glutamate biosensor, Platinum, Permselective membrane, Amperometry, Cryopreservation.

Download English Version:

<https://daneshyari.com/en/article/7233315>

Download Persian Version:

<https://daneshyari.com/article/7233315>

[Daneshyari.com](https://daneshyari.com)