

Author's Accepted Manuscript

Enzyme-less Electrochemical Displacement
Heterogeneous Immunosensor for Diclofenac
Detection

T.T.K. Nguyen, T.T. Vu, G. Anquetin, H.V. Tran,
S. Reisberg, V. Noël, G. Mattana, Q.V. Nguyen,
Tran Dai Lam, M.C. Pham, B. Piro



PII: S0956-5663(17)30385-8
DOI: <http://dx.doi.org/10.1016/j.bios.2017.06.010>
Reference: BIOS9780

To appear in: *Biosensors and Bioelectronic*

Received date: 1 March 2017
Revised date: 30 May 2017
Accepted date: 1 June 2017

Cite this article as: T.T.K. Nguyen, T.T. Vu, G. Anquetin, H.V. Tran, S. Reisberg, V. Noël, G. Mattana, Q.V. Nguyen, Tran Dai Lam, M.C. Pham and B. Piro, Enzyme-less Electrochemical Displacement Heterogeneous Immunosenso for Diclofenac Detection, *Biosensors and Bioelectronic* <http://dx.doi.org/10.1016/j.bios.2017.06.010>

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 a 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

Enzyme-less Electrochemical Displacement Heterogeneous Immunosensor for Diclofenac Detection

T.T. K. Nguyen^{a,b}, T.T. Vu^b, G. Anquetin^a, H.V. Tran^c, S. Reisberg^a, V. Noël^a, G. Mattana^a, Q.V. Nguyen^b, Tran Dai Lam^{d,e}, M.C. Pham^a, B. Piro^{a*}

^aUniv. Paris Diderot, Sorbonne Paris Cité, ITODYS, UMR 7086 CNRS, 15 rue J-A de Baïf, 75205 Paris Cedex 13, France

^bUSTH – Université des Sciences et Technologies de Hanoi, Nghĩa Đô, Cầu Giấy, Hanoi, Vietnam.

^cDepartment of Inorganic Chemistry, School of Chemical Engineering, Hanoi University of Science and Technology (HUST), 1st Dai Co Viet Road, Hanoi, Vietnam

^dGraduate University of Science and Technology, Vietnam Academy of Science and Technology, 18, Hoang Quoc Viet, Ha Noi, Viet Nam.

^eCenter for High Technology Development, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Ha Noi, Viet Nam

*Corresponding authors: Tel.: +33-1-57277224. piro@univ-paris-diderot.fr

Abstract

We describe an electrochemical immunosensor based on functionalization of a working electrode by electrografting two functional diazonium salts. The first one is a molecular probe, diclofenac, coupled with an arylamine onto which a specific antibody is immobilized by affinity interactions; the second is a redox probe (a quinone) also coupled with an arylamine, able to transduce the hapten-antibody association into a change in electroactivity. The steric hindrance induced by the antibody leads to a current decrease upon binding of the antibody on the grafted molecular probe; conversely, when diclofenac is present in solution, a displacement equilibrium occurs between the target diffusing into the solution and the grafted probe. This leads to dissociation of the antibody from the electrode surface, event which is transduced into a current increase (“signal-on” detection). The detection limit is ca. 20 fM, corresponding to 6 pg L⁻¹ diclofenac, which is competitive compared to other label-free immunosensors. We demonstrate that the sensor is selective and is able to quantify diclofenac in tap water.

Graphical Abstract

Download English Version:

<https://daneshyari.com/en/article/5030988>

Download Persian Version:

<https://daneshyari.com/article/5030988>

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