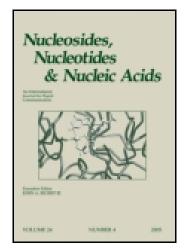
This article was downloaded by: [National Sun Yat-Sen University]

On: 25 December 2014, At: 09:23

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered

office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Nucleosides and Nucleotides

Publication details, including instructions for authors and subscription information:

http://www.tandfonline.com/loi/Incn19

Determination Of 2-Chloro-2'deoxyadenosine (Antileukemic Agent) and Related Compounds by Electrochemical Method

E. Bojarska ^a & Z. Kazimierczuk ^a

^a Department of Biophysics, University of Warsaw, 02-089, Warsaw, Poland

Published online: 04 Oct 2006.

To cite this article: E. Bojarska & Z. Kazimierczuk (1999) Determination Of 2-Chloro-2'-deoxyadenosine (Antileukemic Agent) and Related Compounds by Electrochemical Method, Nucleosides and Nucleotides, 18:4-5, 1073-1074, DOI: 10.1080/15257779908041649

To link to this article: http://dx.doi.org/10.1080/15257779908041649

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at http://www.tandfonline.com/page/terms-and-conditions

DETERMINATION OF 2-CHLORO-2'-DEOXYADENOSINE (ANTILEUKEMIC AGENT) AND RELATED COMPOUNDS BY ELECTROCHEMICAL METHOD

E. Bojarska* and Z. Kazimierczuk

Department of Biophysics, University of Warsaw, 02-089 Warsaw, Poland

ABSTRACT: Electrochemical method for determination of 2-chloro-2'-deoxy-adenosine and related compounds modified in exocyclic 6-NH₂ group is described. Electrochemical detection of investigated compounds, based on the electrooxidation process of the adenine moiety, has been performed in aqueous solutions, in the pH range 2-9, on a glassy carbon electrode

Characterization of any therapeutic agents for use both research and clinical programs is essential for the pharmaceutical and medical applications. A particularly important aspects of the chemical characterization of new drugs include the identification of various byproducts and structurally related derivatives of investigated therapeutic agents. All techniques that can provide informations without complicated step of preparations are particularly valuable for medical applications.

The objective of this work was to develop an electrochemical method for determination of 2-chloro-2'-deoxyadenosine (2CldAdo, Cladribine) and related compounds modified in exocyclic 6-NH₂ group: 2-chloro-9-(2'-deoxy-β-D-erythro-pentofuranosyl)-6[(hydroxyethyl)amino]-9H-purine, 2-chloro-9-(2'deoxy-β-D-pento-furanosyl)-6-methoxypurine and 2-chloro-6-(cyclohexyloamino)-9-(2'deoxy-β-D-erythro-pentofuranosyl)-9H-purine. 2CldAdo is an adenosine-deaminase resistant nucleoside widely used for the treatment of lymphoid and autoimmunoaggressive diseases ^{1,2}. The investigated 2CldAdo analogs substituted at the exocyclic amino group exhibited cytotoxic activity against leukemia cell lines³ and were also substrates for the *E. coli* PNP⁴.

2CldAdo and its analogs were synthesized by Dr Z. Kazimierczuk³. Electrochemical analysis, differential pulse voltammetry (DPV) was conducted with Autolab Electrochemical Analyzer (Eco-Chemie, Netherlands). Electrochemical detection of 2-chlorosubstituted purine nucleosides, based on the electrooxidation process of the adenine moiety, has been performed in aqueous buffer solutions in the pH range 2-9, on a glassy-carbon electrode, in acetate, phosphate and carbonate buffers.

All investigated deoxynucleosides undergo electrochemical oxidation with formation one, pH dependent peak. Direct electrochemical analysis of these compounds provides limits of detection at 1 µM, because oxidation peaks appeare close to the background discharge, due to the strong adsorption on the surface of the electrode. Acid catalyzed hydrolysis of all compounds (1M acetic acid, pH 2.3), lead to the formation of respective bases⁵ (2-chloroadenines), which undergo electrochemical oxidation at potentials about 200 mV less positive in comparison with investigated nucleosides. This makes the electrochemical analysis more sensitive detecting (100 nM).

The electrochemical method can be applied for monitoring concentration of Cladribine in human plasma during the treatment and for detection of 2CldAdo degradation products.

Acknowledgments.

This work was supported by the Committee of Scientific Research, KBN project 4P05F 027 12

REFERENCES

- 1. Bryson, H.M.; Sorkin, E.M. Drugs, 1993, 46, 872-894
- Sipe, J.C; Romine, J.S.; Koziol, J.A.; McMillian R.; Beutler, E. Lancet, 1994, 344, 9-13
- 3. Kazimierczuk, Z.; Vilpo, J.A.; Seela, F. Helv. Chim. Acta, 1992, 75, 2289-2294
- 4. Bzowska, A.; Kazimierczuk, Z. Eur. J. Bioch., 1995, 233, 886-890
- Terasiuk, A.; Skierski, J.; Kazimierczuk, Z. Arch. Immmun. Ther. Exp., 1994, 42, 13-15