

This article was downloaded by:

On: 27 January 2011

Access details: *Access Details: Free Access*

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, Nucleotides and Nucleic Acids

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713597286>

Selective Deuteration Labelling of 2'-Deoxyguanosine at the Carbon C-4' Position

M. Berger^a; J. Cadet^a

^a Laboratoires de Chimie, Département de Recherche Fondamentale, Centre d'Etudes Nucléaires de Grenoble, Grenoble, CEDEX

To cite this Article Berger, M. and Cadet, J.(1985) 'Selective Deuteration Labelling of 2'-Deoxyguanosine at the Carbon C-4' Position', *Nucleosides, Nucleotides and Nucleic Acids*, 4: 1, 287

To link to this Article: DOI: 10.1080/07328318508077892

URL: <http://dx.doi.org/10.1080/07328318508077892>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

SELECTIVE DEUTERATION LABELLING OF 2'-DEOXYGUANOSINE
AT THE CARBON C-4' POSITION

M. Berger and J. Cadet*

Laboratoires de Chimie, Département de Recherche Fondamentale,
Centre d'Etudes Nucléaires de Grenoble, 85X, F-38041 GRENOBLE CEDEX

Selective incorporation of deuterium within the sugar moiety of nucleosides and oligonucleotides can be used for different purposes including isotopic effect determination in mechanistic studies, mass spectrometry fragmentation investigations, nuclear magnetic resonance analyses. We wish to report a simple method which allows the selective deuteration labelling of 2'-deoxyguanosine at the C-4' position through the intermediary of 9-(2-deoxy- β -D-erythropento-1,5-dialdo-1,4-furanosyl)guanine. Heating of aqueous pyridine solution [1:1] of 2'-deoxyguanosine-5'-aldehyde for 1 hr at 60°C leads to a partial epimerisation of carbon C-4' with subsequent formation of 9-(2-deoxy- α -L-threopento-1,5-dialdo-1,4-furanosyl)guanine in 40% yield. A likely intermediate of this reaction appears to be a 5'-enol derivative. Similar treatment of 2'-deoxyguanosine-5'-aldehyde in D₂O-pyridine [1-1] gives after NaBH₄ reduction 60% of 2'-deoxyguanosine which is selectively deuterated at the C-4' position. The extent of the isotopic labelling was up to 95% as determined by high resolution electron impact mass spectrometry and ¹H NMR analyses. Heating of the aqueous pyridine solution of 2'-deoxyguanosine-5'-aldehyde for a longer period (3-4 hrs) gave rise to two other nucleosides which were assigned as 9-(2-deoxy- β -D-threo-pentofuranosyl)guanine and 9-(2-deoxy- α -L-erythro-pentofuranosyl)guanine. A retro-aldol mechanism appears to be involved in the epimerization reaction which takes place at carbon C-3'.