

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>

## Synthesis and Properties of Symmetrically Linked Diribonucleotides

M. Nemer<sup>a</sup>; N. Thériault<sup>b</sup>; A. Schiffman<sup>c</sup>; K. K. Ogilvie<sup>c</sup>

<sup>a</sup> Department of chemistry, McGill University, Canada <sup>b</sup> Institut de Recherches Cliniques de Montréal, Canada <sup>c</sup> Biopolymer Chemistry, The Upjohn Company, U.S.A.

**To cite this Article** Nemer, M. , Thériault, N. , Schiffman, A. and Ogilvie, K. K. (1985) 'Synthesis and Properties of Symmetrically Linked Diribonucleotides', *Nucleosides, Nucleotides and Nucleic Acids*, 4: 1, 257 — 258

**To link to this Article:** DOI: 10.1080/07328318508077878

**URL:** <http://dx.doi.org/10.1080/07328318508077878>

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.

# SYNTHESIS AND PROPERTIES OF SYMMETRICALLY LINKED DIRIBONUCLEOTIDES

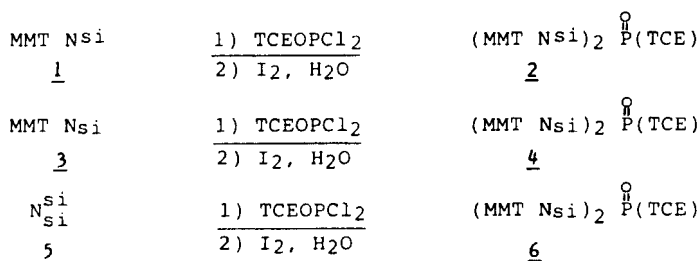
M. Nemer<sup>1</sup>, N. Thériault<sup>2</sup>, A. Schifman and K.K. Ogilvie\*

Department of chemistry, McGill University, Montréal, QC, Canada H3A 2K6

**Summary.** Several symmetrically linked (3'-3', 2'-2' and 5'-5') diribonucleoside monophosphates were prepared using the phosphodichloridite procedure. The 3'-3' and 2'-2' dimers showed unusual lability towards both acid and base due to the two hydroxyls adjacent to the phosphate moiety.

Ribonucleotides possessing 3'-5' or 2'-5' phosphate linkages have been widely synthesized and their properties are well documented. Little is known about symmetrically linked oligoribonucleotides especially 3'-3' and 2'-2' dimers. We present here a complete investigation of the synthesis and properties of symmetrically linked ribonucleotides.

Symmetrically linked dinucleotides were prepared by a simple two step reaction that involved adding a one fold excess of the suitably protected nucleoside to the trichloroethylphosphodichloridite followed by iodine-water oxidation as illustrated below:



a; N = uridine

b; N = adenosine

c; N = N benzoyl cytosine

The fully protected dimers 2, 4 and 6 were purified on silica gel chromatography. Their physical properties were very different from those of their 2'-5' and 3'-5' counterparts. Their <sup>31</sup>P nmr spectra showed only one peak as a result of the loss of chirality at the phosphorus atom.

The deprotection of the 5'-5' linked dimers proceeded smoothly to give the expected products which were good substrates for snake venom phosphodiesterase but were resistant to ribonuclease (Rnase) and spleen phosphodiesterase. On the other hand some problems were encountered in the deprotection of the 3'-3' and 2'-2' dimers which are readily degraded in slightly alkaline conditions presumably because of the two hydroxyls adjacent to the phosphate linkage. Neither 3'-3' nor 2'-2' linked dimers

were substrates for Rnase A<sub>1</sub>, Rnase T<sub>2</sub> and snake phosphodiesterase ; they were at best poor substrates for spleen phosphodiesterase.

Acknowledgement

This work was supported by the National Research Council of Canada (NSERC) and its presentation was made possible through a travel grant from the Quebec Ministry of Science and Technology, to M.N.

- 1 - Present address : Institut de Recherches Cliniques de Montréal, 110, Avenue des Pins Ouest, Montréal, QC, Canada, H2W IR7.
- 2 - Present address : Biopolymer Chemistry, The Upjohn Company, Kalamazoo, Mi, U.S.A. 49001.