



**HAL**  
open science

## New Polyamines Phosphoramidate Vectors for Gene Therapy

Mathieu Mével, François Lamarche, Jean-Claude Clément, Pascal Laurent, Jean-Jacques Yaouanc, Laure Burel-Deschamps, Philippe Giamarchi, Tristan Montier, Pascal Delépine, Pierre Lehn, et al.

► **To cite this version:**

Mathieu Mével, François Lamarche, Jean-Claude Clément, Pascal Laurent, Jean-Jacques Yaouanc, et al.. New Polyamines Phosphoramidate Vectors for Gene Therapy. Phosphorus, Sulfur, and Silicon and the Related Elements, 2008, 183 (2-3), pp.623 - 624. 10.1080/10426500701793303 . hal-01580437

**HAL Id: hal-01580437**

**<https://hal.univ-brest.fr/hal-01580437>**

Submitted on 20 Jun 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## **New Polyamines Phosphoramidate Vectors for Gene Therapy**

**Mathieu Mével,<sup>1</sup> François Lamarche,<sup>1</sup> Jean-claude Clément,<sup>1</sup> Pascale Laurent,<sup>1</sup> Jean-jacques Yaouanc,<sup>1</sup> Laure Burel,<sup>1</sup> Philippe Giamarchi,<sup>1</sup> Tristan Montier,<sup>2</sup> Pascal Delépine,<sup>2</sup> Pierre Lehn,<sup>2</sup> Paul-Alain Jaffrès,<sup>1</sup> and Claude Férec<sup>2</sup>**

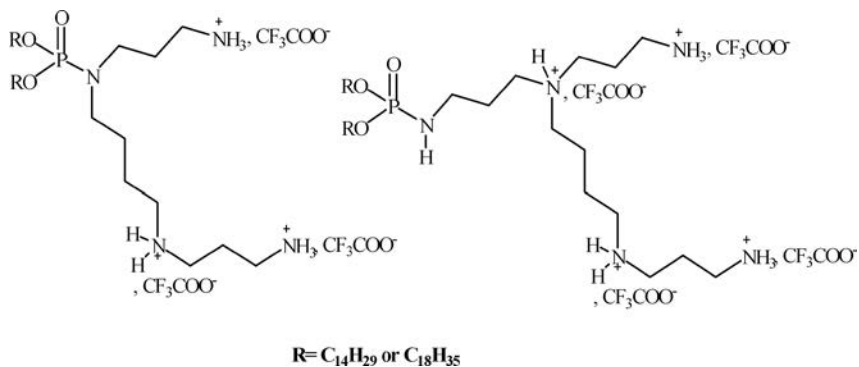
<sup>1</sup>CEMCA, UMR CNRS 6521, Faculté des Sciences et Techniques, Université de Bretagne Occidentale, Brest, France;

<sup>2</sup>Unité INSERM 613, Institut de Synergie des Sciences et de la Santé, Université de Bretagne Occidentale, Brest cedex 2, France

**Keywords** Cationic lipid; phosphoramidate; polyamine; transfection

DNA delivery into cells can be achieved by using synthetic vectors that compact DNA forming a cationic lipoplex that can interact with cell membrane by electrostatic interactions. The next step will consist to liberate the plasmid DNA into the cytoplasm followed by its migration up to perinuclear region and finally across the nuclear membrane. Finally, it migrates to the nucleus where it penetrates via the nuclear pores or during the mitosis. The chemical structure of the synthetic vectors can be classified into two categories: cationic polymers (PEI . . .) and cationic lipids. In our group, cationic lipids possessing structure inspired from phospholipids present in membranes have been synthesized and tested for in vivo and in vitro essays.<sup>1,2,3</sup> Of note, many cationic polymers (e.g., PEI) or cationic lipids (DOGS, DPPEs, DOSPA), identified by their transfection efficiency, are characterized by the presence of several amino functional groups on their backbone. We attempt the synthesis of cationic lipids having a phosphoramidate lipidic moiety and a polyamino polar headgroup. For this study, the polar headgroup is formed by the spermine as depicted below.

Address correspondence to Mathieu Mével CEMCA, UMR CNRS 6521, Faculté des Sciences et Techniques, Université de Bretagne Occidentale, 6 avenue Le Gorgeu, 29238 Brest, France. E-mail: mathieu.mével@univ-brest.fr



## REFERENCES

- [1] J. C. Clément, P. Delépine, H des Abbayes, C. Férec, K. Le Ny, T. Montier, and J. J. Yaouanc, French patent N°0214044 (2002), PCT N° FR0350116 (2003).
- [2] T. Montier, P. Delépine, K. Le Ny, F. Blanc, Y. Fichou, M. Le Bris, D. Gillet, E. Picquet, J.C. Clément, J.J. Yaouanc, H des Abbayes, and C. Férec, *Recent Res. Dev. Chem.*, **1**, 41 (2003).
- [3] T. Montier, P. Delépine, K. Le Ny, Y. Fichou, M. Le Bris, E. Hardy, E. Picquet, J.C. Clément, J.J. Yaouanc, and C. Férec, *Biochimica et Biophysica Acta*, **1665**, 118 (2004).