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New Polyamines Phosphoramidate Vectors for Gene Therapy

**Mathieu Mével,¹ François Lamarche,¹ Jean-claude
Clément,¹ Pascale Laurent,¹ Jean-jacques Yaouanc,¹
Laure Burel,¹ Philippe Giamarchi,¹ Tristan Montier,²
Pascal Delépine,² Pierre Lehn,² Paul-Alain Jaffrès,¹
and Claude Férec²**

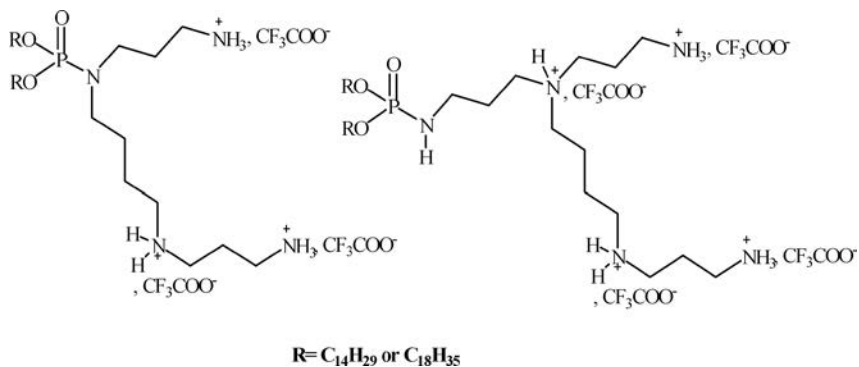
¹CEMCA, UMR CNRS 6521, Faculté des Sciences et Techniques,
Université de Bretagne Occidentale, Brest, France;

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

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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.^{1,2,3} 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).