New fluorescent probes for neurotransmitters detection

Nicolas Fantozzi[1], Emilie Genin[1], Sara Lefevre[2], Alexandre Martinez[3], Rémi Pétuya[4], Didier Bégué[4], Sandra Pinet[1], Isabelle Gosse[1]

[1] *Institut des Sciences Moléculaires UMR CNRS 5255, Université de Bordeaux, Bâtiment A12, 351 cours de la libération, 33405 Talence cedex, France*

[2] *Laboratoire de Chimie, UMR CNRS 5255, Ecole Normale Supérieure de Lyon, UCBL, 46, Allée d'Italie, 69364 Lyon (France)*

[3] *Aix Marseille Université, Centrale Marseille, CNRS, iSm2 UMR 7313, 13397 Marseille, France*

[4]*Institut des Sciences Analytiques et de Physico-Chimie pour l'Environnement et les Matériaux, UMR CNRS 5254, Université de Pau et des Pays de l'Adour, Hélioparc, 2 Av. du Pt. P. Angot, 64053 Pau Cedex 9, France*

E-mail : nicolas.fantozzi@u-bordeaux.fr

Neurodegenerative diseases like Alzheimer, Parkinson or Huntington are related to an imbalance of neurotransmitters. Nevertheless, the sources of this neuronal communication disorder are not well-understood to date. This is mainly due to the lack of tools allowing real-time and real-space monitoring of neurotransmitters, in biological systems. Thus, it is extremely important to develop such tools for the imaging of neurotransmitters and more particularly fluorescent supramolecular probes.

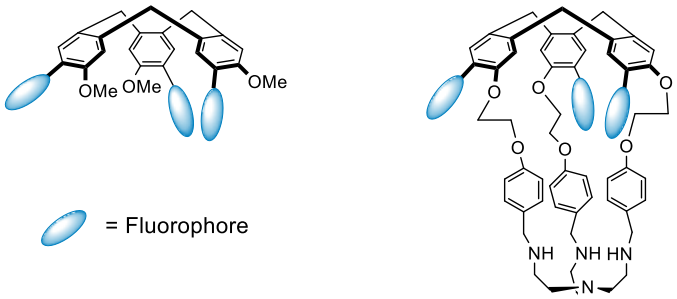

Figure 1. a) Cyclotriveratrylene with fluorescent arms, b) Hemicryptophane with tren pattern[1]

In a previous study carried out in our groups, fluorescent probes having a cyclotriveratrylene skeleton, able to recognize efficiently acetylcholine (ACh) and dopamine in buffer aqueous solution (pH 7.4), have been synthesized.[2] Some of them were able to discriminate between neurotransmitters, in particular between ACh and choline which is highly interesting since choline is both the precursor and the metabolite of the ACh. However, these molecules do not respect all the criteria needed for imaging in biological conditions. Indeed, they are excitable at low excitation wavelength and their complexation constants need to be increased. In this communication, we will present the recent results we obtained with

new fluorescent probes based on cyclotriveratrylene and hemicryptophane derivatives.[3] Fig. 1.[4] In particular their synthesis, fluorescence and recognition properties will be presented. In solution, binding phenomena will be explained thanks to reactive molecular dynamics simulations.

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