

CiQUS Lecture



Prof. Ivan Huc
Aromatic foldamers: engineering molecular shape

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

The Ivan Huc Group
Aromatic
Supramolecular
Chemistry

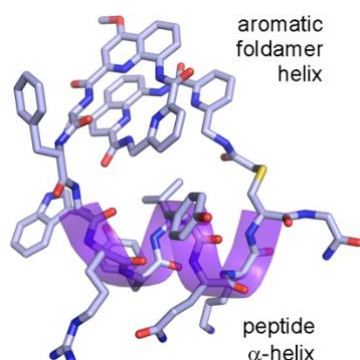
FONDO EUROPEO DE DESENVOLVEMENTO REGIONAL
PO FEDER Galicia 2014-202 - *Unha maneira de facer Europa*

Thursday, May 25, 2023
12:15 p.m. - CiQUS Seminar Room

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Abstract:



Aromatic oligomers constitute a distinct and promising class of synthetic foldamers – oligomers that adopt stable folded conformations. Single helical structures are, to a large extent, predictable, show unprecedented conformational stability in essentially all solvents, and represent convenient building blocks to elaborate synthetic, very large (protein-sized) folded architectures. Cavities can be designed within such synthetic molecules that enable them to act as artificial receptors and molecular motors. This lecture will give an overview of our current efforts to design and select aromatic foldamers and foldamer-peptide hybrids to recognize protein surfaces.[1-3] It will also

highlight the benefits of foldamer macrocyclization to access to otherwise improbable molecular shapes[4-6] and showcase key methodologies, e.g. solid phase synthesis, crystallogenes, and single crystal x-ray diffraction.

Figure 1. Structure of a foldamer-peptide hybrid in its conformation bound to a protein target.

References

- [1] J. M. Rogers, S. Kwon, S. J. Dawson, P. K. Mandal, H. Suga & I. Huc., Nat. Chem. 2018, 10, 405.
- [2] C. Tsiamantas, S. Kwon, J. M. Rogers, C. Douat, I. Huc & H. Suga, Angew. Chem. Int. Ed. 2020, 59, 4860.
- [3] S. Dengler, R. Howard, V. Morozov, C. Tsiamantas, Z. Liu, C. Dobrzanski, V. Pophristic, S. Brameyer, C. Douat, H. Suga & I. Huc [pre-publication on ChemRxiv 2022. DOI:10.26434/chemrxiv-2022-5rlmv]
- [4] K. Urushibara, Y. Ferrand, Z. Liu, K. Katagiri, M. Kawahata, E. Morvan, R. D'Elia, V. Pophristic, A. Tanatani & I. Huc, Chem. Eur. J. 2021, 27, 11205.

[5] S. Dengler, P. K. Mandal, L. Allmendinger, C. Douat & I. Huc, Chem. Sci. 2021, 12, 11004.

[6] C. G. Pappas, P. K. Mandal, B. Liu, B. Kauffmann, X. Miao, D. Komáromy, W. Hoffmann, C. Manz, R. Chang, K. Liu, K. Pagel, I. Huc & S. Otto, Nat. Chem. 2020, 12, 1180.

Biosketch:

- 2017 W3 Professor, Department of Pharmacy, Ludwig-Maximilians-University, Munich, Germany
- 2010-2017 Co-director of the Institute of Chemistry and Biology of Membranes and Nanoobjects, UMR 5248 CBMN, Bordeaux, France
- 2008-2017 Co-director of the European Institute of Chemistry and Biology (IECB), Bordeaux, France
- 1998-2017 Group Leader (CR, then DR CNRS) at the European Institute for Chemistry and Biology, Bordeaux, France
- 1999 Habilitation Diploma
- 1995-98 Research Associate (CR CNRS), Université Louis Pasteur de Strasbourg (France), working with Prof. J.-M. Lehn on combinatorial aspects of supramolecular chemistry.
- 1994-95 Post-Doctoral Fellow, Université Louis Pasteur de Strasbourg (France), working with Dr. J.-P. Behr on the recognition of DNA sequences by strand replacement using polyamino-oligonucleotides.
- 1990-94 PhD Thesis, jointly at the Massachusetts Institute of Technology, Cambridge (USA), and at the Ecole Normale Supérieure in Paris, working with Prof. J. Rebek Jr. (MIT), and Dr. C. Rolando (ENS) on the synthesis and study of organic enzyme mimics.
- 1990 B.Sc., chemistry, at the Ecole Normale Supérieure, Paris, France

Selected awards and lectureships:

2021 Izatt-Christensen award in macrocyclic and supramolecular chemistry

2017 Schulich Guest Professor, Technion-Israel Institute of Technology

2015 Great Prize "Mme Victor Noury" from the French Academy of Sciences

2015 Werdelmann Lectureship, Univ. Duisburg-Essen, Germany

2015 Glasser Visiting Professor, Univ. of the Sciences, Philadelphia, USA

2014 Junior Distinguished member of the French Chemical Society

2012 FP7-ERC Advanced Investigator Grant, European Union

2012 Silver medal of the CNRS

2012 Research Funding Award from the "Simone et Cino del Duca" Foundation, France

2011 Molecular Science Forum Professorship, Chinese Chemical Society

2009 Invited Professor, Nagoya University, Japan

2008 Taiwan National Science Council Distinguished Scholarship

2008 Jecker Prize of the French Academy of Science

2003 Acros Young Chemist Prize of the organic division of The French Chemical Society

2003 Concordia-Merck-Frosst Lectureship, Canada

2001 Silver medal of the Société d'Encouragement au Progrès, France

1999 Bronze Medal of the CNRS, France

1987 Olympiads of Chemistry, national laureate, France .