RÉSEAU FRANÇAIS DU **FLUOR**

Modélisation **E**t **S**pectroscopies (**ModES**)

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CEISAM UMR CNRS 6230

Chimie **E**t **I**nterdisciplinarité, **S**ynthèse, **A**nalyse, **M**odélisation

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Keywords **:** **Hydrogen-Bond Properties** (geometry, energetics, spectroscopic parameters, intra/inter-molecular interactions)**, Partition Coefficients**

FTIR Spectroscopy, Quantum calculations, NMR Spectroscopy

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Probing Organic Fluorine Effects on molecular properties

Aims.

- quantification and rationalisation of the effects of fluorination on molecular properties of functional groups relevant to medicinal chemistry.

- hydrogen-bond (H-bond) acidity/basicity characterisation of fluorohydrins, fluoroamines…

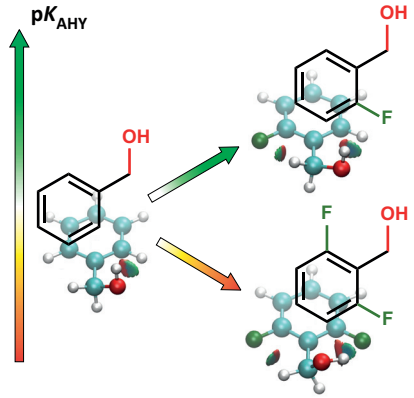
- depiction of intramolecular interactions.

Methods.

- Thermodynamic and spectroscopic measurements of equilibrium constants of H-bond complexation through **FTIR spectroscopy**.

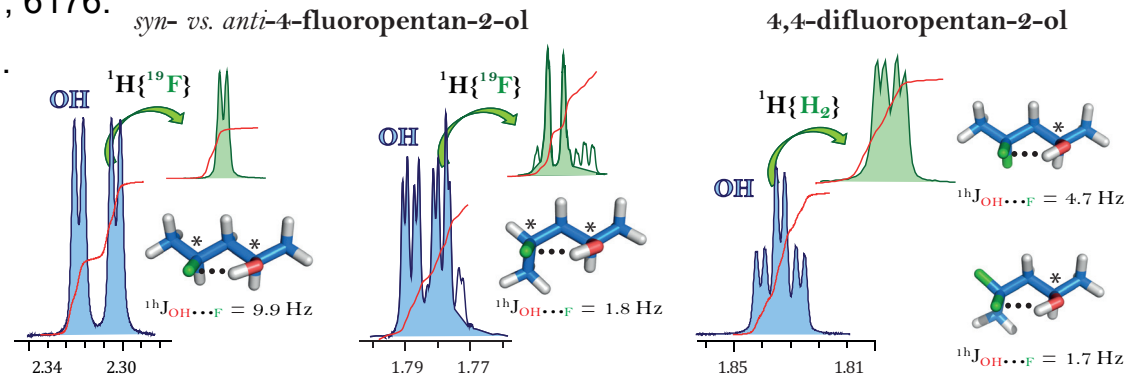
- Rationalisation/prediction of fluorine influence through **quantum chemical calculations**.

- Highlighting of intramolecular interactions through **NMR spectroscopy**



Publications.

- J. Graton *et al.*, *Angew. Chem. Int. Ed.*, **2012**, *51*, 6176.
- E. Bogdan *et al.*, *Chem. Eur. J.*, **2015**, *21*, 11462.
- B. Linclau *et al.*, *Chem. Eur. J.*, **2015**, in press.



Fundings.

- ANR JCJC “ProOFE” grant (ANR-13-JS08-0007-01)

Collaborations.

- Fluorohydrins preparation: **Prof. Bruno Linclau**, University of Southampton (UK) (funded by an EPRSC grant)

Properties of molecular fragments of interest in medicinal chemistry and agrochemistry

Methods.

- Thermodynamic and spectroscopic measurements of equilibrium constants of H-bond complexation through **FTIR spectroscopy**.

- Rationalisation/prediction of fluorine influence through **quantum chemical calculations**.

Industrial collaborations.

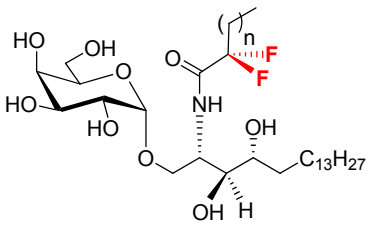
- H-bond basicity measurements of fluorinated nitrogen heterocyclic fragments of potential agrochemical compounds (**Syngenta Crop Protection** - 2014).

Academic collaborations.

- Rationalisation of the control activity of KRN7000 analogs (immunostimulant)

(**Profs. Jacques Lebreton & Didier Dubreuil**, Symbiose group in CEISAM, University of Nantes)

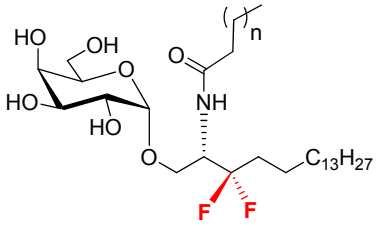
⇨ T_H1 / T_H2 orientation, according to the $NH_{amide}\cdots Thr_{154}$ interaction



T_H2 orientation

NH···F intramolecular interaction

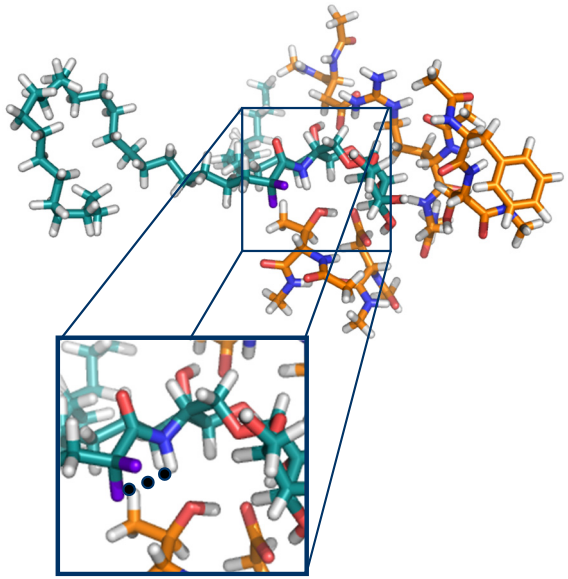
⇨ Decrease of NH group H-bond acidity



T_H1 orientation

Electronwithdrawing effect of fluorines

⇨ Increase of NH group H-bond acidity



Publications.

- J. Hunault *et al.*, *J. Med. Chem.*, **2012**, *55*, 1227.