Our projects are based on chemical biology (use of chemical molecules for understanding biological phenomena) and medicinal chemistry (compounds with therapeutic properties). As chemists we will take care of molecule synthesis in tight collaboration with biologists for the design of the most appropriate compounds.

The team is mainly working in 4 directions:

- **Vectorization/Targeting**: The aim is to develop new therapies based on cytotoxic agents targeted by Shiga Toxin or antibodies. New linkers and scaffolds were designed for this purpose. In some cases, the same compounds can also be used for imaging, in a theranostic approach.
Figure 1: Shiga toxin B subunit as a vector for antitumour drugs
The Shiga toxin B subunit (STxB) is used for intracellular retrograde delivery of drug.

- **Glycosphingolipids/Membranes**: This project is a typical Chemical Biology project. We are designing and synthesizing modified glycosphingolipids and chemical probes, to study and understand phenomena concerning the cell membranes and endocytosis.
- **Self-immolative spacers**: Self-immolative spacers are used in prodrug and in profluorophore strategies. We are working on the structures in correlation with the kinetic parameters of these spacers, as well as on biological applications.
• **Heterocyclic Inhibitors**: Hits have been obtained from the chemical library of the Institut Curie or from other external libraries by screening for various activities. Particularly, compounds able to inhibit Shiga toxin infection have been identified and will be developed in two directions: identification of the cellular target, and optimization of activity for therapeutic purposes.

The team is also involved in the *Institut Curie/CNRS small molecule library*. The library was created by all the chemists of Institut Curie and is now ruled as a common platform between the Chemical Biology units of Institut Curie Paris and Orsay.

### Key publications

#### Year of publication 2016


#### Year of publication 2015

Year of publication 2013

Ahmed Alouane, Raphaël Labruère, Thomas Le Saux, Isabelle Aujard, Sylvie Dubruille, Frédéric Schmidt*, Ludovic Jullien* (2013 Apr 6)

**Light activation for the versatile and accurate kinetic analysis of disassembly of self-immolative spacers.**

*Chemistry (Weinheim an der Bergstrasse, Germany)* : 11717-24 : DOI : [10.1002/chem.201301298](https://doi.org/10.1002/chem.201301298)

Year of publication 2012

Raphaël Labruère, Ahmed Alouane, Thomas Le Saux, Isabelle Aujard, Philippe Pelupessy, Arnaud Gautier, Sylvie Dubruille, Frédéric Schmidt, Ludovic Jullien (2012 May 24)

**“Self-immolative” spacer for uncaging with fluorescence reporting.**

*Angewandte Chemie (International ed. in English)* : 9344-7 : DOI : [10.1002/anie.201204032](https://doi.org/10.1002/anie.201204032)

Marion Livecchi, Géraldine Calvet, Frédéric Schmidt (2012 May 18)

**Palladium-catalyzed synthesis of 2,3-disubstituted 5-azaindoles via heteroannulation reaction and of 2-substituted 5-azaindoles through domino sila-Sonogashira/5-endo cyclization.**

*The Journal of organic chemistry* : 5006-16 : DOI : [10.1021/jo300481s](https://doi.org/10.1021/jo300481s)

Year of publication 2011

Géraldine Calvet, Marion Livecchi, Frédéric Schmidt (2011 May 2)

**Synthesis of polysubstituted 5-azaindoles via palladium-catalyzed heteroannulation of diarylalkynes.**

*The Journal of organic chemistry* : 4734-40 : DOI : [10.1021/jo200480h](https://doi.org/10.1021/jo200480h)