

Research project for a PhD student
(for candidates with training in organic chemistry)

Project title: Synthesis of heptoside mimics related to *Campylobacter jejuni* capsular polysaccharide as potential campylobacteriosis vaccines.

Location: Centre [INRS – Institut Armand-Frappier](#), 531, boul. des Prairies, Laval (Québec), H7V 1B7, Canada

Project description: *Campylobacter jejuni* infections are one of the leading causes of bacterial gastroenteritis worldwide, especially in young children. Following infection with *C. jejuni*, patients are at risk of developing autoimmune diseases such as Guillain-Barré syndrome. *C. jejuni* expresses on its surface a capsular polysaccharide (CPS), which is the target of the protective immune response in the host. The CPS of *C. jejuni* HS4c, the most prevalent infectious serotype in humans, contains β -D-*ido*-heptose residues. Our research group has recently developed an intramolecular glycosylation approach for the synthesis of β -D-*manno*-heptosides ([Tamigney Kenfack et al. J. Org. Chem. 2014, 79, 4615](#)). As part of this project, we plan to: 1) adapt the intramolecular glycosylation method to the synthesis of β -D-*ido*-heptosides; 2) synthesize mimics of the repeating unit of *C. jejuni* HS4c CPS; 3) couple the synthetic mimics to a carrier protein; and 4) evaluate the immunogenicity of vaccines in an animal model (collaboration with [Pr Charles M. Dozois](#)).

Keywords: Organic synthesis, glycochemistry, immunology, vaccines.

Starting date: September 2018 or January 2019

Supervisors: [Pr Charles Gauthier](#)

Funding: This project is funded in part by the Natural Sciences and Engineering Research Council of Canada (NSERC) through the “Discovery grants” program. The student will receive a scholarship for the duration of his/her PhD studies (maximum four years).

Study program: [PhD in biology](#) or [PhD in virology and immunology](#) (at the student’s choice)

Eligibility: The candidate must hold a BSc and an MSc in chemistry (or equivalent grade) and must have maintained a cumulative average of at least 3.2/4.3 or equivalent. The student must have experience in organic synthesis and in 1D and 2D NMR analysis. An interest in glycochemistry would be an asset.

Questions: Please contact Pr Gauthier (email: charles.gauthier@iaf.inrs.ca; phone: +1-450-687-5010 ext. 8886). For more details on Pr Gauthier’s research topics, visit his website (<http://cgauthier.profs.inrs.ca/>).

Submit your application: Prospective students are requested to send their CV, the transcript of their most recent degree, a cover letter as well as the contact information of two individuals who can provide reference letters to the following email address: charles.gauthier@iaf.inrs.ca