

Title of the thesis	Halophytes of the Region Hauts-de-France as a source of potential anti-human coronavirus biomolecules
Acronym	HaloHcov
Reference number	010

Hosting institution	Employer
Université de Lille Website: https://www.univ-lille.fr/home/	CNRS Website: http://www.cnrs.fr/en
Hosting research unit 1	Hosting research unit 2
Name: Center for Infection and Immunity of Lille Acronym: CIIL Identification number: U1019 – UMR9017 Address: 1, rue du Professeur Calmette Campus de l'Institut Pasteur de Lille 59019 LILLE Cedex Website: http://www.ciil.fr/center/	Name: UMR transfrontalière BioEcoAgro Acronym: BioEcoAgro Identification number: UMR 1158 Address: Université de Lille, Avenue Paul Langevin 59655 Villeneuve d'Ascq Website: institutcharlesviollette.univ-lille.fr/
Principal supervisor	Co-supervisor
Name: Karin Surname: SERON Email: Karin.seron@ibl.cnrs.fr Phone: +33 320 871 199	Name: Céline Surname: RIVIERE Email: celine.riviere@univ-lille.fr Phone: +33 (0)3 20 96 40 41

Thesis information	
Keywords	Virus, antiviral agents, halophytes, phytochemistry, natural products
Abstract	<p>Respiratory diseases caused by human coronavirus infections are a global health burden. The main objective of the present proposal is to purify and identify active natural products from halophilic plant extracts inhibiting human coronavirus (2019-nCoV, MERS-CoV, HCoV-229E) and to understand their mechanism of action. Halophytes are plants adapted to grow in saline soils. By their adaptation to abiotic stresses, they are able to produce specialized metabolites that may have biological activities including antiviral ones. These plants will be collected in the Region Hauts-de-France. After screening of different plant extracts for their antiviral activity against different human coronavirus (2019-nCoV, MERS-CoV, HCoV-229E), a bioguided fractionation will be performed to identify and purify the active compound(s). The toxicity of the compounds will be evaluated in vitro. The mechanism of action of the molecules will be studied on the different steps of the virus infectious cycle. The aim of the PhD project is to identify new antiviral agents against coronavirus that could be used in antiviral therapy in the future. The two supervisors of the PhD project, Karin Séron (Molecular and Cellular Virology, CIIL) and Céline Rivière (Phytochemistry, ICV), are actively collaborating on this topic and have successfully identified, following a bioguided fractionation, a novel antiviral agent inhibiting hepatitis C virus (Sahuc et al. <i>J. Virol.</i> 2019). The two laboratories have already developed all the tools necessary to perform this project.</p> <p>The results will be presented by the student in different national or international congress, either in Virology (Nidovirus symposium, ASV congress, Journées Francophones de Virologie) or in Phytochemistry (Young Scientists' Meeting of the Phytochemical Society of Europe, Annual Conference of the Society for Medicinal</p>

	<p>Plant and Natural Product Research (GA), congrès annuel de l' AFERP).</p> <p>The candidate will develop different techniques of cellular and molecular virology in the Virology team. Most of the virology experiments will be performed in a BSL-3 laboratory. The candidate will be trained to work with the virus in this confined environment. Concerning the chemistry part, the candidate will develop different analytical and preparative chromatography methods adapted to phytochemistry. The student will also be trained in structural identification by NMR and in different coupling techniques type LC-MS/MS. The two labs are located in Lille and it is very easy to move from one to another by public transport.</p>
Expected profile of the candidate	<p>The PhD candidate will be a highly motivated student with a master's degree and a strong background or good knowledge in the field of virology, molecular biology, cell biology and chemistry/phytochemistry. The student will have to master techniques in virology and cell biology (cell culture, RNA quantification, Western blots....) and in chemistry (at least some chromatographic techniques). A command of statistical tools would be appreciated. The candidate should show a real interest in virology and in plant sciences. He/she will quick to adapt to the two laboratories. The candidate must also have excellent communication skills in written and spoken English and be a good team player who can integrate and interact with different researchers. The candidate should have curiosity and keeping up to date with bibliography on the research topic.</p>
Application procedure	<p>The application procedure is detailed on the European programme PEARL website www.pearl-phd-lille.eu. The funding is managed by the I-SITE ULNE foundation which is a partnership foundation between the University of Lille, Engineering schools, research organisms, the Institut Pasteur de Lille and the University hospital.</p> <p>The application file will have to be submitted before April 15, 2020 (10h Paris Time) and emailed to the following address : international@isite-ulne.fr.</p>
Net salary and Lump Sum	<p>A net salary of about €1,600 + €530 per month to cover mobility, travel and family costs.</p>