

Internship subject : **Study of the (eco)toxicological risk of an emerging pharmaceutical pollutant and its degradation products in a Drosophila model.**

Laboratory: Water Environment Urban Systems Laboratory, Université Paris-Est Créteil <https://www.leesu.fr>

Place of work: UPEC - MSE building, 61 Av. du Général de Gaulle, 94000 Créteil and occasionally at IUT Sénart Fontainebleau, 240 rue de la motte 77550 Moissy Cramayel, France

Type of contract: internship

Duration: 6 months from January 2024

Background

Many pharmaceutical compounds end up in the environment as a result of incomplete elimination by wastewater treatment plants (WWTPs). Some compounds are sometimes present in significant concentrations, posing a risk to the aquatic environment. Among these compounds, furosemide, a diuretic, is very frequently detected in surface water, and significant concentrations are found downstream of WWTPs and hospitals. Several degradation products of furosemide have been identified: saluamine and furfural, and the recently discovered furosemide pyridinium (PoF). These compounds have greater toxicity than furosemide on various organisms, and our recent studies show that PoF is found in the urine of patients treated with furosemide, and is capable of inducing biological markers characteristic of Parkinson's disease at high doses in animal models. In addition, our results show that it is present and quantifiable at different levels of the wastewater network, in the Seine and in effluent from nursing homes.

Objectives

The aim of the internship is to characterise the ecotoxicological impact of PoF alone or in a cocktail with saluamine and furosemide at environmental concentrations in a terrestrial organism model representative of pollinating insects, *Drosophila melanogaster*, (Canton-S wild strain). The impact of ranges of environmental concentrations of PoF and saluamine will be assessed on mortality and behaviour in the adult stage. The neurotoxicological impact of these molecules will be assessed by observing the position of the wings (voluntary movement) and climbing test. Expression of genes involved in neurotoxicity will be quantified by RT-qPCR.

Candidate's profile

Master 1 degree in Toxicology, Environment, Health (essential knowledge of ecotoxicology, biochemistry, statistical analysis and programming in R). Experience with the *Drosophila* model will be a plus. Good interpersonal, organisational and oral/written communication skills (French and English) are essential, as is the ability to work independently.

CVs, covering letter, Bachelor's and Master 1's grades and contact details of persons who can provide a recommendation should be sent to: tharaniya.tambosco@u-pec.fr ; laure.garrigue-antar@u-pec.fr; ch.morin@u-pec.fr

Application deadline: October 25th, 2023

Bibliography

Laurencé C, ..., Barau C, Le Corvoisier P, Martens T, Garrigue-Antar L, Morin C. *Biochem Pharmacol.* 2019 160:14-23. doi: 10.1016/j.bcp.2018.12.007.

Laurencé C, Rivard M, Martens T, Morin C, et al. *Chemosphere.* 2014. 113:193-9. doi : 10.1016/j.chemosphere.2014.05.036.

Olvera-Vargas H, ..., Rivard M, Oturan N, Oturan M, Buisson D. *Environ Sci Pollut Res Int.* 2016. 23:22691-700.

Sandre F, ..., Rivard M, Morin C, Moilleron R, Le Roux J, Garrigue-Antar L. 2023. *Chemosphere* 322, 138212