



THESIS OFFER

Unravelling the structure of bioactive molecules from endophytic fungi and their mode of action during seed germination

Germination is a key step in plant development cycle and is controlled by a large array of endogenous and exogenous signals. Although the plant organs host a complex microbiome, including a variety of endophytic fungi, their involvement and function in regulating seed biology has been poorly investigated so far. Furthermore, the chemical features of the bioactive compounds that may participate in such regulation are unknown, although it may represent a reservoir for innovative biomolecules.

In a collaborative project involving the teams “Chimie des Produits Naturels Fongiques” (CNRS/MNHN) and “Biologie de Semences” (CNRS/SU), we screened a fungal extract library and identified 10 extracts strongly stimulating the seed germination in *Arabidopsis thaliana* model plant. On the basis of these data, the PhD project proposed will aim at unravelling the fine chemical structures of the bioactive compounds present in the endophytic fungus extracts and stimulating germination. Isolated bioactive molecules will be further used to investigate their mode of action in controlling seed biology.

The first axis principally relies on the expertise of the MNHN team in analytical chemistry of natural compounds. It will include extract fractioning and structure identification by multiple analytic chemistry methods. The second axis essentially developed in the SU team will focus on the study of the physiological and molecular effects of the treatments with fungi bioactive molecules during seed germination. It will include a large scale transcriptomic analysis to identify genes deregulated upon treatment. On the basis of these data, *Arabidopsis* mutant seed lines will be selected for functional investigations on the response of seeds to isolated bioactive molecules from endophytic fungi.

We expect that these investigation will identify new mechanisms regulating seed germination together with new natural molecules targeting plant development.

Candidate profile:

We are seeking a highly motivated young scientist who will soon receive a M.Sc. degree in Biology or Chemistry. Experience in plant molecular physiology or analytical chemistry is not mandatory, but is a plus. Applicants should have a strong interest for multidisciplinary projects and aptitudes for collaborative work.

Contacts :

Emmanuel Baudouin (emmanuel.baudouin@upmc.fr)

Equipe "Biologie des Semences", Sorbonne Université, Institut de Biologie-Paris Seine, UMR7622 Biologie du Développement , Batiment C/2, 9 quai St Bernard, 75252 PARIS

Soizic Prado (soizic.prado@mnhn.fr)

Equipe "Chimie des Produits Naturels Fongiques", Muséum d'Histoire Naturelle, UMR7245 Molécules de Communication et Adaptation des Microorganismes, 63 rue Buffon, 75005 Paris