



## Analysis of periderm development in potato microtubers

**Place of work:** ForGen Lab – Forest Genomics and Molecular Genetics Laboratory - Faculdade de Ciências da Universidade de Lisboa (FCUL)

<https://forgen.rd.ciencias.ulisboa.pt/>

**Supervisors:** Vera Inácio ([vinacio@fc.ul.pt](mailto:vinacio@fc.ul.pt)), Célia Miguel ([cmmiguel@fc.ul.pt](mailto:cmmiguel@fc.ul.pt)) FCUL)

### Abstract / MSc thesis project proposal

The periderm envelops the roots and shoots of species with secondary growth functioning as an outer protective shield against biotic and abiotic stresses. The periderm is not only crucial for plant survival but is also explored in a sustainable and profitable cork industry, where cork oak is the exclusive commercial source. The periderm is mainly composed of phellem or cork cells resulting from the meristematic activity of the phellogen. After phellogen initiation, cork cells undergo a differentiation process that includes cell wall suberization and programmed cell death. Potato tubers also form a periderm and when potatoes are harvested, the suberization process continues for a few days, resulting in a “mature” potato skin.

In this work, we will use potato microtubers to characterize the phellogen activity and periderm formation at different developmental stages. Microtubers can be induced very quickly in *in vitro* potato cultures using a synthetic cytokinin and it is a valuable tool to study periderm development in a prompt way.

The plan includes:

- (1) Induction of microtuber formation in *in vitro* potato cultures;
- (2) Time-series histological study of microtuber skin to determine periderm developmental/maturation stages using fluorescence, confocal microscopy, and transmission electron microscopy with established methods;
- (3) gene expression analysis by RT-qPCR of genes involved in periderm development to validate phellogen activity/inactivity.

This work will serve as a framework for future studies on the regulation of periderm development at the molecular and chromatin levels.

The student will be integrated into a multidisciplinary team of researchers and will develop his/her knowledge of experimental tools and techniques and teamwork ability, autonomy, organization, and critical thinking, essential in any professional area. Specifically, the student will acquire skills in histology and microscopy techniques, and molecular biology and bioinformatics, transversal to research areas. The student selected for this project, after thesis registration, is eligible to apply to the BioISI Junior Programme (supporting 8 students with a 6-month Scholarship(BII), being the selection criterium the academic merit of the candidates.