Ayuda PID2025-172667NB-I00 financiada por MICIU/AEI /10.13039/501100011033 y por el FSE+

Ph.D. Student Position: MOLECULAR MECHANISMS OF ROOT STEM CELL REGENERATION UNDER CLIMATE INESTABILITY

Root organogenesis, regeneration and regeneration laboratory. **Center for Plant Biotechnology and Genomics (CBGP) in Madrid, Spain**

We are seeking a highly motivated Ph.D. student to investigate how climate change-induced temperature fluctuations affect root stem cell formation and tissue regeneration.
Root stem cell formation and tissue regeneration are highly plastic processes regulated by key transcription factors, hormones such as auxin, and environmental cues. Our previous work has demonstrated the influence of environmental stress on stem cell formation through the identification of biomarkers, changes in telomere length dynamics, and single-cell RNA sequencing (scRNA-seq) analyses.
This Ph.D. project will explore how unpredictable spring temperature regimes reshape cell fate during regeneration. The successful candidate will investigate the largely unexplored molecular feedback loops linking stem cell regulators, telomere dynamics, and auxin signaling under temperature conditions that mimic naturally occurring climate fluctuations.
During the project, the student will gain hands-on experience in state-of-the-art technologies, including:
• **Single-cell RNA sequencing (scRNA-seq)** to characterize cell fate transitions and cellular trajectories.
• **AI-powered 3D confocal imaging** to monitor telomere length dynamics using advanced microscopy and machine learning-based image segmentation.
• **Spatial transcriptomics (Molecular Cartography)** to map gene expression at single-cell resolution and uncover gene regulatory dynamics within their spatial context.

Who are we looking for?
We are looking for a curious, persistent, and highly motivated candidate who is eager to tackle challenging scientific questions. The ideal applicant should be committed to developing scientific independence and taking ownership of their research project.
Candidates must hold a Bachelor's and a Master's degree in Biotechnology, Biology, Biochemistry, Bioinformatics, or a related field.
Experience in plant molecular biology, developmental genetics, or computational biology is highly desirable. Programming skills in R or others will be considered a strong asset for transcriptomic data analysis.

Scholarship and Benefits
• **Position:** Fully funded 4-year predoctoral contract associated with the Spanish AEI *Proyectos de Generación de Conocimiento* program.
• **Salary:** Competitive salary according to the national Ph.D. salary scale and UPM regulations, including full social security coverage, healthcare benefits, and tuition fee reimbursement. Salary progression throughout the contract will follow AEI guidelines.
• **International Mobility:** Includes a fully funded 3-month research stay at a leading international research laboratory.

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Application Details

- **Application deadline:** December 1st.
- **Interviews:** Shortlisted candidates will be invited for interviews during December.

How to Apply

1. Prepare a single PDF file including:

1.1 Academic CV (highlighting research experience and academic achievements).

1.2 Motivation letter (explaining your scientific interests and reasons for joining our laboratory).

1.3 Copies of Bachelor's and Master's degree certificates.

1.4 Complete academic transcripts, including courses taken and grades obtained.

1.5 Contact details of at least one academic referee (e.g., a professor or thesis supervisor) who has agreed to provide a recommendation letter.

2. Send the PDF file by email to both Principal Investigators:

Dr. Miguel A. Moreno Risueño (PI)
miguelangel.moreno@upm.es
Dr. Mary Paz González García (PI)
marypaz.gonzalez.garcia@upm.es

Email subject: *PhD Application – [Your First and Last Name]*

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3. Further Information

More information about our research group can be found here:
https://www.cbgp.upm.es/index.php/en/scientific-information/root-organogenesis-regeneration-and-rooting