

Training program

The Ph. D. project will be developed at the IBMB, located in the “Barcelona Science Park” which agglomerates other two competitive public research institutes (IBEC and IRB) as well as a number of biotech companies. The campus offers a rich scientific environment in structural, computational, cell, developmental, system and genome biology. Further, it has the structure to facilitate transfer of technology to industry. Since our group is not embedded within a University, the student will have the chance to join the Ph. D. Program that better suits her/his interests. Our former students have joined the Ph. D. Program in Biomedicine of the UPF (<https://www.upf.edu/web/phd-biomedicine/presentation>) or the UB (<https://web.ub.edu/ca/web/estudis/w/doctorat-hdk05>), both approved by AQU Catalonia as "Quality Label towards Excellence".

The student enrolling the group will join the project on the role of sterols and ceramides in endocytosis. This is a multidisciplinary project at the interface of cell biology and metabolism that will offer plenty of opportunities to learn different techniques and make stages abroad. Further, the training within this project will provide the student with scientific knowledge and technological skills relevant for the food, cosmetic and pharma industries interested in lipid production.

The scientific and technological development plan will include the following steps:

1. As the student joins the lab, she/he will help writing a review on bioactive lipids in membrane traffic that will strengthen her/his knowledge on the main research topics and provide a first publication. Critical thinking will be developed by participation on the weekly group seminars and a monthly journal club.
2. The student will also immediately start handling yeast and generating strains that will be subsequently used for biochemical, live-cell FM and EM experiments, under the direct supervision of the PI. This will provide a solid background on genetics and molecular biology.
3. In a second stage, the student will be introduced to the analysis of protein-protein interaction by using the two hybrid system, pull downs, and immunoprecipitations techniques. She/he will learn protein purification using affinity and size exclusion chromatography. This will provide her/him with skills to subsequently establish protocols for *in vitro* ceramide transport assays.
4. In parallel, the student will learn the basics on live-cell FM. She/he will acquire skills to grow and mount the cells under optimal conditions, handle the appropriate microscope, design acquisition settings and perform image analysis. The student will be primarily assisted by the PI or IFG and TG, she/he will attend the courses at the IBMB to learn the handling of the microscopes (<https://www.ibmb.csic.es/en/platforms/molecular-imaging-platform/#presentation>) and get training in image acquisition and analysis by the “Advanced Optical & Fluorescence Microscopy & BioImage Analysis Course” organized by the IRB. Once the student is confident with the basics of live-cell imaging, introduction to more advanced FM techniques such as FRET and FLIM will follow.
5. At this point, a stage in the lab of C. Arenz at the Humbolt University of Berlin will be planned to learn the FRET and BRED-based ceramide transport assays.
6. In a third stage the student will have the opportunity to learn the TREM approaches developed in our laboratory under the direct supervision of IFG.

7. As the project generates results, the student will attend international meetings to discuss and present data. The attendance to at least one international meeting is mandatory for our students. Further technological training will be provided by the attendance to EMBO as well as CRG training courses (<https://www.crg.eu/en/content/training-courses/coursescrg/year/2023>).

8. In addition to presenting data in national and international meetings, the student will weekly attend the seminars organized by the IBMB, the IBEC, and the IRB, in campus; and the CRG and the EMBL Barcelona, nearby. Those seminars are given by internationally renowned researchers invited by the different institutions and are normally accessible to all students in Barcelona.

The soft skill developmental plan will include the following steps:

1. Attendance to a number of courses and activities to improve her/his scientific communication and management skills, as well as to provide an ethical and social responsibility frame to scientific research, organized by the CSIC (<https://www.csic.es/es/formacion-y-empleo/formacion-de-personal-investigador/doctorado/formacion-y-actividades-para-doctorandos>).

2. Improvement of her/his oral communication capabilities, by presenting results in English at least once a year to a wide audience, either at the IBMB Seminar series or in research networks such as the Cell and Tissue Research in Catalonia (<https://www.catcat-celltissuebiology.cat/>), the Barcelona Membrane Biology Club or in the Annual Meeting of the Biology Catalan Society (<https://scb.iec.cat/>). This practice will prepare the student for international conferences and guarantee her/his proficiency at job interviews.

3. As part of the training in communication to the public and to promote awareness of social responsibility, she/he will be encouraged to participate in outreach activities organized by the IBMB (<https://www.ibmb.csic.es/en/outreach/>), or the PCB such as the “Microbes” activities for primary schools or “La Fira de Recerca en Directe” for high school students.

4. As part of the management training, the student will be encouraged to join the IBMB Student Council. The Student Council serves as a hinge between PhD students and IBMB boards and organizes student-run activities, both scientific and social (<https://www.ibmb.csic.es/en/researchers-training-programs/#scientific-events>)

The scientific development of the student and her/his welfare will be guaranteed by the IBMB Thesis Advisory Committee (TAC) (<https://www.ibmb.csic.es/en/researchers-training-programs/#thesis-advisory-committees-tac>). The TAC is composed of 2 senior scientists chosen by the student. The TAC monitors the proper advance of the research project, advises and guides for future scientific and professional directions and enquires about her/his welfare in the lab. The TAC meets annually with the student. After the meeting, separate confidential reports are forwarded to the IBMB Ph.D. office for inspection.