



CiMUS International PhD Programme

1. Project title:

Peripheral Control of Metabolic Organ Homeostasis

2. Research Project:

This PhD project aims to bridge two research areas—metabolic organ biology and neural control—to uncover how local neural circuits regulate liver physiology and disease.

The liver is a vital and highly multifunctional organ that serves as a central hub for systemic metabolism, coordinating processes such as energy metabolism, nutrient storage, detoxification, protein synthesis, immune surveillance, and bile production. Owing to this central role, liver function must be precisely and dynamically regulated to maintain whole-body homeostasis. Increasing evidence indicates that this regulation depends not only on systemic hormonal cues but also on finely tuned neural inputs. However, the cellular and molecular mechanisms through which peripheral nerves and their associated glial cells control liver function remain poorly understood.

Schwann cells are specialized glial cells of peripheral nerves that maintain axonal integrity and support neuronal function. Disturbances affecting Schwann cells or the nerve microenvironment—whether due to genetic or acquired diseases, toxic insults, or microbial infections—can result in severely debilitating and even fatal neurological disorders, such as Charcot–Marie–Tooth disease, for which effective treatments are often lacking. Beyond their classical supportive roles, recent studies have revealed that Schwann cells are highly plastic and capable of reprogramming into progenitor-like states with non-canonical functions, suggesting previously unrecognized roles in tissue regulation and disease.

In this context, this PhD project aims to dissect how axons, Schwann cells, and liver parenchymal cells interact at the molecular level to shape liver physiology and pathology. By redefining autonomic regulation at the cellular and molecular scale, this work seeks to establish new conceptual frameworks and identify potential therapeutic targets for metabolic disorders. The project is conceived as a close collaboration between two leading research groups with complementary expertise in liver physiology and disease (led by **Marta Varela-Rey**) and neural control mechanisms (led by **Ashwin Woodhoo**).

3. Job position description:

Key Responsibilities:

The successful candidate will work in a multidisciplinary environment with advanced methodologies. The student will employ advanced experimental approaches, including molecular cell profiling (single-cell RNA sequencing), high-resolution three-dimensional imaging (iDISCO), and functional analyses using mouse genetics, to investigate this largely unexplored aspect of metabolic control.



Requirements for candidates:

Applicants must hold a Bachelor's and Master's degree (or equivalent) in Neuroscience, Biology, Biomedicine, or a related field. Previous research experience in a laboratory setting would be valued, while experience with rodent work is welcome but not required. The candidates should be fluent in spoken and written English and demonstrate strong teamwork and initiative.

4. Supervisor and Co-Supervisor

Name: Marta Varela Rey

Email: martavarela.rey@usc.es

Research group: Liver Metabolism and Disorders Laboratory (LiMED)

Link to the group website: <https://cimus.usc.gal/es/grupo/liver-metabolism-and-disorders-laboratory>

Name: Ashwin Woodhoo

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Research group: Gene Regulatory Control in Disease (GeneControl)

Link to the group website: <https://cimus.usc.gal/es/group/genecontrol>