MuSkLE
PhD programme
Building, maintaining and repairing the functional locomotor system

Co-funded by the European Union

PhD Position 17 job vacancy

Reference:	**PP17**
Title:	**Exploring subcellular LKB1 signaling in cell fate determination in neurons and skeletal muscle through light-controlled regulation**
Hiring institution:	University Grenoble Alpes
Location:	Grenoble France
Start date:	As from 1st September 2027
Duration:	36 months
Application deadline:	15th January 2027

Job description

Objective:	Skeletal muscle function relies on muscle stem cells (MuSCs), which drive regeneration, and motor neurons, which innervate muscle fibers through the neuromuscular junction (NMJ). Both compartments decline in aging and neuromuscular diseases. Evidence implicates defective energy-sensing signaling, mediated by the LKB1–AMPK/NUAK1 axis, as a key driver of this dysfunction. Given the fundamental roles of LKB1 signaling we have uncovered in stem cells, particularly within the neuroglial lineage, we hypothesize that spatiotemporal regulation of the LKB1-AMPK/NUAK1 axis governs MuSC activation, migration, differentiation, and metabolic adaptation, as well as neuronal differentiation, axonal growth, and metabolic homeostasis. We further propose that disruption of these signaling dynamics contributes to impaired muscle regeneration and NMJ maintenance. To test this hypothesis, the recruited doctoral fellow (DF17) will develop optogenetic strategies enabling light-induced precise, reversible, and spatially confined control of the activity of LKB1 signaling pathway in both cell types. First, the PhD project will design and generate light-controllable LKB1, AMPK and NUAK1 constructs using rational protein engineering informed by structural modeling and established optogenetic kinase platforms, expressed in C2C12 myoblasts and in neuronal cells. DF17 will use these tools to map LKB1, AMPK and NUAK1 signaling dynamics in MuSCs and neurons through live-cell imaging and FRET-based biosensors. Next, DF17 will test the whether optogenetic activation of LKB1-AMPK/NUAK1 rescues physiological functions in cells lacking these kinases, establishing causal links between localized kinase activity and cell fate. Combined with subcellular targeting (e.g., neuronal axons and growth cones), DF17 will determine how distinct kinase pools and activation patterns control proliferation, quiescence, differentiation, cytoskeletal organization, and energy or lipid metabolism. Finally, neuron-muscle co-cultures will be used to assess how compartment-specific kinase activation influences NMJ formation and maintenance. These studies will establish a quantitative framework linking energy sensing to muscle and neuronal function, while providing optogenetic tools to guide future therapies aimed at enhancing muscle regeneration and preserving neuromuscular integrity.
Collaborations and co-supervisions:	The PhD project will be conducted in the INVADE team (IAB Grenoble) which investigates the molecular mechanisms of cell invasion, aiming to prevent pathological invasion while preserving essential physiological processes. The team combines expertise in cell biology, synthetic biology notably optogenetics, biophysics, bioinformatics and advanced microscopy. DF17 will be co-supervised by Chantal Thibert and Olivier Destaing and the project will benefit from collaborations with J. Courchet and R. Mounier (PGNM, Lyon).
Supervisors:	chantal.thibert@univ-grenoble-alpes.fr Olivier.destaing@univ-grenoble-alpes.fr

Place of work:	Institute for Advanced Biosciences site Santé, Allée des Alpes, 38700 La Tronche - France
Required degree	Master's degree or equivalent in Cellular and molecular biology
Skills/Experience:	Strong theoretical background in molecular and cellular biology. Knowledge of imaging techniques and their applications in biological research. Familiarity with muscle stem cells and/or neurons would be an advantage. Scientific curiosity, rigor, and strong organizational skills. Ability to work collaboratively within a multidisciplinary team.
Keywords	Optogenetics, LKB1 signaling, muscle stem cells, time and space compartmentalization

Mandatory requirements

Eligibility:	The doctoral fellow: - should not have resided or carried out his/her main activity (work, study) in the country where he/she is being recruited, i.e., France, **for more than 12 months in the 3 years before the application call deadline,** unless this time was part of a compulsory national service or a procedure for obtaining refugee status under the Geneva Convention. - **must be in possession of a master's degree** at the date of the call deadline. Applicants who have completed their cursus but not yet been awarded the formal master's degree by that date will not be considered eligible. - must be **a doctoral candidate** (not already in possession of a doctoral degree at the date of the application call deadline).
Languages:	Oral and written skills must meet the standards of academic English used in international research.

Job details

Type of contract:	Full time position
Gross salary:	The monthly **living allowance, including employer and employees' social charges, is €3,800.** This amount corresponds to a gross monthly salary estimated to 2717€, and to an estimated net monthly salary before income tax of 2184€. On top of the monthly salary, the candidate will receive a **mobility allowance,** including employer and employees' social charges of €4752 over the 36 months of the working contract. This amount corresponds to a gross monthly allowance estimated to €132 and to an estimated net monthly allowance before income tax of approximately €119.
Other benefits:	**Social Protection**: The candidate will benefit from **full social security coverage**, including health insurance, unemployment insurance, and pension contributions. He/she will also have access to occupational health services (*médecine du travail*), as required by French labour law. **Additional Insurance**: The candidate may choose to subscribe to complementary health insurance plans, such as LMDE or SMERRA, at affordable rates (approximately €42 *per* month). Host institutions will provide 15 euros per month. **Paid Leave**: The candidate is entitled to up to **45 days of paid leave annually**, in accordance with national labour law, and will enjoy the same employment rights as other public-sector employees, including student union membership. **Transport**: The candidate benefits from significantly **reduced fares on public transport**, available in all partner cities. Additionally, the host institution will cover 50% of the monthly transportation costs.