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

Co-funded by the European Union

PhD Position 02 job vacancy

Reference:	**PP02**
Title:	**The NUAK1 kinase at the crossroads of autophagy, mitochondrial biology, and skeletal muscle homeostasis**
Hiring institution:	**Lyon1**
Location:	Physiopathologie Génétique du Neurone et du Muscle (PGNM) - Institut NeuroMyoGène
Start date:	As from 1st September 2027
Duration:	36 months
Application deadline:	15th January 2027

Job description

Objective:

Our collaborative teams have recently identified the NUAK1 kinase as a key regulator of skeletal muscle homeostasis. We demonstrated that NUAK1 deficiency in skeletal muscle promotes autophagy defects and sarcopenia-like features.

Research objectives and scientific hypothesis: This PhD project aims to decipher the molecular mechanisms through which the kinase NUAK1 maintains the skeletal muscle homeostasis and to determine how its dysfunction contributes to the development of sarcopenia-like phenotypes. We want to determine if **NUAK1 is a critical regulator of autophagy and/or selective autophagy of mitochondria (mitophagy), through direct interactions with key components of the autophagic machinery, thereby contributing to the skeletal muscle homeostasis.** To do so, the PhD candidate will be emerged in an interdisciplinary training environment at the interface of muscle biology, autophagy, mitochondrial physiology, and ageing research, supported by the complementary expertise of the collaborating teams. The project will combine state-of-the-art cellular and molecular biology approaches with advanced imaging and functional muscle physiology techniques, potentially including:

- Confocal and electronic microscopy
- pH-sensitive fluorescent reporter to quantify mitochondrial delivery to acidic lysosomes
- Oroboros high-resolution respirometry in skeletal muscle fibers
- Advanced skeletal muscle contractile properties approaches
  Large scale approaches such as RNA sequencing, single-cell transcriptomics and proteomics

Collaborations and co-supervisions

The successful candidate will receive close co-supervision and training in the experimental methods used in muscle physiology and cell biology through a collaboration between the two teams led by R. Mounier and F. Strappazzon.

Collaborations and co-supervisions:

- **Mounier team** (remi.mounier@univ-lyon1.fr) : The seminal aim of our team was to explore the mechanisms underlying the dynamics and temporality of the main intrinsic metabolic pathways that regulate the fate of muscle stem cells during adult myogenesis. Since then, the team has broadened its scope beyond skeletal muscle. As such, we implement our research objectives towards the study of the role of metabolic cross-talk in striated muscle maintenance in physiological and pathophysiological conditions with a multi-scale approach; encompassing 1) the cellular level, addressing the cross-talk between (metabolic) organelles within and between muscle cells; 2) the organ level, addressing the cross-talk between cells via alterations in local (metabolic) microenvironment; and 3) the organism level, addressing the cross-talk between different organ systems via alterations in the systemic (metabolic) environment.
- **Strappazzon team** (flavie.strappazzon@univ-lyon1.fr) : The team investigates the molecular mechanisms underlying autophagy and mitophagy in physiological and pathological conditions, with a particular emphasis on the role of mitochondrial quality control in neurodegeneration. By combining biochemical, cellular, and *in vivo* approaches, the team aims to uncover how alterations in autophagy pathways contribute to disease progression and tissue dysfunction.

	Through a multidisciplinary strategy, the team seeks to identify novel molecular mechanisms and therapeutic targets while developing innovative approaches to modulate mitochondrial quality control in disease and aging. **Selected publications :** **Hoang D-H, et al. - 10.1038/s44319-025-00516-3** **Andreana I, et al. - 10.1016/j.omtm.2025.101564** **Caratti G, et al. - 10.15252/embr.20225536** **McArthur S, et al. - 10.1172/JCI124635.** **Theret M, et al. - 10.15252/embj.201695273** **Carpentier M, et al.- 10.1080/15548627.2026.2673172** **Mattioni A, et al. - 10.1038/s41419-025-07611-2** **Di Rita A, et al.- 10.1038/s41418-021-00766-3** **Di Rita A, et al. - 10.1038/s41467-018-05722-3**
Place of work:	Physiopathologie Génétique du Neurone et du Muscle (PGNM) - Institut NeuroMyoGène Faculté de Médecine- 8 avenue Rockefeller - 69008 LYON-FRANCE
Required degree	Master in cell biology, molecular biology, physiology or a related field
Skills/Experience:	• Strong knowledge of cell and molecular biology • Experience with transgenic mouse line maintenance • Immunofluorescence, Western blot and qPCR • A passion for experimental research and science • The ability to work independently, scientific rigor and a team spirit
Keywords	Nucleus; Sarcopenia; skeletal muscle biology; autophagic machinery, AMPK Kinase family

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 €3,500.** This amount corresponds to a gross monthly salary estimated to €2,440 and to an estimated net monthly salary before income tax of approximately €1,976. On top of the monthly salary, the doctoral fellow will receive a **mobility allowance,** including employer and employees' social charges of €4,752 over the 36 months of the working contract. This amount corresponds to a gross monthly allowance estimated to €92 and to an estimated net monthly allowance before income tax of approximately €74.
Other benefits:	**Social Protection**: The fellow 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 fellow may choose to subscribe to complementary health insurance plans, at affordable rates (approximately €70 *per* month), of which 50% is paid by the employer. **Paid Leave**: The fellow is entitled to up to **33.5 days of paid leave annually** (for 35 hours worked per week), in accordance with national labour law, and will enjoy the same employment rights as other public-sector employees. **Transport**: The fellow 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. **Sports and culture:**The fellow will enjoy the cultural environment provided by the Lyon 1 campuses, where numerous exhibitions and activities open to the general public are organised throughout the year. The fellow may play his/her favourite sport in the largest University Sports Association in France, where over 30 activities are on offer year-round through the Sports & Physical Activity University Department. The fellow may also join one of the 70 student associations that unite the University.