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

Co-funded by the European Union

PhD Position 12 job vacancy

Reference:	**PP12**
Title:	**dWdr45 Regulation of Locomotion via Dual Autophagy-Dependent and Independent NMJ Pathways**
Hiring institution:	**ENS of Lyon**
Location:	LBMC, 46 allée d'Italie 69007 Lyon
Start date:	As from 1st September 2027
Duration:	36 months
Application deadline:	15th January 2027

Job description

Objective:	The recruited doctoral fellow (DF11) will investigate the role dWdr45 in Drosophila locomotion via dual autophagy-dependent and independent NMJ pathways. Mutations in *WDR45* (WIPI4), an autophagy gene, cause BPAN (Beta-propeller Protein-Associated Neurodegeneration), characterized by early motor delays, ataxia, and progressive parkinsonism. The respective contributions of the central (CNS) and peripheral (PNS) nervous systems to these locomotor impairments remain poorly understood (Celle *et al*., 2025; Hayflick *et al*., 2013). We developed a *Drosophila dwdr45* knockout (KO) model that reproduces BPAN phenotypes including locomotion defects and lifespan shortening. In addition, dwdr45KO shows a defective neuromuscular junction (NMJ) arborization during development (Celle *et al*., 2025). This project will elucidate CNS and PNS contributions in the progressive locomotor impairment. **Aim 1** will map autophagy flux deficits underlying NMJ and locomotor defects in both larval and adult stages. Using temporally and cell-type–specific GAL4 drivers, with autophagy reporters, we will correlate autophagy flux with NMJ architecture and behavioral performance and identify the cell types most critical for NMJ function. **Aim 2** will explore non-autophagic pathways contributing to the phenotype, including iron metabolism, and oxidative stress signaling. Rescue experiments with *Atg1*, *Lamp2A*, *Sod2*, *Catalase*, and *Fer1HCH* overexpression will help distinguish autophagy-related and stress-mediated components responsible for NMJ and behavioral defects. **Aim 3** will apply spatial transcriptomics developed at IGFL facility to discover NMJ- and locomotion-related effectors. Spatial differential expression analysis in larval and adult neuromuscular tissues, followed by FISH and genetic validation, will identify candidate modifiers. Overall, this project will deliver an integrated cellular and molecular atlas of autophagy and stress pathway contributions to NMJ dysfunction and locomotor deficits in BPAN, establishing *Drosophila* NMJs as a powerful platform for therapeutic screening.
Collaborations and co-supervisions:	The PhD project will be implemented in collaboration with the laboratory of Jonathan Enriquez who bring the necessary expertise for the analysis of adult neuromuscular junction.
Supervisors:	Main supervisor: Bertrand Mollereau - bertrand.mollereau@ens-lyon.fr Supervisor 2: Ludivine Walter - ludivine.walter@ens-lyon.fr

References

-Janssens, J et al. (2025). Spatial transcriptomics in the adult Drosophila brain and body. eLife. 10.7554/eLife.92618
-Celle et al. (2025). A dwdr45 knock-out Drosophila model to decipher the role of autophagy in BPAN. Hum Mol Genet, 35(3). 10.1093/hmg/ddaf198
-Enriquez et al. (2015). Specification of individual adult motor neuron morphologies by combinatorial transcription factor codes. Neuron.86, p955-970. 10.1016/j.neuron.2015.04.011
-Hayflick et al. (2013). beta-Propeller protein-associated neurodegeneration: a new X-linked dominant disorder with brain iron accumulation. Brain. 136, p1708-17. 10.1093/brain/awt095
-Shen & Ganetzky (2009). Autophagy promotes synapse development in Drosophila. Autophagy. 187. 71-9. 10.1083/jcb.200907109
-Zhao et al. (2015). The autophagy gene Wdr45/Wipi4 regulates learning and memory. Autophagy. 11. P881-90. 10.1080/15548627.2015.1047127

Place of work:	LBMC, ENS of Lyon, 46 allée d'Italie, 69007 Lyon
Required degree	Master's degree in Cell biology or genetics
Skills/Experience:	Knowledge in Drosophila genetics, imaging will be appreciated. Soft skills: communication ; independence and teamwork.
Keywords	Drosophila, neuromuscular-junction, locomotion, autophagy

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 €2,500, and to an estimated net monthly salary before income tax of €2,100 (estimated amount). On top of the monthly salary, the candidate will receive a **mobility allowance,** including employer and employees' social charges of €4752, paid as a monthly salary supplement. This amount corresponds to a gross monthly allowance estimated to €98 and to an estimated net monthly allowance before income tax of approximately €63.
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. The HR department can offer assistance with obtaining a social security number. **Additional Insurance**: The candidate is required to subscribe to supplementary health insurance, with partial coverage provided by the host institution. **Paid Leave**: The candidate is entitled to **25 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, 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 75% of the monthly transportation costs. **Relocation assistance via Espace Ulys** (EURAXESS center of the Université de Lyon): the candidate can be provided with special relocation assistance and help for immigration and administrative, accommodation, healthcare and integration formalities. **Other benefits:** - A laboratory manager as contact person for all administrative matters before and during their stay, - Dedicated information tools: HR Information, Welcome booklet, etc. - The opportunity for scientists and their partner to take a 22-hour beginner's French as a Foreign Language course at ENS Lyon with other scientists, - A guided tour of both campuses in English to help the candidate to discover their new environment, - The opportunity to join the ENS de Lyon sports association and participate in various sport activities.