Internship proposition 2026-2027

Master 2 GP Medicine 4R (Repair, Replace, Regenerate, Reprogram)

Lab: TaRGeT - Translational Research in Gene Therapy - INSERM UMR 1089, Nantes Université.
Team: Muscle, Calcium and Therapies (MusCaT)

Name and position of the supervisor: FRAYSSE Bodvaël, team co-leader, senior scientist

Email of the supervisor: bodvael.fraysse@univ-nantes.fr

Candidate (if internship filled): Maëlle BELAUD

Title of the internship: Improving human skeletal muscle models of Duchenne muscular dystrophy using 3D bioprinting

Summary of the internship proposal:
Duchenne muscular dystrophy (DMD) is the most common inherited neuromuscular disorder and remains incurable despite major advances in gene therapy. Progress in therapeutic development depends on robust human experimental models capable of faithfully reproducing skeletal muscle physiology while providing reliable and reproducible functional readouts.
Engineered Muscle Tissues (EMT) generated from human myogenic cells have emerged as promising three-dimensional (3D) models of healthy and DMD skeletal muscle. However, their fabrication still relies largely on manual molding procedures, introducing experimental variability that may mask subtle disease-associated phenotypes or therapeutic responses.
This project aims to determine whether 3D bioprinting can improve the robustness and predictive value of EMT as human models of DMD. We hypothesize that improving tissue production reproducibility will reduce experimental variability and increase the sensitivity of functional and structural analyses.
The student will develop bioprinted EMT generated from immortalized healthy and DMD myoblasts and compare them with conventionally molded tissues. Functional characterization will rely on contractility measurements, while tissue organization, differentiation and maturation will be assessed by immunofluorescence and quantitative image analysis.
By combining skeletal muscle biology, tissue engineering and biofabrication, this project will contribute to the development of next-generation human models for neuromuscular disease research and preclinical evaluation of innovative therapies.

Main techniques

- Human myoblast culture and differentiation
- Engineering of skeletal muscle tissues
- 3D bioprinting and biomaterial optimization
- Functional assessment of muscle contractility
- Immunofluorescence and confocal microscopy
- Quantitative image analysis and statistics

Profile(s) linked to the project:

- [x] Experimental Biology *(Recherche expérimentale)*
- [ ] Clinical Research *(Recherche clinique)*
- [ ] Research in data analysis (Recherche en analyse de données)