Position: PhD student in precision oncology and skin carcinoma

Place : Commissariat à l'énergie atomique et aux énergies alternatives (CEA) - Grenoble

Team : Biomicrotechnologie et Génomique Fonctionnelle (BIOMICS)

Project description

SkinCarcinOmics: Omics and AI approaches to improve treatment outcomes in skin carcinoma

Skin carcinomas, including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), are the most common human malignancies. While often treated successfully by surgery, advanced or recurrent forms of these tumors present a therapeutic challenge. Targeted therapies and immunotherapies exist but show highly variable outcomes between patients, often due to poorly understood resistance mechanisms.

The **SkinCarcinOmics** project aims to decipher the molecular and pathway signatures driving treatment responses and resistance in BCC and SCC using a precision medicine approach. By leveraging transcriptomic, proteomic, and post-translational modification datasets from patient biopsies, integrated with clinical outcomes, we seek to identify biomarkers predictive of treatment efficacy and uncover actionable molecular vulnerabilities.

Objectives of the PhD:

1. Identify and characterize molecular signatures (genes, proteins, post-translational modifications) from omics datasets of BCC and SCC patient biopsies.
2. Integrate omics with clinical data using statistical and AI-based models to predict treatment outcomes (e.g., progression-free survival, recurrence).
3. Conduct in silico and in vitro drug screening to propose alternative treatments targeting pathway vulnerabilities identified in patients.
4. Validate selected drug candidates on 2D and 3D models including patient-derived skin organoids.

This project is embedded in a multidisciplinary consortium involving clinicians, omics experts and data scientists, and will benefit from ongoing collaborations and funding through national programs (e.g., ANR, MIAI). The PhD student will be co-supervised by experts in cancer biology and proteomics, and will be actively involved in data generation, interpretation, drug testing and scientific dissemination

Expected outcomes:

This project will identify predictive biomarkers and molecular vulnerabilities in skin carcinoma, enabling stratification of patients for treatment and guiding new therapeutic strategies. The student is expected to contribute to peer-reviewed publications, patents (if applicable), and to present findings at national and international conferences.

Profile and skills required:

Applicants should hold a Master's degree in molecular biology, biotechnology, bioinformatics or a related field. Experience in cell biology, omics data analysis (transcriptomics, proteomics), or cancer research is highly appreciated. Familiarity with organoid models and/or drug screening is a plus. The candidate should be rigorous, motivated, collaborative, and fluent in English (written and spoken).

Supervision and Research Environment:

The PhD will be co-supervised by:

- **Prof. Walid Rachidi** (UGA-CEA-INSERM, IRIG/BGE/BIOMICS), expert in skin biology and organoid engineering.
- **Dr. Sandrine Bourgoin** (Associate Professor, TIMC, CNRS/UGA, EPSP), specialist in proteomics and biomarker discovery.

The PhD student will work within a multidisciplinary consortium involving researchers, clinicians, and bioinformaticians. Patient samples are already available through the CHUGA hospital cohort.

PhD start date:

October 2025

Funding:

Doctoral contract funded by the **EUR ARCANE-GRAL 2025** program,including financial support for experimental missions, omics analyses, publications, and conferences.