Internship Proposition
(one page max)

Master 2 GP Immunology & ImmunoIntervention (I^3)
2025-2026

Lab: CRCI2NA

Team: PETRY

Name and position of the supervisor: Claire Pecqueur, DR CNRS

Email of the supervisor: claire.pecqueur@univ-nantes.fr

Candidate (if internship filled):

Title of the internship: Metabolic Profiling of Vδ2 CAR T Cells: Impact of CAR Design on Function and Exhaustion

Summary of the internship proposal: Chimeric Antigen Receptor (CAR) T cell therapy is revolutionizing cancer treatment, yet its efficacy in solid tumors such as glioblastoma (GBM) remains limited. Among alternative immune effectors, γδ T cells, and particularly the Vδ2 subset, offer unique advantages due to their MHC-independent recognition and dual innate-adaptive cytotoxic capacity.

This project aims to characterize how different CAR designs influence the metabolism and functional fitness of Vδ2 T cells. Specifically, we will compare CAR constructs featuring distinct transmembrane (TM) and costimulatory domains: CD28TM-CD28 vs. CD8TM-4-1BB, and investigate their association with metabolic fitness and T cell exhaustion.

In addition, various culture conditions, in particular various nutrient availability, will be explored to identify strategies that optimize CAR-Vδ2-T cell function and persistence. In this project, the student will perform metabolic characterization using the Seahorse XF Analyzer to assess mitochondrial and glycolytic activity, as well as functional assays to assess the degranulation (FACS) and cytotoxicity (microscopy, FACS) of CAR-Vδ2-T cells. Taken together, these data will provide strong preliminary results to improve preclinical CAR-based strategies.

This project offers a unique opportunity to work at the intersection of immunometabolism and cellular therapy, and will contribute to the rational design of next-generation CAR T cell strategies for solid tumors.

Option(s) linked to the project:

☐ Clinical Research Profile (Recherche Clinique)
☐ Data Analyst Profile (Recherche et Analyse de Données Omiques)
☒ Experimental Biology Profile (Recherche Expérimentale)

Form to be sent by email to : gpi3@univ-nantes.fr