

**Internship Proposition**  
**(one page max)**

**Master 2 GP Immunology & ImmunIntervention (I<sup>3</sup>)**  
**2026-2027**



**Lab:** CRCI2NA, Inserm UMR 1307/CNRS UMR 6075/Nantes Université, IRS-UN, 8 quai Moncoussu, BP 70721, 44007 Nantes cedex 1, FRANCE

**Team:** Team 2 Nuclear Oncology

**Name and position of the supervisor:** Mathilde ALLARD - MCU

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**Candidate (if internship filled):** open position

**Title of the internship:** Deciphering the Immunological Impact of Targeted Alpha Therapy in Triple-Negative Breast Cancer through Transcriptomic and Cytokine Analyses

**Summary of the internship proposal:**

Targeted alpha therapy (TAT) is an emerging therapeutic modality in oncology that combines the high cytotoxicity of alpha-particle emitters with the selective targeting of tumor-associated antigens. Beyond their direct tumoricidal effects, alpha particles may also modulate antitumor immunity by inducing inflammatory responses and reshaping the anti-tumor immune response. However, the immunological consequences of TAT remain poorly characterized, particularly in triple-negative breast cancer (TNBC).

The objective of this project is to investigate the local and systemic immune responses induced by TAT in syngeneic murine models of TNBC (4T1 and EMT6). Particular attention will be paid to changes occurring within the tumor immune microenvironment (TIME), as well as to the identification of circulating immune biomarkers.

To address these questions, the student will participate in the preparation of RNA libraries for subsequent bulk RNA sequencing analyses of tumor samples. In parallel, the expression of immune-related genes, including cytokine-encoding transcripts, will be quantified by RT-qPCR in tumor tissues. Systemic immune responses will be assessed through the measurement of circulating cytokines in serum using ELISA-based assays.

The project will be conducted within a multidisciplinary environment at the interface of nuclear medicine and immunology. We are looking for a highly motivated, rigorous, and enthusiastic Master's student with a strong interest in translational research.

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)