Caroline ARBER
Associate Professor
Ludwig adjunct scientist
Laboratory C. Arber

Department of oncology UNIL CHUV
Ludwig Institute for Cancer Research Lausanne

SUR Programme 2025 Project description:

The SUR participant will support a research project developing an organ-on-chip system to evaluate the anti-tumor function of CAR-T cells against Multiple Myeloma. Briefly, CAR-T cells today are mainly assessed in 2D *in vitro* culture, which fails to recapitulate multiple challenges CAR-T cells face when combating Multiple Myeloma in a patient, and animal models, which are likewise hampered by limited translatability to humans and ethical concerns. Organ-on-chip systems are engineered from human tissue with the aim to closely recapitulate the human microenvironment and/or specific organ functions. Studying the action of CAR-T cells in a more native-like environment may thus provide translationally relevant insights in an animal-free setting. This project aims to mimic the human bone marrow in an organ-chip with the goal to recapitulate key bone marrow physiological features and evaluate how CAR-T cell killing of Multiple Myeloma cells is influenced in this environment.

In the project the participant will employ a range of methods listed below, some of which will be carried out independently after instruction:

- Micromanufacturing of PDMS-based organ-chips
- Basic cell culture methods
- 3D cell culture
- Flow cytometry
- Fluorescence microscopy