Developing off-the-shelf allogeneic chimeric antigen receptor T cells for childhood leukemia

Project

Prof. Dr. med. Caroline Arber, Department of oncology, University Hospital Lausanne (CHUV)
Additional affiliations: University of Lausanne (UNIL), Ludwig Institute for Cancer Research Lausanne Branch

Project summary

Treatment options are extremely limited for children with acute leukemia relapse after standard of care, including allogeneic hematopoietic stem cell transplantation. In this project, we aim to develop a chimeric antigen receptor (CAR) based adoptive T cell therapy targeting a cell surface antigen involved in leukemogenesis and differentially expressed in leukemic and normal hematopoietic cell subsets. We have already developed our own CAR constructs and have shown that CAR T cells are able to eliminate leukemia cell lines *in vitro* and *in vivo* in a xenograft mouse model. In this project, we will develop an off-the-shelf CAR T cell platform with genome engineering (CRISPR/Cas9) to generate allogeneic banked CAR T cells with enhanced engraftment capacity and minimal alloreactivity. For patients with rapidly progressing and highly aggressive acute leukemia relapse or refractory disease, an off-the-shelf, readily available T cell product is preferable over an autologous product that requires several weeks of wait time until manufacturing is completed and the product is available for infusion. If our approach is successful, we will develop a clinical trial and evaluate allogeneic CAR T cells for children with relapsed/refractory acute leukemia.