Our group is linked to the Department for BioMedical Research at the University of Bern and to the University Clinic of Rheumatology and Immunology at the Insel hospital, Bern. One of our main research areas is cancer immunology and immunotherapy.

We are presently seeking a PhD student in Cancer Immunology, 100%

Project description
Breast cancer is one of the most common types of cancers and is currently considered the leading cause of cancer-related deaths in women worldwide ("Breast cancer statistics," 2022), accounting for 11.7% of all cancers. After surgical resection, 80% of breast cancer patients receive postoperative treatment. Nevertheless, most patients experience recurrence within 5 years. Breast cancer treatment usually starts with surgery followed by neoadjuvant therapy including radiotherapy, chemotherapy, hormone therapy or combination of these treatments depending on the type and stage of breast cancer. About 90% of breast cancer mortality is due to recurrence and metastasis of the residual tumors. The available treatment combination for population with high risk for recurrence may not always be successful; therefore additional treatments are highly required to improve the outcome for such patients.

Immunotherapy is a growing field and is poised to revolutionize the therapeutic landscape for breast cancer patients with high risk of metastasis and recurrence. Therapeutic cancer vaccines in general are considered a promising treatment due to their exquisitely targeted nature, minimal toxicity and side effects and the ability to induce long lasting immunological memory. The potential long-lasting memory would possibly eradicate residual cancer cells and reduce or ablate the chances of metastasis and recurrence. Cancer cells frequently express tumor antigens that, in principle, can be recognized by the patient's immune system; however, resultant immune responses are ineffective and often do not parallel clinical tumor regression.

In this project, multi-disciplinary teams from the University of Texas and University of Bern collaborate to deliver both personalized cancer vaccines for breast cancer and check-point inhibitors (CBI) to non-tumor draining lymph nodes in order to mount efficient, antitumor response without causing immune-related adverse effects (irAEs). Specifically, the team proposes to develop and use a translatable, plant-based, virus-like-particle (VLP) platform presenting personalized tumor neoantigens (tNeoAgs) and to combine it with CBI delivered to lymphatic watersheds in syngeneic mouse models of triple negative breast cancer (TNBC). Effectiveness of the approach is evidenced by strong preliminary data showing enhanced anti-tumor responses accompanied by clonal expansion of cytolytic, tAg-specific tumor infiltrating lymphocytes from bioinformatic analyses of single cell RNA sequencing. The team will test safety of the approach in a transgenic mouse susceptible to induced lymphatic infiltration in normal tissues as a clinical readout of irAEs following CBI dosing. Because the teams have translated their respective technologies into clinical studies, the developments made herein could be rapidly implemented to improve the efficacy of current and emerging CBI, establish the concept of personalized cancer vaccines, and expand the use of CBI in TNBC patients who have limited treatment options.

Requirements
We are seeking for a highly motivated PhD student. Previous work with mice is an asset (LTK module 1 level). Solid communication skills in English are required as the position involves working with an interdisciplinary team of experimental and clinical scientists. The candidate should have a proactive and independent working attitude but should be able to work in a team as well. Background or experience in flow cytometry and cancer murine models are an asset.

We offer
The position is available immediately. We offer an international dynamic and team-oriented scientific environment and excellent facilities for research with well-equipped laboratories. The experimental labs are located at the Insel hospital in Bern.

For any questions regarding the position, please feel free to contact PD Dr. Mona Mohsen directly via mona.mohsen@unibe.ch. Please send your application including CV, motivation letter, reference letter, University diplomas with grades to immunologie@insel.ch and to mona.mohsen@unibe.ch.