

Current research projects:

I) Cancer at high altitude

Living at high altitude (HA) lowers cancer mortality over a broad spectrum of cancer types. This suggests that common tumor suppressive mechanisms in different cancer types are activated in HA adapted humans. The majority of adaptive processes at HA occur in response to reduced oxygen availability (hypoxia). We investigate if adaptation to hypoxia is the driving force for reduced cancer mortality at HA. We analyze how HA exposure impacts on tumor progression, response to chemotherapy, tumor hypoxia and metastasis by using *in vitro* and *in vivo* cancer models. Some of our experiments are performed at the Jungfrauoch research station at 3'500 m altitude.

II) Anemia of cancer

Anemia of cancer is the most frequent comorbidity in cancer patients. Often anemia results from low iron levels or low erythropoietin (EPO) levels. EPO stimulates the formation of red blood cells and iron is required for the assembly of hemoglobin – the oxygen carrier of red blood cells. A reduced number of red blood cells (i.e., anemia) increases fatigue in cancer patients and may contribute to the cancer disease progression. HA residents seem to develop less anemia. We investigate if HA, by altering iron and EPO levels, lowers anemia in different anemia of cancer models.

III) Erythropoietin receptor in cancer cells

Depending on the type of anemia, cancer patients are often treated with iron, erythropoietin (EPO), or both. EPO, however, is a growth factor and has been suspected to stimulate tumor growth and metastasis. We generated erythropoietin receptor (EPOR) knock out cancer cells by CRISPR/Cas to investigate to role of EPO and EPOR in cancer cells.