

## Research Areas

### Genetic disorders of immune regulation

Antimicrobial immune responses are highly dynamic processes that involve rapid expansion and contraction of immune cell populations, targeted exertion of highly potent effector functions and secretion of soluble mediators that have antimicrobial properties and influence cell functions and interactions. To maintain homeostasis, both innate and adaptive immune responses require tight regulation. There are many checkpoints that help to maintain homeostasis in the immune system involving a variety of cells and mediators. It is therefore not surprising that genetic deficiencies in many immunologically relevant molecules can lead to immune dysregulation in addition to or in the absence of susceptibility to infection. Failure to regulate immune responses may lead to various clinical manifestations including (benign) lymphoproliferation, granuloma formation, severe eczema, colitis, febrile inflammatory responses and autoimmunity, in particular autoimmune cytopenia.

We study three immunodeficiency syndromes that predominantly manifest with immune dysregulation.

Projects:

- [ALPS - Autoimmune Lymphoproliferative Syndrome](#)
- ["leaky" SCID - Severe Combined Immunodeficiency](#)
- [FHL / HLH - \(Familial\) Hemophagocytic Lymphohistiocytosis](#)

### T-cell immunity to respiratory viruses

T cells are critical for the control of viral infections. For an effective antiviral T cell response, T cells have to be activated, to differentiate, to migrate to the site of infection and to exert their effector function. In many cases the elimination of viruses is associated with tissue damage (immunopathology).

We use various respiratory viruses (respiratory syncytial virus (RSV), pneumonia virus of mice (PVM) to understand these processes in a mouse model. It is our goal to identify target molecules that allow to reduce the (immuno) pathology induced by a viral infection without compromising virus control. Furthermore our work intends to make a contribution to vaccine development against respiratory viruses.

In recent years we have been able to contribute some aspects to the role of T cells in respiratory virus infections in the mouse model. Benefit versus damage by antiviral T cell responses is in the center of these investigations.

Projects

- [RSV - Respiratory Syncytial Virus](#)
- [PVM - Pneumonia Virus of Mice](#)