

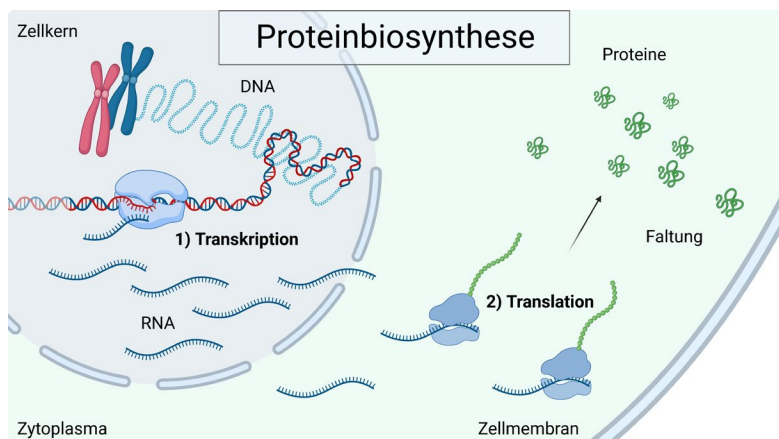
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Research in the Grisons

T helper cells in the focus of research

In search of hidden proteins

As a child, Jana Koch learned to ski at the Bolgenlift in Davos. For her doctoral thesis, the native German has returned to Davos. Previously, Koch studied molecular medicine in Freiburg, Germany. Since the end of 2018, she has been conducting research at the Swiss Institute for Allergy and Asthma Research SIAF, which came to her attention through the Life Science Zurich Graduate School's doctoral program: "I wasn't aware until then that research in medicine and the natural sciences has been going on in Davos for over 100 years." She adds jokingly, "I had also almost forgotten how to ski in the meantime."



*Protein biosynthesis: from DNA to protein.
Image: Created with www.biorender.com.*

Koch describes her challenging research topic: "As our institute name already implies, at SIAF we investigate the causes and mechanisms of allergies and asthma. T cells circulating in the blood play an important role for the human immune system. They specialize into different types of T helper cells (Th cells) when activated by antigens. Th cells help our body fight off bacteria and viruses. But they also play a

central role in diseases such as allergies. For my research project, I am looking at what exactly happens in Th cells at a certain point in time. During protein biosynthesis, which takes place in the cells, the genetic code of the DNA is 'translated' into proteins. The proteins produced then perform a specific function. I hope to detect proteins that were previously not known to be created during the translation process and that may also have an impact on the behavior of Th cells."

The molecular physician explains how she obtained the required Th cells: "First, I took 200 ml of blood each from healthy persons. To separate the blood into its components, I centrifuged it with a device. Using a pipette, I removed the layer that also contained the T cells. With the help of certain antibodies coupled to tiny magnetic beads, I was able to 'fish' the T cells out of the liquid. This gave me about 20 million 'naïve' (not yet fixed on a type of Th cell) T cells. To help them turn into Th cells, I stimulated them with antibodies and other substances to mimic the environment in which they are activated in the human body."

To get a ‘snapshot’ of the process in the Th cells that she is particularly interested in, however, Koch has to go through many more complicated steps, using techniques such as ribosome profiling and RNA sequencing. The computer-assisted analysis of the several hundred gigabytes of data Koch has obtained will take some time: “Ultimately, we want to use this research to help allergy sufferers. I hope to find clues to proteins that we can ideally use in such a way as to prevent allergic reactions, for example.”

Jana Koch and Daniela Heinen

Research at SIAF (www.siaf.uzh.ch) focuses on the immunological basis of allergic and asthmatic diseases. SIAF is affiliated with the University of Zurich and a member of the Life Science Zurich Graduate School.

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Jana Koch