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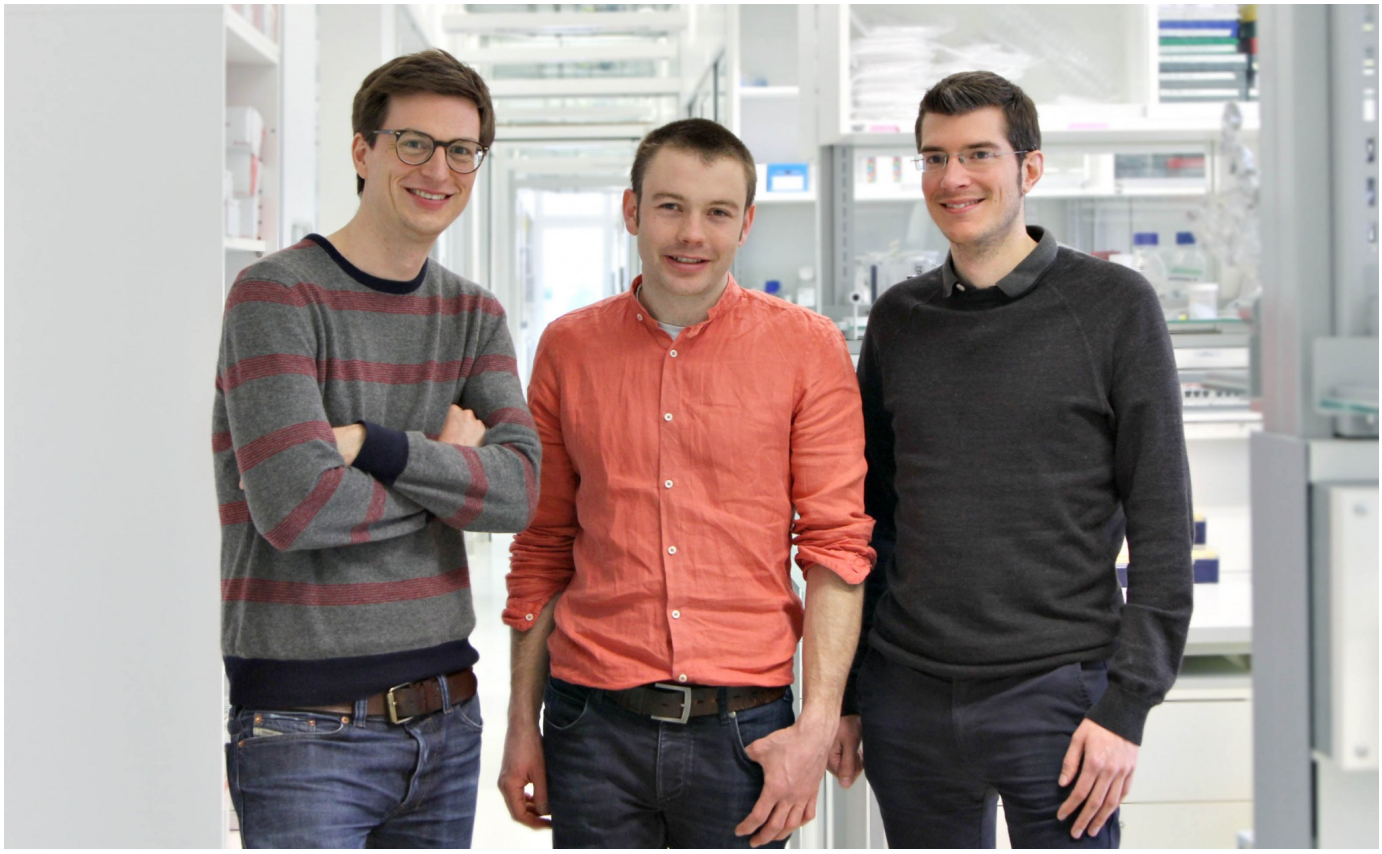
Healthcare industry BW

Double success for Heidelberg stem cell researchers

Two awards at once, both carrying high monetary prizes, go to young researchers from the Heidelberg Institute for Stem Cell Research and Experimental Medicine (HI-STEM) at the German Cancer Research Center (DKFZ): Simon Raffel will receive the 2018 Walter Schulz Prize for his discovery how misregulated breakdown of amino acids in leukemia stem cells promotes blood cancer. Simon Haas will share the 2018 Otto Schmeil Prize with his colleague Lars Velten from EMBL. The two stem cell researchers have jointly demonstrated that the development of blood cells in the bone marrow follows very different paths from what scientists have assumed up to now.



Simon Raffel, Lars Velten and Simon Haas.

The Heidelberg Academy of Sciences will honor Simon Haas and Lars Velten with the 2018 Otto Schmeil Prize from the Otto Schmeil Foundation. The award, which was established in 2016, carries a monetary prize of €15,000 and will be presented on June 9 in the Old Assembly Hall of Heidelberg

University.

Blood consists of a wide variety of cell types specialized on specific tasks: oxygen supply, wound healing, or defense against pathogens. High quantities of these cells die every day and must immediately be resupplied by the blood-forming (hematopoietic cells) in the bone marrow. So far, thousands of cells had to be analyzed together in order to study hematopoiesis. In a collaboration between the DKFZ, HI-STEM and the European Molecular Biology Laboratory (EMBL), Simon Haas and Lars Velten have now been the first to investigate the process of blood formation from stem cells in single cells.

The researchers developed a method to characterize the gene activity and the characteristics of thousands of individual stem cells separately. Up to now, scientists have assumed that hematopoietic stem cells have to pass through defined development stages to develop into mature blood cells in a stepwise process. However, Haas and Velten have now demonstrated that stem cells follow a continuous and gradual development process to mature into blood cells, without passing through the previously postulated defined intermediate stages.

In addition, the two young researchers discovered a previously unnoticed heterogeneity in stem cells, suggesting that they commit to a specific differentiation path earlier than previously thought. Haas demonstrated in mice that stem cell specialization is important in order to be able to respond more quickly to stress such as in a viral infection. These results are also relevant in order to better comprehend how blood cancer develops. Velten and Haas are currently pursuing research on this.

Simon Haas studied Molecular Cell Biology and Biochemistry at Heidelberg University and at the Imperial College in London. Already in his PhD thesis in the HI-STEM group led by Marieke Essers, he specialized in stem cell research. He subsequently did research at the Massachusetts Institute of Technology and at Harvard Medical School. After earning his PhD in 2017, Haas has been leading a HI-STEM research group at the DKFZ

Lars Velten studied Molecular Cell Biology at Heidelberg University and undertook a PhD at EMBL in the area of genome research. Following research positions at the Universities of Berkeley and Stanford (USA) and at the Weizmann Institute (Israel), he now pursues research at EMBL's Genome Biology Unit.

Misregulated breakdown of amino acids promotes leukemia

Simon Raffel, DKFZ and HI-STEM, will be recognized with this year's Walter Schulz Prize, which comes with a monetary prize of €10,000. Established in 1980, the Walter Schulz Foundation annually gives a research award to young scientists who have attained an excellent accomplishment in tumor research. Raffel will receive the award on April 20 in Munich.

Acute myeloid leukemia (AML) is an aggressive cancer of the blood that very often recurs in the wake of successful initial treatment. Therapy-resistant leukemia stem cells are the culprits for this. Raffel has now been able to show that an enzyme that is responsible for breaking down specific amino acids in food plays a key role in the development of this type of leukemia.

The enzyme, called BCAT1, is found at suspiciously high levels in leukemia stem cells. These levels rise even higher during a cancer recurrence. Working in the group of Andreas Trumpp, Raffel discovered a surprising link between energy metabolism and the so-called "epigenetic code". High BCAT1 levels lead to increased levels of tiny chemical labels, called methylations, in the DNA. These epigenetic labels determine whether particular genes are active or silent.

The level of DNA methylation has an immense impact on many cellular functions including

aggressiveness of a tumor and resistance against chemotherapy. A blockade of BCAT1 using a targeted agent might normalize DNA methylation. The researchers expect that this could be a way to eliminate leukemia stem cells and thereby substantially improve the prognosis of AML patients.

Stefan Raffel studied medicine at the University of Heidelberg and Columbia University in New York. Subsequently, he pursued research at Harvard Medical School in Boston, USA. Following a short interval of work as a consultant at McKinsey, he accepted a position as assistant physician at Charité Hospital in Berlin where he earned his doctorate in 2011. Dr. Raffel then joined HI-STEM at the DKFZ as a postdoc. Since 2015, he has also been working as an assistant physician at Heidelberg University Hospital.

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