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The immunologist Dr. Andrea Ablasser receives the Paul Ehrlich and Ludwig Darmstaedter Prize for Young Researchers for 2014

DNA sensors detect "foreign" nucleic acids outside the cell nucleus – a tactic that is an important mechanism especially for identifying viruses and certain bacteria. Andrea Ablasser is investigating how different DNA sensors function.

FRANKFURT am MAIN. The €60,000 Paul Ehrlich and Ludwig Darmstaedter Prize for Young Researchers was awarded this year to Dr. Andrea Ablasser, an immunologist working in Bonn. Ablasser, a medical doctor, received the prize because, as the Scientific Council of the Paul Ehrlich Foundation stated, "her research shows how the immune system identifies viruses and bacteria." The award will be presented today, the 160th birthday of Paul Ehrlich, by Professor Harald zur Hausen in the Paulskirche, Frankfurt.

The mammalian immune system comprises both innate and adaptive immune defenses. The innate immune defense system identifies invaders by their specific patterns or molecular signatures. On initial contact, the innate immune system gathers information on the type and context of the threat so that it can trigger an immune response that is specifically tailored to the danger presented. Viruses are among the most common invaders. Viruses bring DNA or RNA with them and they are difficult to identify because, beside these nucleic acids, they otherwise carry very little "baggage". "Viral DNA is recognized as foreign mainly because it appears at the wrong place in the cell," says Andrea Ablasser. "In other words, outside the cell

nucleus." The DNA's presence is "picked up" there by sensors that are specialized in detecting DNA from different pathogens, e.g., viruses. Depending on which sensor responds, the immune system receives initial information as to the identity of the invader.

Ablasser, who is currently Head of a Junior Research Group at the Institute of Clinical Chemistry and Clinical Pharmacology at the University of Bonn, has worked on various DNA sensors and has discovered a novel 2nd messenger molecule, which is being produced by one of these DNA sensors. The young scientist has made a name for herself with numerous prestigious publications.

One of the DNA sensors Ablasser has been working on activates a nanomachine that produces suitable messengers for an appropriate immune response. This particular sensor reacts to poxviruses and listeria. Another DNA sensor that Ablasser has discovered ensures that the genes necessary for a specific antiviral immune response are activated. For instance, it reacts to Epstein Barr viruses. A third DNA sensor recognizes a number of different viruses and possibly also some bacteria. It informs neighboring cells about the imminent threat and is helped in this job by an unconventional messenger that Ablasser has identified. This unconventional messenger is passed through specialized channels into adjacent cells and puts them on alert. These cells then prepare to fend off the attack even though they have not come in direct contact with the invader. "The whole thing is not unlike an advance warning system," explains Ablasser. "That's how the infected cells prevent the invader from spreading."

The prize-winner's research has great significance for medicine. The better scientists understand how the innate immune system gathers information about the type and context of a threat, the more effective the treatments for autoimmune diseases. In autoimmune diseases, the immune system does not distinguish correctly between "self" and "non-self". Ablasser's research contributes to developing better vaccines for immunotherapy, for instance in the treatment of cancer.

Short biography of Dr. Andrea Ablasser

Andrea Ablasser (born 1983) studied medicine at the Ludwig Maximilians University in Munich, where she also completed her doctorate in 2010. In 2006 and 2008 she spent a number of months at the University of Massachusetts in Worcester. Ablasser did her clinical training at the Ludwig Maximilians University in Munich and spent parts of her practical year at Oxford University and at Harvard Medical School. Ablasser has been doing research at the Institute of Clinical Chemistry and Clinical Pharmacology at the University of Bonn, latterly as Head of a Junior Research Group. She will soon take up a professorship at the Federal Institute of Technology Lausanne (EPFL). Ablasser has already published 16 articles in high-caliber journals, three of them in Nature in the last year alone. The Young Researcher prize-winner was awarded the Jürgen Wehland Prize just a few weeks ago.

Paul Ehrlich and Ludwig Darmstaedter Prize for Young Researchers

The Paul Ehrlich and Ludwig Darmstaedter Prize for Young Researchers, awarded for the first time in 2006, is conferred once a year by the Paul Ehrlich Foundation on a young investigator working in Germany for his or her outstanding achievements in the field of biomedical research. The prize money must be used for research purposes. University faculty members and leading scientists at German research institutions are eligible for nomination. The selection of the prizewinner is made by the Scientific Council on a proposal by the eight-person selection committee.

The Paul Ehrlich Foundation

The Paul Ehrlich Foundation is a legally dependent foundation which is managed in a fiduciary capacity by the Association of Friends and Sponsors of the Goethe University, Frankfurt. The Honorary Chairman of the Foundation, which was established by Hedwig Ehrlich in 1929, is the German Federal President, who also appoints the elected members of the Scientific Council and the Board of Trustees. The Chair of the Paul Ehrlich Foundation is Professor Harald zur Hausen, and the Chair of the Board of Trustees is Dr. Rolf E. Breuer. Professor Wilhelm Bender, in his function as Chair of the Association of Friends and Sponsors of the Goethe University, is at the same time the Chair of the Scientific Council of the Paul Ehrlich Foundation. The Chancellor of the Goethe University is at the same time a member of the Board of Trustees.

Further information

You can obtain selected publications, the list of publications and a photograph of the prizewinner from the Press Office of the Paul Ehrlich Foundation (c/o Dr. Hildegard Kaulen, phone: +49 06122/52718, email: Paul-Ehrlich-Stiftung@uni-frankfurt.de and at www.paul-ehrllich-stiftung.de.