

How gut bacteria educate our immune system and how cancer drugs can be remote-controlled

*This year's Paul Ehrlich and Ludwig Darmstaedter Prizes
will be awarded at Paulskirche in Frankfurt today*

Physician and immunologist Dennis L. Kasper (81) of Harvard Medical School will receive the Paul Ehrlich and Ludwig Darmstaedter Prize 2024, endowed with €120,000, in a ceremony held in Frankfurt's Paulskirche today. The award recognizes his discovery of the first words of the biochemical language through which bacteria that populate our colon educate our immune system, thereby ensuring its healthy development. The Early Career Award goes to chemist Johannes Karges (31) from Ruhr University Bochum for his invention of a process with which highly effective chemotherapeutic agents can only accumulate in the tumor and can only be activated there by irradiation with light or ultrasound.

FRANKFURT. Around ten trillion bacteria live in the large intestine of every human being, which, for the most part, act as guarantors of our health. This is because over the course of evolution, relationships have developed between bacteria and their hosts from which both benefit. In return for finding an ideal habitat in the gut, the bacteria defend us against their pathogenic relatives, provide us with vitamins and nutrients or help us with digestion. This symbiosis can only succeed through continuous communication between our intestinal bacteria and our immune system. **Dennis L. Kasper** has decoded the first words and rules of the language in which this communication takes place. He discovered that certain bacterial molecules act as educators of the immune system and teach it not to attack useful bacteria or cells of its own body, i.e. to maintain a healthy balance between tolerance and aggression. "Dennis Kasper is the first person to succeed in uncovering communication channels in the superorganism formed by humans and their microbiome," explains, Prof. Dr. Thomas Boehm, Chairman of the Scientific Council of the Paul Ehrlich Foundation. "In doing so, he has opened the door to a field of research in which new approaches for the treatment of autoimmune diseases are already emerging."

Cisplatin and two of its derivatives are the world's most common cancer drugs. While they show impressive success against certain types of cancer, at the same time, they quickly bring about resistance. In addition, given that they also inhibit the division of healthy body cells, they cause serious side effects. The winner of this year's Paul Ehrlich and Ludwig Darmstaedter Early Career Award, **Johannes Karges**, has developed a process that allows platinum-containing drugs to act exclusively in the tumor. To do so, he packages them in nanoparticles that only accumulate in the cancer tissue, where they are then activated by external irradiation with light or ultrasound. In this way, he can precisely control the use of certain cytostatic drugs in terms of both space and time – like remote-controlled magic bullets that, in the spirit of Paul Ehrlich, selectively cure the disease without harming the rest of the body. The prizewinner has already provided preclinical proof of his concept, whose translation into clinical

practice could significantly increase both the efficacy and tolerability of many chemotherapies.

Paul Ehrlich and Ludwig Darmstaedter Prize 2024

<https://tinygu.de/5UkpI>

Dennis L. Kasper has been *William Ellery Channing Professor of Medicine* since 1989 and *Professor of Immunology* at Harvard Medical School since 1997. He is co-editor of *Harrison's Principles of Internal Medicine* (currently in its 22nd edition), the world's most widely used medical textbook, of which he was editor-in-chief for the 16th and 19th editions.

<https://kasperlab.hms.harvard.edu/>

Paul Ehrlich and Ludwig Darmstaedter Early Career Award 2024

<https://tinygu.de/jiiHJ>

Johannes Karges studied chemistry in Marburg and London and conducted research as a doctoral student in Paris and Guangzhou. As a postdoctoral researcher, he worked at the University of California, San Diego, in La Jolla. Since November 2022, he has headed a research group at Ruhr University Bochum as a Liebig Fellow of the Chemical Industry Fund. <https://www.kargesgroup.ruhr-uni-bochum.de/>

Further information

Press Office of the Paul Ehrlich Foundation

Joachim Pietzsch

Phone: +49 (0)69 36007188

E-mail: j.pietzsch@wissenswert.com

www.paul-ehrlich-stiftung.de

The Paul Ehrlich and Ludwig Darmstaedter Prize

The Paul Ehrlich and Ludwig Darmstaedter Prize is the most prestigious medical prize in Germany. It is endowed with 120,000 euros and is traditionally awarded on Paul Ehrlich's birthday, March 14, in Frankfurt's Paulskirche. It honors scientists who have made outstanding contributions in the field of research represented by Paul Ehrlich, particularly in immunology, cancer research, haematology, microbiology and chemotherapy. The prize, which has been awarded since 1952, is financed by the Federal Ministry of Health, the German Association of Research-Based Pharmaceutical Companies and earmarked donations from the following companies, foundations and institutions: Else Kröner-Fresenius-Stiftung, Sanofi-Aventis Deutschland GmbH, C.H. Boehringer Sohn AG & Co KG, Biotest AG, Hans und Wolfgang Schleussner-Stiftung, Frankfurter Allgemeine Zeitung, Fresenius SE & Co KGaA, F. Hoffmann-LaRoche Ltd, Grünenthal Group, Janssen-Cilag GmbH, Merck KGaA, Bayer AG, Georg von Holtzbrinck GmbH & Co KG, GlaxoSmithKline GmbH & Co KG, B. Metzler seel. Sohn & Co KGaA. The prize winners are selected by the Board of Trustees of the Paul Ehrlich Foundation. A list of the members of the Board of Trustees is available on the website of the Paul Ehrlich Foundation.

The **Paul Ehrlich and Ludwig Darmstaedter Early Career Award**, awarded for the first time in 2006, is presented once a year by the Paul Ehrlich Foundation to a young scientist working in Germany for outstanding achievements in biomedical research. The prize money of €60,000 must be used for research-related purposes. University professors and senior scientists at German research institutions are eligible to nominate candidates. The award winners are selected by the Board of Trustees on the recommendation of an eight-member selection committee.

The **Paul Ehrlich Foundation** is a legally dependent foundation that is administered in trust by the **Association of Friends and Sponsors of Goethe University (www.vff.uni-frankfurt.de)**. Professor Dr. Katja Becker, President of the German Research Foundation, who also appoints the elected members of the Foundation Council and the Board of Trustees, is Honorary President of the Foundation, which was established by Hedwig Ehrlich in 1929. The Chairman of the Board of Trustees of the Paul Ehrlich Foundation is Professor Dr. Thomas Boehm, Director at the Max Planck Institute of Immunobiology and Epigenetics in Freiburg, and the Chairman of the Board of Trustees is Professor Dr. Jochen Maas, Managing Director Research & Development, Sanofi-Aventis Deutschland GmbH. In his function as Chairman of the Association of Friends and Sponsors of Goethe University, Prof. Dr.

Wilhelm Bender is also a member of the Board of Trustees of the Paul Ehrlich Foundation. In this function, the President of Goethe University is also a member of the Board of Trustees.

With its research strength and international orientation, Goethe University is one of Frankfurt's largest employers and a member of the association of the 15 major research-intensive and leading medical universities in Germany (German U15). Together with the Technical University of Darmstadt and Johannes Gutenberg University Mainz, Goethe University Frankfurt operates the strategic Rhine-Main Universities alliance (RMU). Established in 1914 as a foundation university with funding from Frankfurt's citizens, Goethe University enjoys a high degree of autonomy, and is embedded in a highly participatory and supportive environment.

Research at Goethe University is structured into six profile areas spanning the humanities, social sciences, economics, natural and life sciences, as well as medicine – and is conducted in an interdisciplinary, cross-faculty and self-governed manner. Whether it concerns teaching and research, or the transfer of technology and knowledge in close interaction with civil society, Goethe University delivers contributions to meet the challenges of the 21st century and acts as a driving force for the progressive development of society, politics, and business – together with its regional, national, and international partners. Based on its holistically conceived, research-oriented educational process, Goethe University is dedicated to qualifying its students to become responsible, cosmopolitan citizens. <https://www.goethe-university-frankfurt.de/en>

Publisher: The President of Goethe University **Editor:** Joachim Pietzsch/Dr. Markus Bernards, Science Editor, PR & Communication Office, Theodor-W.-Adorno-Platz 1, 60323 Frankfurt am Main, Tel: -49 (0) 69 798-12498, Fax: +49 (0) 69 798-763 12531, bernards@em.uni-frankfurt.de