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LEIBNIZ INSTITUTE FOR EXPERIMENTAL VIROLOGY (HPI)

Human adenovirus: promising target for treatment identified

Results published in Science Immunology

Hamburg. In a collaborative study, researchers from the Leibniz Institute for Experimental Virology (HPI) used a 3D organoid model of the intestine to investigate how natural killer cells recognize and kill intestinal epithelial cells infected with human adenoviruses (HAdV). In doing so, they succeeded in identifying a new target that may pose a candidate for immune therapies for children with severe adenovirus infections after stem cell transplantation. The results have now been published in the renowned journal "Science Immunology".

Human adenoviruses are a major cause of disease in children and immunocompromised people, especially after allogeneic hematopoietic stem cell transplantation. Effective therapies against HAdV infections without severe side effects are currently not available. Against this background, researchers from the HPI research departments "Virus Immunology" and "Viral Transformation" have now used a 3D organoid model of the intestine to investigate how natural killer cells recognize and kill HAdV-infected intestinal epithelial cells.

It was shown that a cascade is initiated in infected intestinal cells that enables improved recognition and killing by KIR3DS1+ natural killer cells. In line, the researchers discovered that children who received donor cells during stem cell transplantation with the receptor KIR3DS1+/HLA-Bw4+ are better protected against a severe course of HAdV infection.

"Intestinal organoids enable the study of interactions between human immune cells and tissue cells in inflammation and infection in the context of personalized medicine. Our results suggest that the KIR3DS1/HLA-F axis could be a promising target for the treatment of severe HAdV reactivation after allogeneic hematopoietic stem cell transplantation in children", explains Dr. Dr. Madeleine Altfeld-Bunders from the HPI research department of Virus Immunology and the III Medical Clinic of the University Medical Center Hamburg-Eppendorf.

The HPI-led study involved numerous scientific institutions, including the University Utrecht and its associated University Medical Center (UMC), the University Medical Center Hamburg-Eppendorf (UKE), the Princess Máxima Center for pediatric oncology, the German Center for Infection Research (DZIF), and Altona Children's Hospital.

The results have been published in the journal Science Immunology:

Johannes M. Jung, Wilhelm Ching, Martin E. Baumdick, Helga Hofmann-Sieber, Jens B. Bosse, Tobias Koyro, Kimberly J. Möller, Lucy Wegner, Annika Niehrs, Kristina Russu, Mareike Ohms, Wenli Zhang, Anja Ehrhardt, Kevin Duisters, Eric Spierings, Angelique Hölzemer, Christian Körner, Suze A. Jansen, Sven Peine, Ingo Königs, Marc Lütgehetmann, Daniel Perez, Konrad Reinshagen, Caroline A. Lindemans, Marcus Altfeld1, Mirjam Belderbos, Thomas Dobner, and Madeleine J. Bunders (2021). **KIR3DS1 directs**

Media Contact

Dr. Franziska Ahnert, HPI
Phone: 040/48051-108
presse@leibniz-hpi.de

Scientific Contact

Dr. Dr. Madeleine Altfeld-Bunders, HPI
Phone: 040/48051-224
madeleine.bunders@leibniz-hpi.de

Publication

KIR3DS1 directs NK cell-mediated protection against human adenovirus infections.
Science Immunology,
September 17, 2021.

NK cell-mediated protection against human adenovirus infections. Science Immunology, September 17, 2021.

HPI contact:

Dr. Dr. Madeleine Altfeld-Bunders
Madeleine.bunders@leibniz-hpi.de
Tel.: 040/48051-224

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Download the PDF of the press release: https://www.hpi-hamburg.de/en/current-topics/press/singleview/archive/2021/article/humanes-adenovirus-vielversprechendes-ziel-fuer-die-behandlung-identifiziert//?tx_ttnews%5Bmonth%5D=09&cHash=50514fff6df4adccbdd429f1ab7babb

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The Leibniz Institute for Experimental Virology (HPI) conducts research into human pathogenic viruses with the aim of understanding virus-related diseases and developing new therapeutic approaches.

On the basis of basic experimental research, new starting points for improved procedures for the treatment of viral diseases such as AIDS, influenza and hepatitis, but also of emerging viral infections, are to be developed. With its main research areas, HPI covers the world's most important viral infectious agents.

Founded in 1948, the institute's origins go back to the patron Philipp F. Reemtsma and the neurologist Heinrich Pette. As a foundation under civil law, HPI is a non-profit and independent research institution that has been a member of the Leibniz Association (WGL) since 1995. The institute is funded proportionally by the German Federal Ministry of Health (BMG) and the joint research funding of the federal states, represented by the Ministry of Science, Research, Equality and Districts (BWFGB) of the Free and Hanseatic City of Hamburg. In addition, a large proportion is obtained through competitive procedures.

More information: www.hpi-hamburg.de

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