Press Release

29. July, 2019

Identification of a direct interaction between NK cells and a subset of HLA class II molecules

Previously unknown interaction suggests role of HLA class II molecules as regulators of innate immune responses

Hamburg. A scientific team from the Research Department of Virus Immunology at the Heinrich Pette Institute, Leibniz Institute for Experimental Virology (HPI) has investigated the binding of NK cell receptors to HLA class II molecules. The results have now been published in the renowned journal "Nature Immunology".

Natural killer cells (NK cells) can recognize virus-infected and stressed cells with the help of activating and inhibitory receptors. Many of these receptors interact with human leukocyte antigen (HLA) class I molecules on the cell surface. Although early studies have also suggested a functional influence of HLA class II molecules on NK cell activity, no NK cell receptor has yet been identified that specifically recognizes HLA class II molecules.

Researchers from the HPI Research Department of Virus Immunology under the leadership of Prof. Marcus Altfeld have now investigated whether two large families of NK cell receptors (killer cell immunoglobulin-like receptors and natural cytotoxicity receptors) contain receptors that can bind to HLA class II molecules.

The results, now published in the renowned journal "Nature Immunology", show a direct interaction between the activating NK cell receptor NKp44 and a subset of HLA class II molecules, including the HLA molecule HLA-DP401, one of the most abundant HLA-DP molecules in Caucasians.

"Our results show a previously unknown interaction between a number of HLA-DP molecules and the NK cell receptor NKp44. This interaction suggests an influence of HLA class II molecules on the regulation of innate immune cells", explains Annika Niehrs, first author of the publication and PhD student at the HPI.

"This newly identified interaction now enables the functional assessment of the consequences of these interactions for disease outcomes associated with HLA-DP genotypes. These include, for example, infections with the hepatitis B virus and inflammatory intestinal diseases", adds Prof. Marcus Altfeld, Head of the HPI Research Department "Virus Immunology" and Coordinator of the HIV Research Area at the German Center for Infection Research (DZIF).

This study, led by the Heinrich Pette Institute, was conducted as part of a DZIF project (TTU 04.810) and supported by the Federal Funds of the Frederick National Laboratory for Cancer Research.

The results were published in the journal „Nature Immunology":

Annika Niehrs, Wilfredo F. Garcia-Beltran, Paul J. Norman, Gabrielle M. Watson, Angelique Hölzemer, Anais Chapel, Laura Richert, Andreas Pommerening-Röser, Christian Körner, Mikki Ozawa, Gloria Martus, Jamie Rossjohn, Jar-How Lee, Richard Berry, Mary Carrington, Marcus Altfeld (2019). ***A subset of HLA-DP molecules serve as ligands for the natural cytotoxicity receptor NKp44.*** Nature Immunology, 2019 July. *DOI:* 10.1038/s41590-019-0448-4

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Publication

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Heinrich Pette Institute, Leibniz Institute for Experimental Virology

The Heinrich Pette Institute, Leibniz Institute for Experimental Virology (HPI) investigates the biology of human pathogenic viruses with the aim of unraveling the molecular mechanisms that control viral life cycles and virus induced pathogenesis. The institute applies basic experimental research to develop new approaches for contemporary treatments of viral infections such as AIDS, influenza and hepatitis but also of emerging viral diseases.

The HPI was established by the philanthropist Philipp F. Reemtsma and the neurologist Heinrich Pette in 1948. The institute is a non-profit, independent research foundation that is part of the Leibniz Association.

The HPI is a member of the German Centre for Infection Research (DZIF).

Further information: www.hpi-hamburg.de