

New insights into the immune system of the gastrointestinal tract

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Lymphotoxin is a cytokine, or intercellular messenger, and plays an important role in the immunological balance of the gastrointestinal tract. It regulates the immune system of the digestive tract, which is made up of immune cells, immunoglobulins (antibodies) as well as intestinal bacteria. An international team of scientists supported by the Helmholtz Zentrum München has now discovered how this complex interaction functions and how lymphotoxin controls the production of immunoglobulins in the gut. The results are published in the latest issue of the specialist journal *Science*.

Naturally occurring [intestinal bacteria](#) (also known as gut flora) and an immune system comprising local immune cells maintain the immunological balance in the [gastrointestinal tract](#). One important agent is immunoglobulin A (IgA), which is found on mucous membranes, where it renders pathogens and toxins harmless.

Lymphotoxins control the production of immunoglobulin A (IgA) and thus participate in immune responses as well as in the regular composition of the [intestinal flora](#), the scientists report in the study. The team led by Dr. Andrey Kruglov and Professor Sergei Nedospasov from the German Rheumatism Research Center (DRFZ) Berlin, an institute of the Leibniz Association, Professor Mathias Heikenwälder from the Institute of Virology at the Helmholtz Zentrum München (HMGU) as well as other national and international partners were able to show that lymphotoxins – soluble lymphotoxin alpha (sLTa3) as well as membrane-bound lymphotoxin beta (LTa1b2) – induce IgA production and support

the body's [immune response](#). Lymphotoxins are inflammatory messengers that are formed by [immune cells](#) when they come into contact with pathogens. If these lymphotoxins are lacking, IgA production is reduced or even halted, resulting in changes in the intestinal flora.

"The results provide us with new insights into how the enteric [immune system functions](#). The relationship between inflammatory messengers and the performance of the immune system helps us to understand how intestinal diseases occur", Professor Heikenwalder explains. He adds another important relevance of their results: "These insights are also important for the treatment with certain immunomodulators (such as tumor necrosis factor alpha (TNF) blockers). They bind soluble lymphotoxin and could therefore also influence IgA production and as a result upset the immunological balance."

More information: Kruglov, A. et al. (2013), Nonredundant Function of Soluble LTa3 Produced by Innate Lymphoid Cells in Intestinal Homeostasis. *Science*, [DOI: 10.1126/science.1243364](https://doi.org/10.1126/science.1243364)

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