

# COVID: On the lookout for new antibodies

January 9 2023

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A team of researchers at FAU and Universitätsklinikum Erlangen has gained new insights into the maturation of SARS-CoV-specific antibodies after multiple vaccinations with the Comirnaty mRNA vaccine. They have now published their work in the journal *Science Immunology*.

Antibody response is essential for protection against viral infectious diseases, since only neutralizing antibodies can prevent the initial

penetration of a pathogen effectively. These antibodies block the binding sites in the surface protein of the virus that are required for docking onto the cellular receptor and thus for uptake into the cell. In addition, antibodies can limit the spread of the virus in the body via additional functions. These functions depend, to a very high extent, on the relevant subclass of the antibody molecule.

During their research, the team led by Prof. Dr. Matthias Tenbusch, Institute of Clinical and Molecular Virology at Universitätsklinikum Erlangen; Prof. Dr. Thomas Winkler, FAU Professorship for Genetics; and PD Dr. Kilian Schober, Institute of Clinical and Molecular Virology at Universitätsklinikum Erlangen, was able to demonstrate that an increased number of antibodies of the IgG4 subclass form after repeated vaccinations with the Comirnaty mRNA vaccine.

Up to now, only a small amount of research in the context of viral infectious diseases has been carried out on these antibodies, which tend to be considered as non-inflammatory, because they are quite rare. This exciting discovery in the field of immunology thus raises new questions about antibody maturation.

The ability of IgG4 antibodies to successfully neutralize the SARS-CoV-2 virus and its variant remains unchanged—an ability that does not differentiate this class of antibodies from the subclass IgG1, which are most frequently formed. The vaccination continues to be effective and it offers very good protection from serious cases as proven in clinical trials. In addition, there is no evidence of adverse effects to the clinical course of an infection with SARS-CoV-2 after several mRNA vaccinations.

However, in the context of the potential of mRNA vaccines for use in infectious diseases as well as for tumors and auto-immune diseases, it is all the more important that the triggered immune responses are fully

understood. Further studies are required to find out which immunological mechanisms are responsible for the unusual IgG4 antibody production. During these studies, it will be interesting to investigate whether this type of antibody is formed with other mRNA vaccinations and whether they could be significant for the progression of viral infections.

**More information:** Pascal Irrgang et al, Class switch towards non-inflammatory, spike-specific IgG4 antibodies after repeated SARS-CoV-2 mRNA vaccination, *Science Immunology* (2022). [DOI: 10.1126/sciimmunol.ade2798](https://doi.org/10.1126/sciimmunol.ade2798)

Provided by Friedrich–Alexander University Erlangen–Nurnberg

Citation: COVID: On the lookout for new antibodies (2023, January 9) retrieved 16 April 2024 from <https://medicalxpress.com/news/2023-01-covid-lookout-antibodies.html>

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