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UNIVERSITÄT BERN

*Media release*

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**Covid-19**

# Limited vaccination success after antibody therapy

**In a groundbreaking study, researchers at Inselspital, the Bern University Hospital and the University of Bern investigated the effect of mRNA vaccines in patients following antibody therapy. In this exceptionally vulnerable patient group, the immune system's vaccine response is significantly reduced after anti-CD20 treatment. At the same time, however, the researchers have demonstrated ways to optimize the vaccine protection, at least in parts of this particularly at-risk group.**

Antibody therapy for the treatment of certain autoimmune diseases (e.g. rheumatoid arthritis), some types of B-cell cancers (e.g non-Hodgkin's lymphoma) and certain kidney transplants uses drugs that are effective against the surface antigen CD20 on B cells. For instance, this anti-CD20 therapy can be used to specifically inhibit or target B cells while sparing hematopoietic stem cells. Worldwide, several million patients are treated with these drugs each year. It was already known that individuals with diseases requiring anti-CD20 therapy form a risk group for severe COVID-19 trajectories. Based on the presence of antibodies against SARS-CoV-2-spike-protein in the blood, the study has now addressed the question of how effectively an mRNA vaccination can protect this at-risk group against COVID-19. The antibodies detected generally correlate well with the ability to neutralize SARS-CoV2 and are therefore used as a measure to predict vaccination success.

**Impaired immune response to mRNA vaccination after anti-CD20 therapy**

The study shows that the immune response to vaccination with the tested mRNA vaccines is significantly impaired in individuals who had previously undergone one of the anti-CD20 therapies Rituximab or Ocrelizumab. For example, antibodies specific to SARS-CoV2-spike-protein, an indication of a protective effect after vaccination, could be detected in just under half of patients, compared with 100% in healthy individuals. However, the study also shows that some of these at-risk groups may still benefit from a COVID-19 vaccination under certain circumstances.

**About the study**

Participating in the study were the Departments of Rheumatology and Immunology, Nephrology, Hematology, Neurology and Dermatology as well as the Center of Laboratory Medicine at Inselspital, Bern University Hospital. Furthermore, the Institute for Infectious Diseases at the University of Bern also made significant contributions. The breadth of expertise reflects the spectrum of diseases for

which anti-CD20 therapies are used. In close collaboration with the Institute for Infectious Diseases at the University of Bern, the study collected a large number of indicators of possible vaccination success. Included were nearly 100 patients who had undergone anti-CD20 therapy. Twenty-nine healthy adults who had been vaccinated twice served as a control group. Prof. Dr. med. **Britta Maurer,** co-study leader, is confident: *"In this study, we have gained valuable information on important immunological questions in the context of mRNA Covid-19 vaccination in a short period of time in close collaboration with numerous institutes and clinics. By identifying important factors that are a prerequisite for an immune response, we hope to soon be able to contribute to the protection of a particularly vulnerable group of patients."*

**Possibilities for optimization revealed**

Despite the generally limited immune response following vaccination, the study was able to identify criteria that indicate possibilities for optimizing vaccine protection. Dr. **Matthias B Moor**, first author of the study, clarifies: *"These include, for example, the time since the last anti-CD20 therapy or a controlled use of immunosuppressive drugs in the concomitant therapy. The study shows that the time since anti-CD20 therapy, the number of B cells in the blood and, interestingly, the number of T helper cells in the blood allow predictions about the vaccination response."*

**Vaccination strategy for vulnerable patients with anti-CD20 therapy**

The study reveals that despite the general limitation in terms of immune response, it is still possible to protect several vulnerable groups with vaccination.
If the indications for optimization possibilities are confirmed in further, larger studies, individual vaccination and therapy plans could soon be developed.
PD Dr. **Daniel Sidler**, co-leader of the study, explains: *"The results of the study show that the phase of uncertainty we experienced at the beginning of the pandemic is now slowly coming to an end. A scientific basis is now being established that addresses open questions about prevention, diagnosis, therapy and vaccination of SARS-CoV2 infections. This study is a small yet important contribution to managing the COVID pandemic."*

**Experts:**

- Dr. med. et phil. Matthias Moor, Department of Nephrology and Hypertension, Inselspital, Bern University Hospital
- Prof. Dr. med. Britta Maurer, Chairwoman and Chief Physician, Department of Rheumatology and Immunology, Inselspital, Bern University Hospital
- PD Dr. med. et phil. Daniel Sidler, Senior Attending Specialist, Department of Nephrology and Hypertension, Inselspital, Bern University Hospital
- PD Dr. Franziska Suter-Riniker, Head of Clinical Microbiology, Institute for Infectious Diseases, University of Bern

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- Young Talents Grant for Patient-Oriented Research, Insel Gruppe

**Links**:

- Original publication: https://doi.org/10.1016/S2665-9913(21)00251-4 Humoral and cellular responses to mRNA vaccines against SARS-CoV-2 in patients with a history of CD20 B-cell-

depleting therapy (RituxiVac): an investigator-initiated, single-centre, open-label study; Matthias B Moor, Franziska Suter-Riniker, Michael P Horn et al. The Lancet Rheumatology

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