Researchers investigate immune response of a man who received 217 COVID vaccinations

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Researchers at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) and Universitätsklinikum Erlangen have examined a man who has received more than 200 vaccinations against COVID-19. They learned of his case via newspaper reports.

Until now, it has been unclear what effects hypervaccination such as this

would have on the immune system. Some scientists were of the opinion that immune cells would become less effective after becoming used to the antigens. This proved not to be the case in the individual in question: his immune system is fully functional.

Certain immune cells and antibodies against SARS-CoV-2 are even present in considerably higher concentrations than is the case with people who have only received three vaccinations. The results have been published in the journal *The Lancet Infectious Diseases*.

More than 60 million people in Germany have been vaccinated against SARS-Coronavirus 2, the majority of them several times. The man who has now been examined by researchers at FAU claims to have received 217 vaccinations for private reasons. There is official confirmation for 134 of these vaccinations.

"We learned about his case via newspaper articles," explains Privatdozent Dr. Kilian Schober from the Institute of Microbiology—Clinical Microbiology, Immunology and Hygiene (director Prof. Dr. Christian Bogdan). "We then contacted him and invited him to undergo various tests in Erlangen. He was very interested in doing so." Schober and his colleagues wanted to know what consequences hypervaccination such as this would have. How does it alter the immune response?

As a rule, vaccinations contain parts of the pathogen or a type of construction plan that the vaccinated person's cells can use to produce these pathogenic components themselves. Thanks to these antigens, the immune system learns to recognize the real pathogen in the event of a later infection. It can then react more rapidly and forcibly. But what happens if the body's immune system is exposed extremely often to a specific antigen?

"That may be the case in a chronic infection such as HIV or hepatitis B, that has regular flare-ups," explains Schober. "There is an indication that certain types of immune cells, known as T-cells, then become fatigued, leading to them releasing fewer pro-inflammatory messenger substances." This and other effects triggered by the cells becoming used to the antigens can weaken the immune system. The immune system is then no longer able to combat the pathogen so effectively.

Blood samples from several years investigated

The current study, which also involved researchers from Munich and Vienna, does not deliver any indication that this is the case, however. "The individual has undergone various blood tests over recent years," explains Schober.

"He gave us his permission to assess the results of these analyses. In some cases, samples had been frozen, and we were able to investigate these ourselves. We were also able to take blood samples ourselves when the man received a further vaccination during the study at his own insistence. We were able to use these samples to determine exactly how the immune system reacts to the vaccination."

The results showed that the individual has large numbers of T-effector cells against SARS-CoV-2. These act as the body's own soldiers that fight against the virus. The test person even had more of these compared to the control group of people who had received three vaccinations. The researchers did not perceive any fatigue in these effector cells, they were similarly effective as those in the control group who had received the normal number of vaccinations.

Memory T cells are another aspect the researchers explored. These are cells at a preliminary stage, before effector cells. Similar to stem cells, these cells can replenish numbers of suitable effector cells. "The number

of memory cells was just as high in our test case as in the control group," explains Katharina Kocher, one of the leading authors of the study.

"Overall, we did not find any indication for a weaker immune response, rather the contrary." In addition, even the 217th vaccination that the man received during the study still had an effect: the number of antibodies against SARS-CoV-2 increased significantly as a result.

Immune system remains active against other pathogens

Further tests indicated that there was no change to the immune system's effectiveness against other pathogens. It therefore appears to be the case that the hypervaccination has not damaged the immune system as such.

"Our test case was vaccinated with a total of eight different vaccines, including different available mRNA vaccines," states Dr. Kilian Schober. "The observation that no noticeable side effects were triggered in spite of this extraordinary hypervaccination indicates that the drugs have a good degree of tolerability."

However, this is one individual case. The results are not sufficient for making far-reaching conclusions let alone recommendations for the general public. "Current research indicates that a three-dose vaccination, coupled with regular top-up vaccines for vulnerable groups, remains the favored approach. There is no indication that more vaccines are required."

More information: Katharina Kocher et al, Adaptive immune responses are larger and functionally preserved in a hypervaccinated individual, *The Lancet Infectious Diseases* (2024). DOI: 10.1016/S1473-3099(24)00134-8