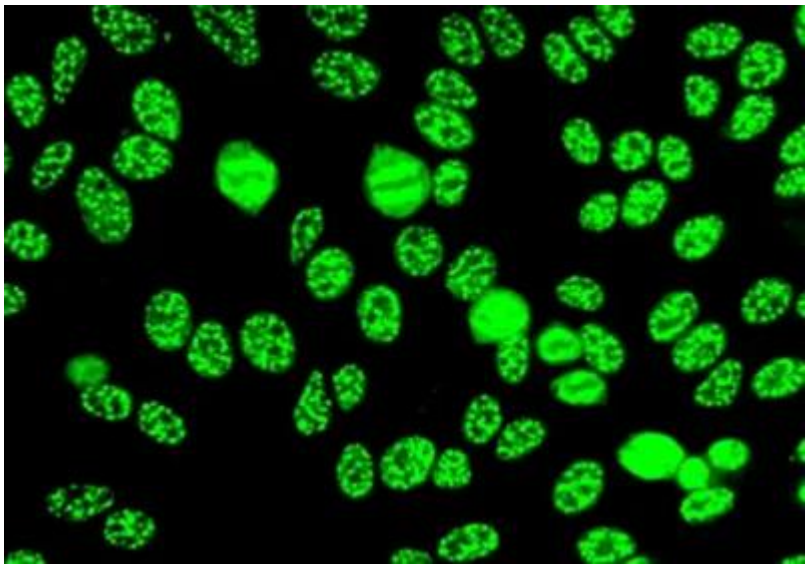
BNT162b2 (Pfizer- BioNTech) and mRNA 1273 (Moderna) vaccines were the first messenger RNA (mRNA)-based vaccines ever approved. In both vaccines, a mRNA sequence determines the structure and assembly of the immunogen, the SARS-CoV-2 spike (S) glycoprotein. The mRNA is protected from degradation by lipid nanoparticles. The effects of both vaccines, mRNA-1273, and BNT162b2, and their ability to stimulate an autoimmune reaction are still unclear. The Italian authors conducted this prospective follow-up study to determine the autoantibody production in healthcare workers vaccinated with three mRNA COVID-19 vaccines, focusing on the antibodies against nuclear antigens (antinuclear antibodies, ANA).

Previous studies reported new-onset autoimmune phenomena after COVID-19 vaccination, including immune thrombotic thrombocytopenia, autoimmune liver diseases, IgA nephropathy, rheumatoid arthritis, and systemic lupus erythematosus. Antiphospholipid antibodies are among the most commonly inducible antibodies after infection or vaccination. A recent study has shown differences in autoantibodies against receptors involved in autonomic regulation between individuals diagnosed with post-COVID-19 vaccination syndrome and vaccinated healthy subjects.
https://discovermednews.com/autoantibodies-against-elements-of-autonomic-regulation-post-covid-vaccination-syndrome/



About the study

The study included 77 healthcare workers (60 women and 17 men), with a median age of 48 (range 26-67 years). The participants did not have previous COVID-19 infection or

autoimmune disease. All participants received three doses of the COVID-19 vaccine. All received two doses of the BioNtech/Pfizer BNT162b2 mRNA. One-half received a third dose of the same vaccine, and the other half received Moderna (Spikevax) as a third dose. All participants experienced mild or no symptoms after vaccinations.

The blood samples were taken before vaccination, after the second dose of vaccine (three months after the first dose), and after the third dose (12 months after the first dose). All samples were analyzed for the presence of antinuclear antibodies by indirect immunofluorescence. Besides antinuclear antibodies, the analysis included other autoantibodies, such as anti-smooth muscle antibodies, anti-myeloperoxidase, anti-proteinase 3, anti-citrullinated peptide antibodies, and anti-phospholipid antibodies (anticardiolipin and anti-beta-2-glycoprotein).

The results

Before vaccination, 35% (25 of 77) participants were already positive for ANA. 23 participants maintained this positivity after receiving the second or third doses of the vaccine.

52 of 77 participants were negative for ANA. Six of 52 participants who were negative for ANA before vaccination became positive for ANA after the second dose, while 46 remained negative. 16 of 46 participants who were negative for ANA after the second vaccination became positive for ANA after the third vaccination. 30 participants remained negative.

These results show that a significant proportion of healthcare workers (29%, 22 of 77) developed *de novo* autoantibody production after receiving three mRNA-based anti-SARS-CoV-2 vaccines. *De novo* ANA production was detected in 6 out of 77 (8%) participants following the second dose and in 16 out of 77 (21%) participants following the administration of the third dose.

According to these results, the percentage of positivity for ANA correlates with the number of vaccinations. Interestingly, the positivity that developed after the second vaccination was maintained over time.

The researchers then analyzed the patterns of ANA: homogeneous, speckled, cytoplasmatic, nucleolar, and other (e.g., midbody, centrosomes, spindle poles). After the second vaccination, the homogeneous pattern was observed in 5/6 samples, the speckled in 4/6, and the cytoplasmatic in 1/6. After the third vaccination, the homogeneous pattern was observed in 12/21, speckled in 6/21, nucleolar in 2/21, cytoplasmic in 1/21, and other patterns in 7/21

samples.

The most prevalent was a homogeneous pattern, commonly associated with anti-double-stranded DNA, anti-nucleosome, and anti-histone autoantibodies. Therefore, all samples found positive for the homogeneous pattern after the second COVID-19 vaccination were tested for these autoantibodies, and the results were negative.

The analysis of other autoantibodies demonstrated a slight increase in anticardiolipin and anti-alpha smooth muscle actin antibodies after the second vaccination, but this increase was not statistically significant.

Conclusion

This study showed that 29% of healthcare workers developed *de novo* autoantibody production after three mRNA COVID-19 vaccines. These results support the hypothesis that overstimulation of the immune system could lead to an autoinflammatory mechanism and eventually to autoimmune diseases.

The authors concluded that monitoring the individuals who developed *de novo* autoantibody production after COVID-19 vaccination is necessary to determine whether they show any clinical signs of autoimmune disease.

This article was published in Autoimmunity.

Journal Reference

M.C Sacchi,et al. The onset of *de novo* autoantibodies in healthcare workers after mRNA based anti-SARS-CoV-2 vaccines: a single centre prospective follow-up study. Autoimmunity, 2023; 56:1, 2229072.
https://www.tandfonline.com/doi/full/10.1080/08916934.2023.2229072


UNLIMITED DOWNLOADS
VectorStock
ROYALTY FREE VECTOR GRAPHICS