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Analysis of IgG, IgA, and IgM antibodies against SARS-CoV-2 spike protein S1 in convalescent and vaccinated patients with the Pfizer-BioNTech and CanSinoBio vaccines

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Abstract

The SARS-CoV-2 virus was detected for the first time in December 2019 in Wuhan, China. Currently, this virus has spread around the world, and new variants have emerged. This new pandemic virus provoked the rapid development of diagnostic tools, therapies and vaccines to control this new disease called COVID-19. Antibody detection by ELISA has been broadly used to recognize the number of persons infected with this virus or to evaluate the response of vaccinated individuals. As the pandemic spread, new questions arose, such as the prevalence of antibodies after natural infection and the response induced by the different vaccines. In Mexico, as in other countries, mRNA and viral-vectored vaccines have been widely used among the population. In this work, we developed an indirect ELISA test to evaluate S1 antibodies in convalescent and vaccinated individuals. By using this test, we showed that IgG antibodies against the S1 protein of SARS-CoV-2 were detected up to 42 weeks after the onset of the symptoms, in contrast to IgA and IgM, which decreased 14 weeks after the onset of symptoms. The evaluation of the antibody response in individuals vaccinated with Pfizer-BioNTech and CanSinoBio vaccines showed no differences two weeks after vaccination. However, after completing the two doses of Pfizer-BioNTech and the one dose of CanSinoBio, a significantly higher response of IgG antibodies was observed in persons vaccinated with Pfizer-BioNTech than in those vaccinated with CanSinoBio. In conclusion, these results confirm that after natural infection with SARS-CoV-2, it is possible to detect antibodies for up to ten months. Additionally, our results showed that one dose of the CanSinoBio vaccine induces a lower response of IgG antibodies than that induced by the complete scheme of the Pfizer-BioNTech vaccine.

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