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SARS-CoV-2: CRITICAL ISSUES IN THE USE OF ANTIGEN TESTS IN THE TRACKING OF POSTIVES

Antigen tests vs Molecular tests - published study in «Nature» showing the low effectiveness of antigen tests in containing the Covid-19 epidemic

Despite the unprecedented approval of multiple vaccines in the two years following the SARS-CoV-2 global emergency, the non-capillary distribution of these together with the immune decline have led to the evolution and spread of new variants.

Population tests, which aim to identify and isolate infected individuals to break the chain of transmission, remain a key tool for controlling the spread of the virus.

The gold standard for SARS-CoV-2 diagnostic tests is a molecular test that has high sensitivity and specificity but requires laboratory analysis to amplify genomic sequences, meaning that results are often subject to delay reporting. In contrast, antigen tests are immunological tests and can provide results in less than 30 min. These tests are easy to use and inexpensive, with at least 400 tests commercially available worldwide. However, the sensitivity of the antigen test is lower than that of molecular tests, particularly when the viral load is lower (i.e. at the beginning or before the infectious period), resulting in more frequent false negative results.

In the study “*Impact of antigen test target failure and testing strategies on the transmission of SARS-CoV-2 variants*” published in the prestigious journal «Nature Communications» and conducted by a team of researchers from the University of Padua and Imperial College London coordinated by prof. Andrea Crisanti, new limitations of widespread antigen tests are highlighted in the absence of molecular tests for diagnostic or confirmatory purposes. In particular, it demonstrates that genomic surveillance systems that rely on antigen population testing to identify samples for sequencing influenced the detection of escape antigen test variants.

«Here we describe a SARS-CoV-2 variant that escapes N antigen tests due to multiple substitutions of disruptive amino acids in the N protein – **explains Prof. Andrea Crisanti, Director of the Department of Molecular Medicine of the University of Padua** -. By adapting a multi-strain compartmental model to genomic and epidemiological data, we show that the antigen test widespread in the Italian region of Veneto has favored the undetected spread of the antigen-escape variant compared to the rest of Italy.

So far, antigen testing has contributed positively to the surveillance of the major SARS-CoV-2 variants, as both previously identified discordant variants had limited viral adaptability (read R0) and circulated at low prevalence. However, as antigen testing continues to play a vital role in the surveillance and control of COVID-19, there remains a risk that the absence or limited use of molecular testing may not signal the emergence of variants that may escape antigen testing. Although many studies have evaluated the economic and epidemiological advantages of antigen over molecular testing strategies, none has studied how such strategies would be affected by a variant that can escape detection by antigen testing.»

«Together, our results shed new light on the limitations of mass antigen testing in the absence of molecular testing and the importance of maintaining molecular tests, not only for diagnostic purposes but also for monitoring and surveillance purposes» concludes Crisanti.

Link:

<https://www.nature.com/articles/s41467-022-33460-0>