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# SPIKE-PROTEIN VACCINES ARE EFFECTIVE AGAINST MANY VARIANTS OF SARS-COV-2, FINDS IIT-M STUDY

Relevant for: Science & Technology | Topic: Biotechnology, Genetics & Health related developments

The researchers have called for more experimental verification of their findings. File photo

Researchers at the Indian Institute of Technology Madras have shown that spike protein vaccines may be effective against several variants of SARS-CoV-2.

The study suggests that despite compromised neutralising antibodies, vaccine-induced T cell responses could deal with variants such as Delta Plus, Gamma, Zeta, Mink and Omicron. The researchers have called for more experimental verification of their findings.

The team studied the response to post-vaccination infections by variants other than the original Wuhan strain incorporated in the vaccine. Vaccination is a process through which a part of or a milder form of the virus is introduced into the body. Pieces of a protein, called epitopes, of the injected virus/viral part trigger an immune response in the body.

Vani Janakiraman, assistant professor, Department of Biotechnology, Bhupat and Jyoti Mehta School of Biosciences, led the research, whose findings were published in the peer-reviewed journal BBA Molecular Basis of Disease. Two students from the department, S. Sankaranarayanan and Mugdha Mahkhedkar, co-authored the article. “The efficacy of vaccines depends on whether they can trigger not only the antibody response but also the T cell response. Efficacy against multiple variants can be assessed by first analysing the epitope sequences of various variants for mutation and if they can effectively trigger T cells induced in the immunisation process,” Dr. Vani explained.

The vaccines could be considered effective against the variants if there are less mutated epitopes in their spike protein and if the mutated epitopes can still induce an immune response, comparable to that elicited by original/native epitopes, the researchers said.

“T cells are an important part of the body’s immune response. They have receptors that bind to the epitope that is presented in conjunction with a large molecule, called MHC, on the surface of the infected cell. This triggers immune response, either afresh or through vaccination memory,” Dr. Vani said.

In the case of messenger-RNA vaccination, a strand of messenger-RNA is introduced in the host, which teaches the cells to make the protein. This, in turn, is chopped into smaller pieces (epitopes) and presented to T-cells, ultimately triggering the body’s immune response. The researchers found that in both cases, the body remembers the response to guard against future infections. The team investigated how many epitopes in the variant were mutated and whether they could alter the immune response to vaccination.

The molecular differences in T cell epitopes were analysed across variants, including Delta Plus, Gamma, Zeta, Mink and Omicron. The mutated epitope molecular structures were further analysed with immunoinformatics tools.

The team found that the changes to the epitopes were not large enough to evade the T cell immune response that the body had learned through vaccination, Dr. Vani said.

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