SERB-supported study hints that single-dose vaccine may be sufficient for individuals recovered from COVID-19

Single-dose immunization with COVID-19 vaccine may be sufficient for protecting patients who have recovered from mild COVID-19, as the immunological memory that they develop keeps its imprint for a few years, says a study conducted on Indian patients.

The vaccine is considered as most effective preventive measure to protect from COVID-19 pandemic that has become a major threat to public health globally. However, how long the vaccine will provide the protective cover, whether the vaccine will protect against all recently circulating and future variants of the virus, and what should be the vaccination schedule and dosage for the individuals recovered from COVID-19 are questions that need answers for successful implementation of vaccination throughout the country.

A study by Dr. Nimesh Gupta’s group at the National Institute of Immunology (NII) is in collaboration with Dr. Ashok Sharma, Biochemistry Department, and Dr. Poonam Coshic, Department of Transfusion Medicine at the All India Institute of Medical Sciences (AIIMS), New Delhi indicated that almost 70% of the examined Indian cohort had very high levels of SARS-CoV-2 reactive type of white blood cells that are an essential part of the human immune system (CD4+ T cells). These were present prior to the COVID-19 pandemic. These already present T cells strongly respond to the COVID-19 virus. It was found that these pre-existing cross-reactive CD4+ T cells will not completely abort the virus infection, but they can definitely limit the virus burden and reduce the course of symptomatic infection. This will lead to less severe disease and lower rates of hospitalization. These SARS-CoV-2 reactive CD4+ T cells may have originated due to previous exposure to the highly prevalent ‘Common Cold’ viruses. This work has been recently published in the journal ‘Frontiers in Immunology’.

The research supported under the Intensification of Research in High Priority Areas (IRHPA) scheme of the Science and Engineering Research Board (SERB), a statutory body of the Department of Science and Technology (DST), also reveals that the Indian patients recovered from mild COVID-19 disease have durable immunological memory in most important arms of protective immunity – T cells and B cells. The team believes that the immunological memory, which can last for a few years, is predominantly associated with the spike protein of the virus. These responses are mainly targeted towards the Spike protein, and it also gives high hopes to the current vaccines. This is because if the vaccine can induce the immune response like seen in mild patients, then we will have an effective and long-lasting cellular immunity against SARS-CoV-2.

The study also suggests that the virus Nucleoprotein should not be used as the target protein for seroepidemiological surveys in India. It may give a wrong indication, as almost 30% of the tested donors showed cross-reactive antibodies to SARS-CoV-2 nucleoprotein without exposure to the virus prior to the pandemic.

These findings may prove crucial in understanding how Indian population is responding to COVID-19 virus and provide a key for vaccine implementation in India.
SARS-CoV-2-specific memory B cells in recovered COVID-19 patients.

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