COVID-19 boosters provide better immunity against SARS-CoV-2 variants in elderly Singaporeans

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Understanding the impact of age on vaccinations is essential for the design and delivery of safe vaccines against SARS-CoV-2 (Image: A*STAR ID Labs). Credit: A*STAR ID Labs

Elderly Singaporeans who are above 60 years old develop weaker vaccine-acquired immunity against COVID-19 upon receiving two doses of the Pfizer/BioNTech BNT162b2 vaccine, in comparison to their younger counterparts. These findings are from a new study led by researchers from the A*STAR Infectious Diseases Labs (ID Labs). The study, published online in *Nature Communications*, also demonstrates that a third vaccine dose, or booster jab, alleviates the weak immune response observed in the elderly by increasing the levels of virus-specific antibodies and T cell responses against the ancestral SARS-CoV-2 Wuhan strain, the delta and omicron variants.

The study involved the participation of 312 individuals, including health care workers and elderly individuals, who received a primary COVID-19 vaccination regime consisting of two doses of Pfizer/BioNTech BNT162b2 SARS-CoV-2 mRNA vaccine. Researchers conducted a comprehensive analysis of different immune parameters such as SARS-CoV-2-specific antibodies, memory B cell levels and virus-specific T cell responses, to assess the establishment and persistence of vaccine-acquired immunity. It is widely accepted that high antibody and memory B cell levels are essential for protection against infection while strong T cell responses protect against severe disease.

The study revealed that upon the two-dose regime, most vaccinees developed robust antibody, B and T cell responses against the ancestral SARS-CoV-2 Wuhan strain. However, vaccine-induced immunity against the delta and omicron variants was less effective, suggesting the possibility of breakthrough infections. Weaning of the antibody and cellular responses was also observed in 30% of the participants after 6 months from their second dose.

Importantly, researchers observed that individuals older than 60 years displayed weaker virus-specific antibody responses than younger Singaporeans (