

In vitro neutralizing activity of BNT162b2 mRNA-induced antibodies against full B.1.351 SARS-CoV-2 variant

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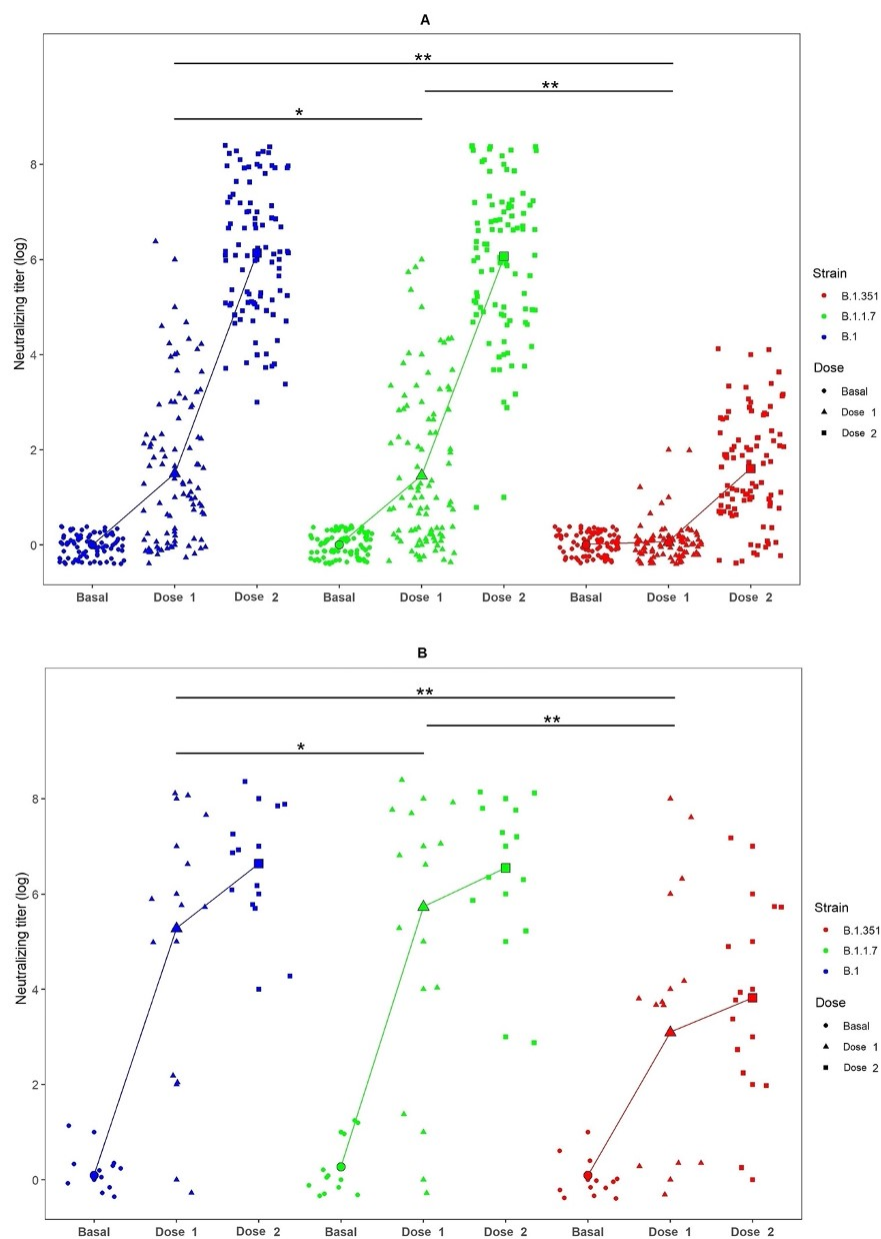
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Abstract

Background: SARS-CoV-2 variation represents a serious challenge to current COVID-19 vaccines. Recent reports suggest that B.1.351 and other variants may escape the neutralization activity of the antibodies generated by current vaccines. **Methods:** Ninety-nine healthcare workers undertaking BNT162b2 mRNA vaccination were sampled at baseline, on the day of the second dose, and 14 days after the latter. Neutralization activity against SARS-CoV-2 B.1, B.1.1.7 and B.1.351 was investigated using a Vero-E6 model. **Results:** Eleven of the study participants had prior infection with SARS-CoV-2. Neutralization titers against the B.1 and the B.1.1.7 variants were not statistically different and were significantly higher than titers against the B.1.351 variant across pre-exposed and non-pre-exposed vaccinated individuals ($p < 0.01$). While all vaccinated individuals presented neutralizing antibodies against B.1 and B.1.1.7 after the second dose, 14% were negative against B.1.351, and 76% had low titers (1/20-1/80). Pre-exposed vaccinated individuals showed higher titers than non-pre-exposed after the first (median titers of 1/387 versus 1/28, respectively) and the second doses (1/995 versus 1/703, respectively). As high as 72% of the pre-exposed vaccinees presented titers $> 1/80$ after a single dose, while only 11% of non-exposed vaccinated individuals had titers $> 1/80$. **Conclusions:** BNT162b2 mRNA-induced antibodies show a lower in vitro neutralizing activity against B.1.351 variant compared to neutralization against B.1.1.7 or B.1 variants. Interestingly, for individuals pre-exposed to SARS-CoV-2, one dose of BNT162b2 mRNA may be adequate to produce neutralizing antibodies against B.1.1.7 and B.1, while two doses of BNT162b2 mRNA provide optimal neutralizing antibody response against B.1.351 too.

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