ORT_20 - Neutralizing antibodies and igg avidity against SARS-CoV-2 variants

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Introduction: The variants of concern (VOCs) of SARS-CoV-2 could evade the natural and/or active immune response against this virus, causing high impacts on public health with recurrent infections. The neutralizing antibody (Nab) elicited by SARS-CoV-2 infection or vaccination and its strength of binding (avidity) to target antigen are crucial for understanding the contribution of this humoral immune response in the cross-protection against VOCs.

Objectives: Therefore, this study aims to quantify and to correlate Nab levels against SARS-CoV-2 and its VOCs with avidity index (AI) of the immunoglobulins from serum of individuals immunized with Oxford-AstraZeneca vaccine.

Methodology: For this purpose, were used sera from 100 individuals immunized with two doses of vaccine, with or without prior SARS-CoV-2 infection. The Nabs were quantified by classical PRNT using wild-type (WT) and VOCs (Omicron and Delta) of SARS-CoV-2, carried out in BSL-3 Fiocruz' Lab. The *In-house* IgG avidity ELISA was standardized using a range urea concentration. The AI% was calculated according to the following formula = optical density (OD) of sample with urea / OD sample with PBS x 100. Correlation and statistical analyzes were performed with the software GraphPad Prism 5.

Results: Our results showed a robust and significant Nab titer against WT in the vaccinated group with previous SARS-CoV-2 infection ($p < 0.0001$). Surprisingly, it was observed a remarked decrease ($p < 0.0001$) in Nab levels against the VOC Omicron regardless of the baseline of the immunized group with or without previous infection, with high significance 30 days after booster vaccine ($p < 0.0001$). However, some individuals with high Nab levels against WT responded with low to medium titers against Omicron. Nab titers versus VOC Delta is currently being tested. The best standardized conditions for avidity ELISA using SARS-CoV-2 Spike protein were 8M of urea with 15'of incubation. Preliminary results revealed increased IgG avidity in individuals with prior infection and vaccination experience.

Conclusion: Therefore, high Nab titers and basal IGG avidity against WT SARS-CoV-2 seems to improve antibody levels with cross-reactivity against VOCs (Omicron and Delta).

Keywords: SARS-CoV-2 VOCs, Antibody neutralising, Avidity