Systemic and mucosal immune responses are variably induced in response to SARS-CoV-2 mRNA vaccination in a healthy pediatric cohort

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Introduction

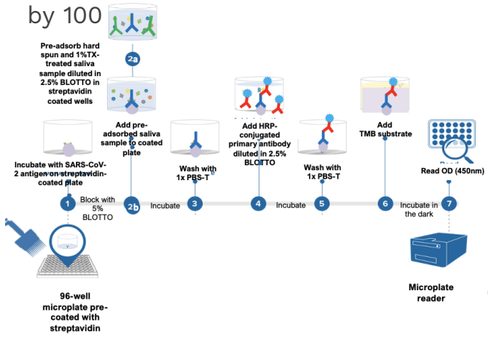
Saliva is an important biofluid that can provide information about the mucosal antibody (Ab) response to respiratory viruses like SARS-CoV-2. We recently reported that COVID-19 vaccination elicited a transient mucosal sIgA response in healthy adults that rapidly waned in most, but not all vaccinees. Moreover, vaccinees who had breakthrough infections post-vaccination had lower systemic (serum) IgA antibodies to SARS-CoV-2 spike/RBD.

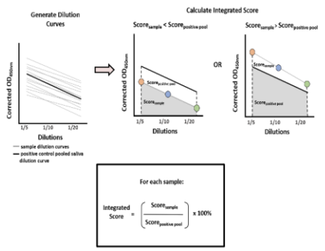
Objective

If low spike-specific serum IgA is associated with breakthrough infection, it is important to determine the level of serum and saliva IgA induced by vaccination in school-age children, many of whom spend their days in congregant settings **Here we aimed to characterize the salivary antibody response to vaccination in a cohort of healthy children, and how this response compares to adults.**

Methods

Saliva collection was conducted according to previously published methods[2]. Saliva was collected from vaccinated participants using the Salivette® collection system and analyzed for the presence of antigen-specific antibodies via an ELISA-based method. Each samples is expressed as a percentage of the positive control, consisting of the score of the sample divided by the score of the positive control, multiplied by 100





Results

Figure 1. Participants who experience a breakthrough infection have lower level of anti-Spike/RBD IgA at 2-4 weeks post-vaccination.

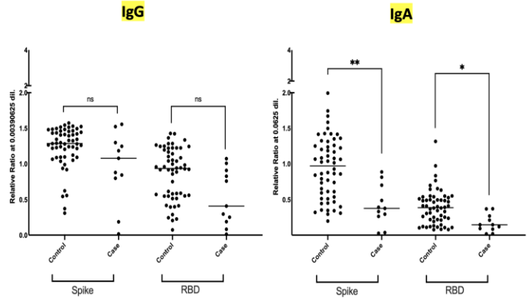


Figure 2. Detection of anti-SARS-CoV-2 antibodies in a pediatric cohort.

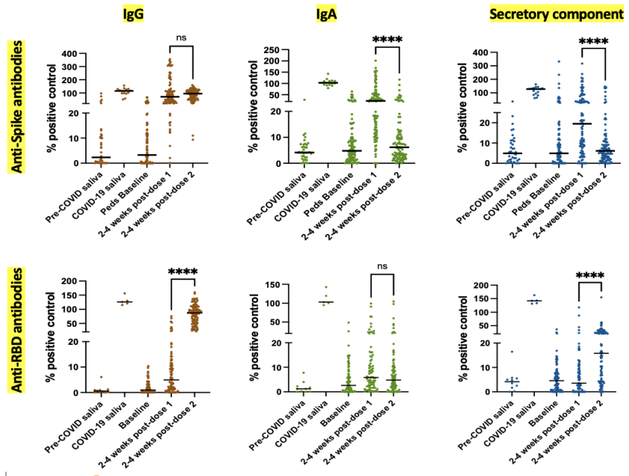


Figure 3. Comparison of median antibody titers in saliva of vaccinated adult and pediatric subjects.

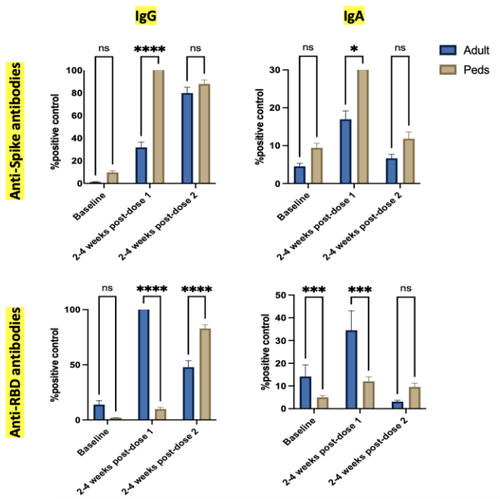
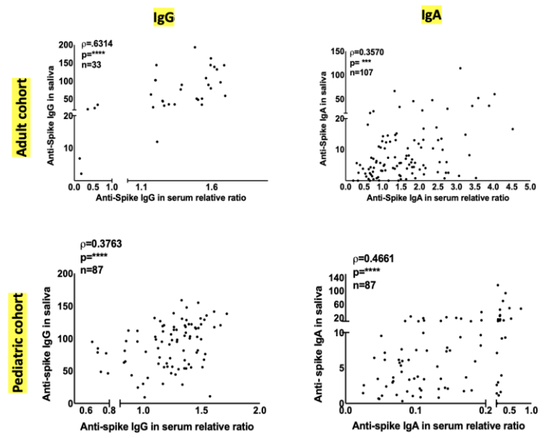


Figure 4. Analysis of anti-Spike and anti-RBD antibodies in saliva and serum from participants receiving COVID-19 mRNA vaccines.



Conclusions

1. Anti-SARS-CoV-2 antibodies can be detected in saliva post-i.m. vaccination, and a second dose boosts the anti-spike/RBD IgG response, but not IgA in a pediatric cohort
2. Pediatric subjects had significantly higher median anti-Spike IgG and IgA titers post-dose 1, while adults showed increased anti-RBD IgG and IgA titers post-dose 1.
3. 30% of adults and 40% of vaccinated pediatric subjects retain detectable titers of SARS-CoV-2-specific IgA in their saliva

References

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2 . Isho, B. *et al.* 2020. Persistence of serum and saliva antibody responses to SARS-CoV-2 spike antigens in COVID-19 patients. *Sci. Immunol* . 5: eabe5511

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