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Temporal mucosal SARS-CoV2-specific antibodies in COVID patients before and after COVID vaccination

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Oral/nasal mucosae are the primary portals of entry for SARS-CoV2. Both innate and adaptive immunity at the mucosa are likely to influence this process. The aims of this study were to determine whether COVID vaccination impacted the elicitation of SARS-CoV2-specific IgG, IgA and/or secretory IgA (sIgA) antibodies in stimulated whole mouth fluid (SWMF) during subsequent exposures to COVID. SWMF samples were collected within 2-4 days of onset from 126 mild COVID patients (N=74 before vaccination; N=52 after vaccination) and longitudinal SWMF samples were collected at day 14 and day 90 from 12 of these vaccinated patients. COVID was confirmed by RT-PCR positive nasopharyngeal swabs. Anti-SARS-CoV2 spike IgG, IgA and sIgA antibodies were detected by ELISA. The mean IgG antibodies were 2.5-fold higher in patients who were vaccinated, while IgA (monomer) and SIgA (dimer) antibodies were 3-folds ($p<0.00001$) and 2.3 folds ($p=0.0001$) higher than in the unvaccinated group, respectively. Longitudinal measurements in the 12 vaccinated COVID patients showed a 4-fold increase in IgG antibodies at day 14, which declined 2.6-fold by day 90 ($p=0.0003$; Anova of repeated measures). However, IgA and SIgA antibodies showed only a marginal increase and decline at these time points. Thus our findings suggest that IgA and SIgA antibodies are only marginally boosted by prior antigen memory unlike IgG antibodies, while the former are elicited at markedly higher levels during the first natural infection. Longitudinal analyses showed higher sustained levels of IgA and SIgA antibodies compared to IgG antibodies in the SWMF. Taken together our data suggests a potential role for the anti-SARS-CoV2 spike mucosal antibodies (IgA and SIgA) in SWMF in COVID.

One sentence:

Immunisation against SARS-CoV2 prior to infection resulted in higher IgG, IgA and SIgA antibodies in secretions, and a longer lasting SIgA response