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Mucosal T cell phenotypes in mild COVID-19 among vaccinated and unvaccinated individuals

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SARS-CoV2 primarily infects the epithelial cells lining the aerodigestive mucosa. Delineation of the T cell phenotypes involved in mucosal host defense may provide insights into COVID-19 pathogenesis. We aimed to compare the T cell phenotypes in the oral mucosa and PBMCs of vaccinated healthcare workers who developed mild COVID-19 (VM; N=9) or recovered from COVID-19 (VR; N=12) with those of normal uninfected controls (NIC; N=5), unvaccinated individuals with mild COVID-19 (UVM; N=3) or recovered from COVID-19 (UVR; N=12). PBMCs and stimulated whole mouth fluid (SWMF) from 41 participants were stained with anti-human PerCP-CD3, PerCP-CD4, APC-R700-CD8, BV711-ICOS, BV786-CD25, BV605-PD-1, BV421-CCR4, BB515-CCR10, PE-Cy7-CXCR5 BV480-T-bet, BV421-GATA-3, BB515-ROR-γt, APC-Foxp3 antibodies and analysed by FACS. SARS-CoV2 RNA was quantified in SWMF by real time RT-PCR. Anti-SARS-CoV2 spike Ig antibodies in serum and SWMF were measured by ECLIA. UVM were antibody negative, while VM, VR and UVR had similar levels of antibodies in both serum and SWMF. SARS-CoV2 clearance was achieved 14 days earlier in VM compared to UVM. UVM and VM did not show any statistical differences between mean T cell percentages in PBMCs/SWMF except CD4 T cells in PBMCs ($p=0.03$). CD3, CD4, Th1, Tfh, Treg, ILC-1 and ILC-2 cells in SWMF showed no statistical differences among the groups. In SWMF, Th2 cells were higher among the vaccinees, while Th17 cells were highest in UVM. All the tissue-resident T cells – Th17, Tfh, ILC-1 and ILC-2 were significantly greater in SWMF than PBMCs. Thus the SARS-CoV2 exposed groups showed a differential expression of mucosal T cells suggesting a strong local immune response in COVID-19.

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