

Significance of MAITs and B cells in SARS-CoV-2 Infection

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Abstract

The spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has led to an ongoing worldwide pandemic of coronavirus disease 2019 (COVID-19). Lymphopenia is a very common finding in severe and moderate cases of COVID-19 and its magnitude predicts worse outcomes and mortality. Mucosal Associated Invariant T cells (MAITs) are a relatively recently identified population of innate-like T cells, which represent 1-5% of T cells in the circulation in adults and have strong tissue homing characteristics especially to liver and lung. MAITs display immediate effector function once get activated by virus and bacterial. Thus, we studied the effect of SARS-CoV-2 on MAITs by using multi-color flow cytometry, *in vitro* viral challenge and RT-qPCR. Our previous study found that human circulating MAITs are activated and declined in patients with acute SARS-CoV-2 infection, which is not probably due to direct virus particle-mediated effects. Instead, MAITs are likely to be affected in an indirect way, possibly through the activation of other immune cells, such as B cells.

B cells can differentiate into plasma cells which derived from germinal center and produce a vast antibody repertoire that protect against the potential pathogen. B cells generate immunological memory to suppress subsequent infections. Using multi-color flow cytometry, we found that in severe COVID-19, circulating plasma cells had a lower frequency trend and plasmablast cells had a significant higher frequency when compared with mild COVID-19. Meanwhile, serum SARS-CoV-2 spike antibody IgG measured by ELISA showed a significant lower level. We also found a negative correlation between MAITs and B cells. Thus, we found that there is a serological response in COVID-19 infection which showed more severe patients had lower level of serum IgG, MAITs and plasma cells. We hypothesize that MAITs and B cells have interaction during SARS-CoV-2 infection. Further study towards their interaction mechanism is ongoing.