CMV Infection in Long Term Care Residents Alters Global Immunologic Phenotype but not Primary SARS-CoV-2 Response

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Introduction

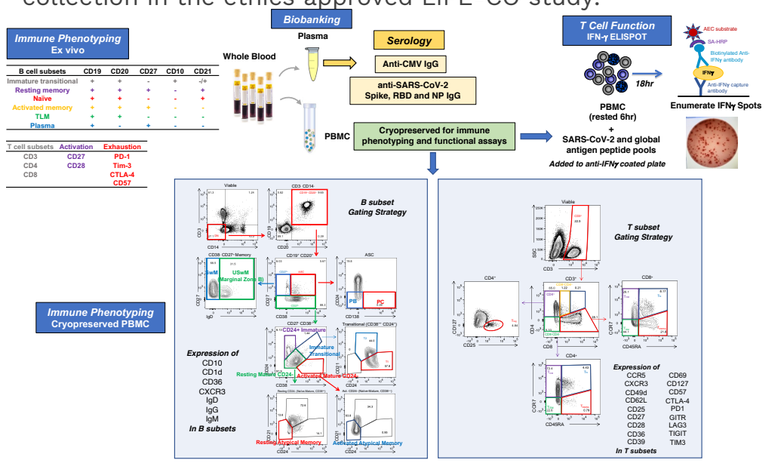
Older individuals are at increased risk of death from infections, possibly related to **chronic CMV associated senescence**. However, detailed immunologic assessment in highest risk settings such as **long term care residents (LTCR)** to support this hypothesis is limited. Examining the immune response to a novel pathogen in the context of CMV co-infection can provide valuable information on primary immune response in the older adult in congregate settings.

Objective

Describe CMV associated T and B cell phenotype and function in long term care residents (LTCR), including primary response to a the novel viral pathogen, SARS-CoV-2.

Methods

- During Wave 1 (March – Jun 2020), 108 LTCR (median 84 yo, range 50-103 yo) consented to clinical data and blood collection in the ethics approved LIFE-CO study.



- CMV stratified T and B cell phenotype and function were assessed in 48 COVID naïve LTCR (67% CMV+) and 60 COVID positive LTCR (73% CMV+)

Results

Figure 1. Decreased T cell activation and increased T cell exhaustion was largely associated with CMV serostatus. Mean±SD.

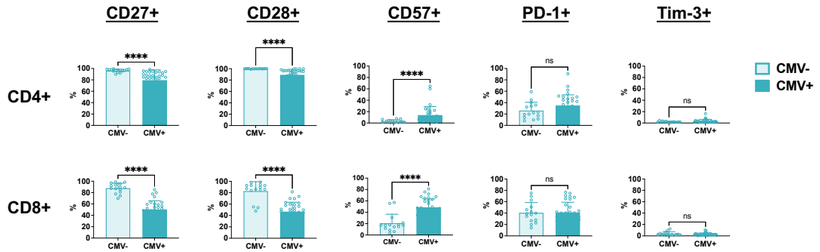


Figure 2. CMV+ LTCR have strong memory T cell responses to CMV, CEF and H1N1 influenza HA, however recall responses to common human coronaviruses (OC43, 229E, NL63 and HKU1) are limited regardless of CMV infection. Mean±SD.

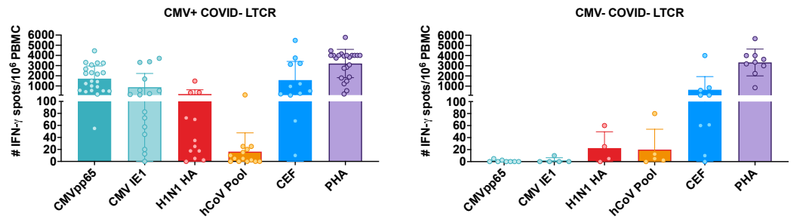


Figure 3. CMV+ LTCR have fewer plasma cells and increased resting atypical memory B cells than CMV- LTCR but the magnitude of anti-SARS-CoV-2 serologic responses after natural primary infection was similar in CMV+ and CMV- individuals. Mean±SD.

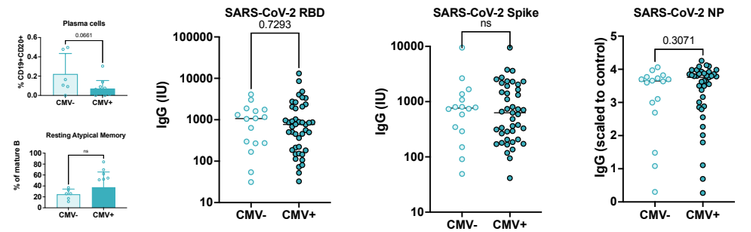
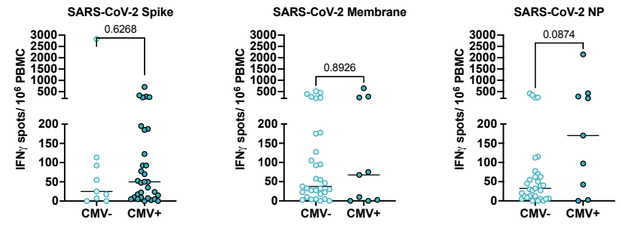


Figure 4. CMV+ and CMV- LTCR had similar primary T cell responses to SARS-CoV-2 Spike, membrane and nucleoprotein, though there was a biologic trend toward higher magnitude T cell response in CMV+ individuals.



Conclusions

- CMV coinfection does not significantly quantitatively alter primary SARS-CoV-2 responses, but the observed biologic trend suggests T cell responses to novel pathogens may be altered in CMV+ individuals.
- T cells play an important role in protecting against severe disease and following SARS-CoV-2 vaccination.[1-3] It may be very important to understand CMV infection in the context of vaccine associated protection from severe covid disease.

References

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