IMMUNOGENICITY OF SARS-COV-2 MRNA VACCINATION IN IDIOPATHIC CD4 LYMPHOPENIA

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BACKGROUND

- Idiopathic CD4 Lymphopenia (ICL) increases risk of opportunistic infections, autoimmunity
- SARS-CoV-2 vaccine-induced immunity is variable in immunocompromised populations

➢ Study aim: determine the immunogenicity of SARS-CoV-2 mRNA vaccines in people with ICL

METHODS

ICL Cohort → CD4 <300 twice at least 6-weeks apart

- Compared to matched healthy volunteers (HVs)
- **Collected serum and PBMCs pre/post-vaccination**

Testing

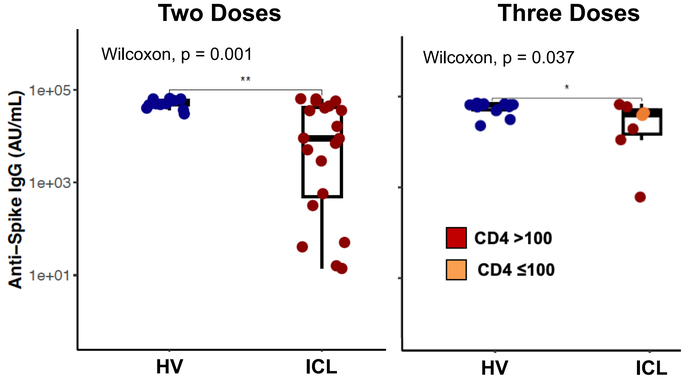
- Anti-spike antibodies – ELISA, ECLIA
- SARS-CoV-2 spike protein T-cell stimulation assays

Characteristic	ICL*	Control**	P-value
N	**25**	**23**	
Age – y	51	54	0.93
Female – no. (%)	12	13	0.55
White	21	16	0.23
African/American	4	7	0.33
CD4 T-cells/μL	150	856	<0.001
CD4 >100	14	0	
CD4 ≤ 100	11	0	
CD8 T-cells/μL	167	365	0.007
B-cells/μL	129	220	0.01

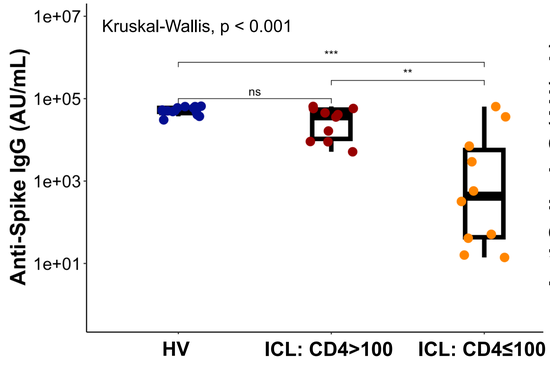
* 12-BNT162b2 and 13-mRNA-1273; ** 7-BNT162b2 and 16-mRNA-1273

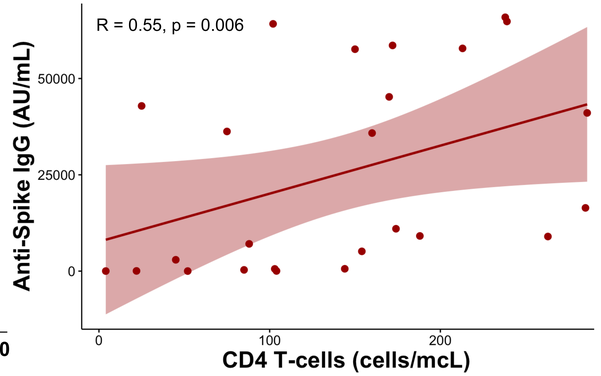
RESULTS – ANTIBODY RESPONSES

- ECLIA: Anti-spike antibody responses are impaired in ICL
- Antibody differences are primarily driven by people with ICL and baseline CD4 T-cells ≤100 cells/μL

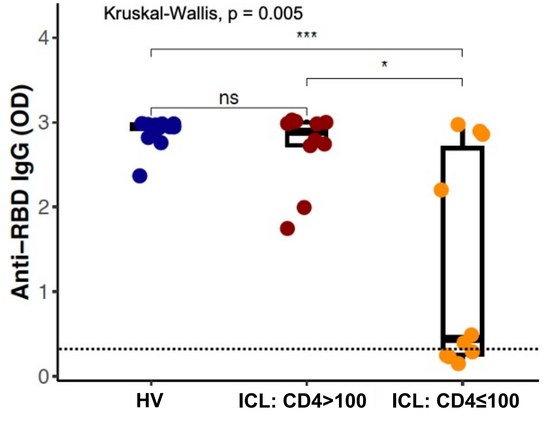


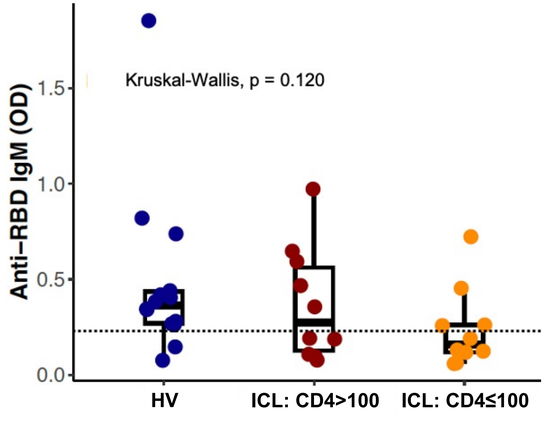
People with ICL and CD4 ≤100 have impaired SARS-CoV-2 vaccine-induced immunity and may require regular boosters and other risk mitigation strategies





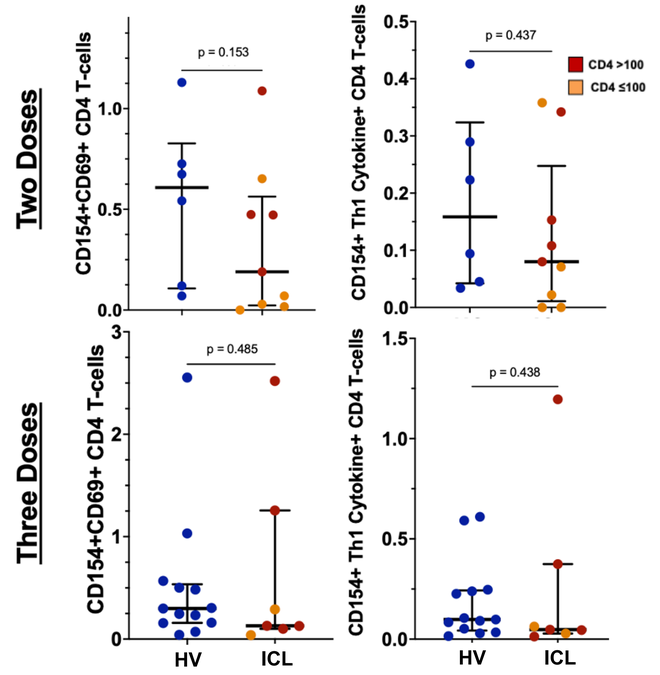
- Anti-spike IgG levels correlated with baseline CD4 T-cell count
- ELISA: Anti-RBD also showed lower IgG levels in those with ICL and CD4 ≤100
- No difference in SARS-CoV-2 anti-spike or RBD IgM production





RESULTS – T-CELL RESPONSES

- No differences in anti-SARS-CoV-2 specific CD4 T-cell responses after two or three mRNA vaccine doses
- CD8 specific T-cell responses were poorly detectable in all individuals tested
- Lower overall CD4 T-cell responses when CD4 ≤100



CONCLUSIONS

- People with ICL and baseline CD4 T-cells >100 cells/μL mount similar humoral and cellular immune responses to SARS-CoV-2 vaccination as healthy volunteers
- Those with ICL and CD4 T-cells ≤100 have impaired vaccine-induced immunity and they should be prioritized for boosters and/or other available risk mitigation strategies

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