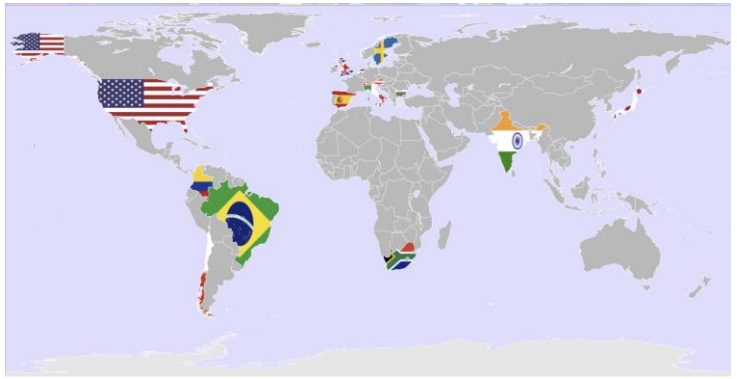
Further studies on SARS-CoV-2 variants

Worldwide collaborations

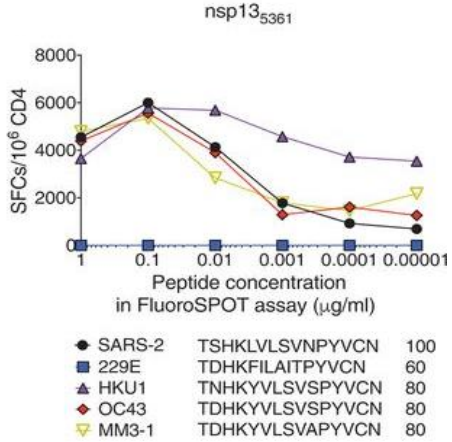


Lists of variant mutations:

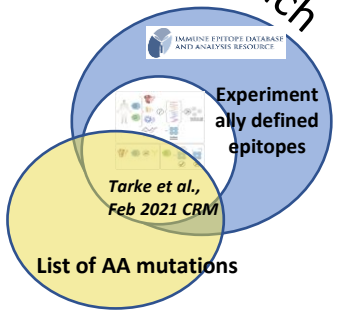
-B.1.1.7 (alpha)
-B.1.351 (beta)
-P.1 (gamma)
-CAL.20C (B.1.427/9; epsilon)
-B.1.1.519
-B.1.525 (eta)
-B.1.526 (iota)
-B.1.526.1
-B.1.617.1 (kappa)
-B.1.617.2 (delta)
-C.37 (lambda)
-R.1

Experimental approaches

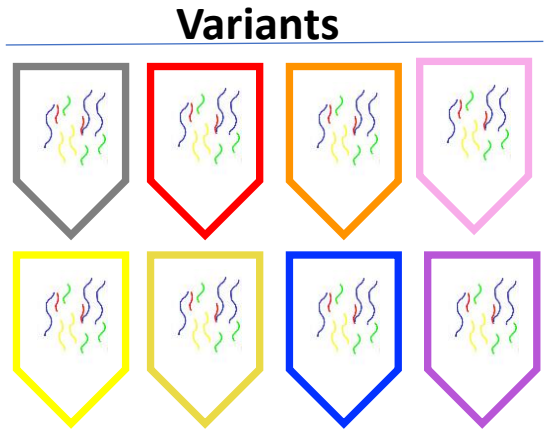
Detailed study T cell reactivity at the single donor level



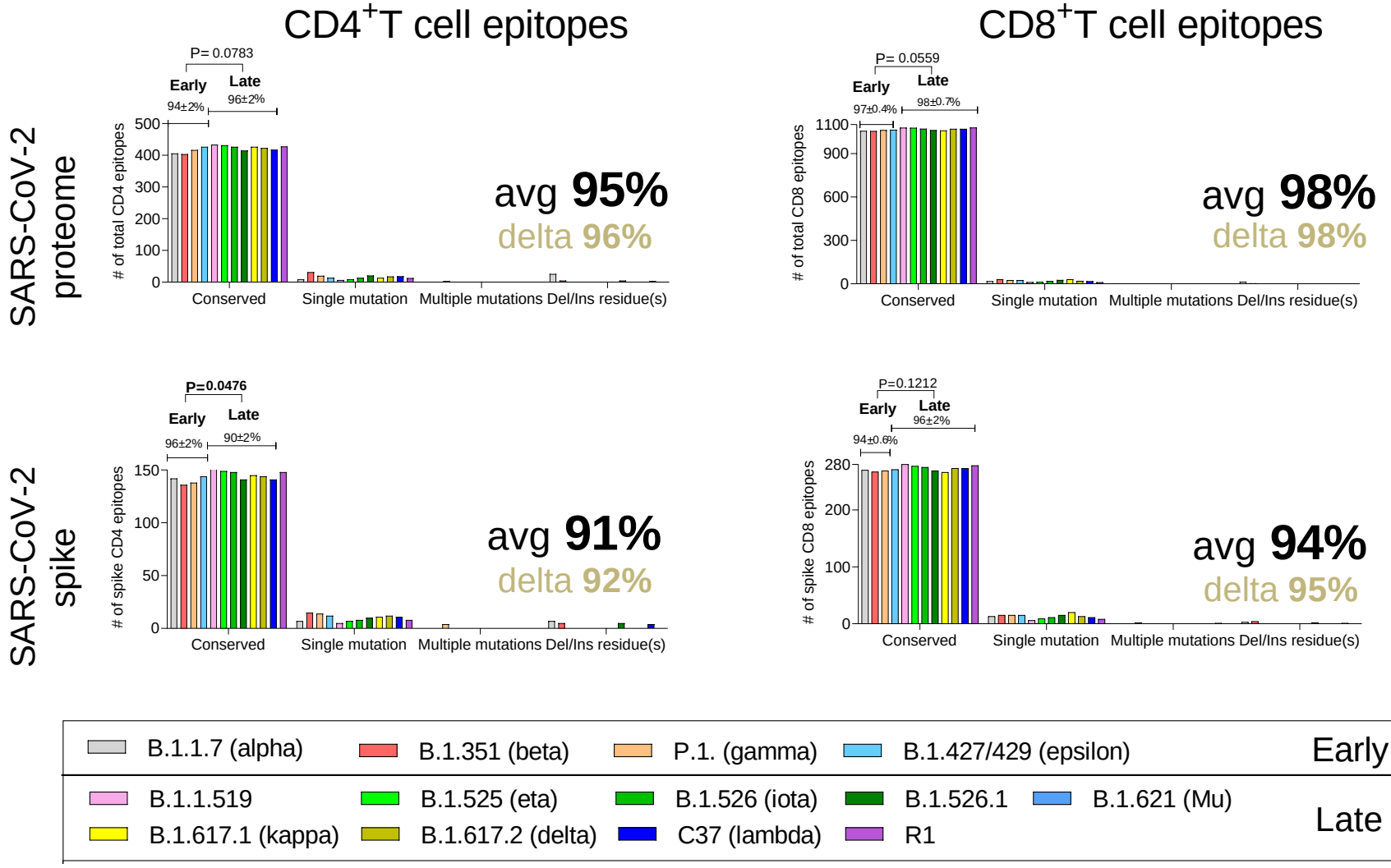
Bioinformatic approach



Peptide pools for each protein/variant combination to assess overall reactivity



Bioinformatic analyses do not suggest viral evolution is increasingly or prominently escaping T cell responses



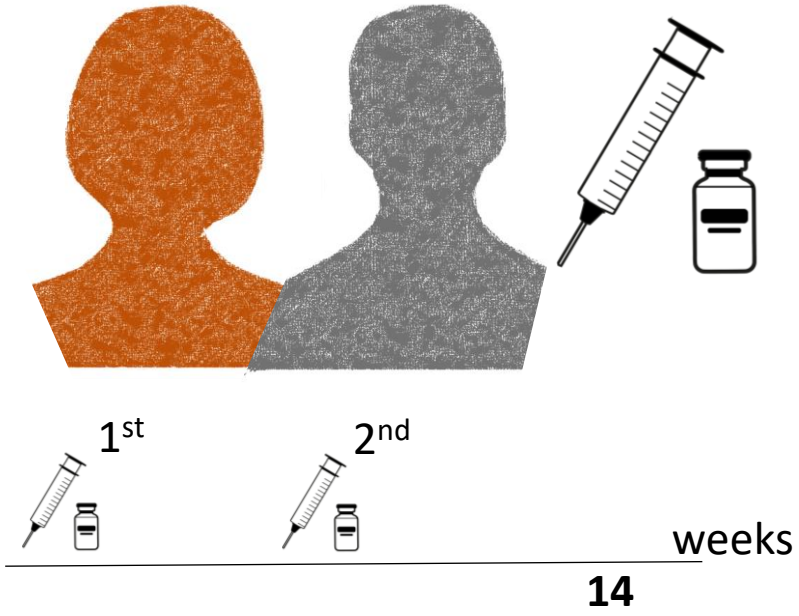
Patterns of T cells recognition of current variants at the population level

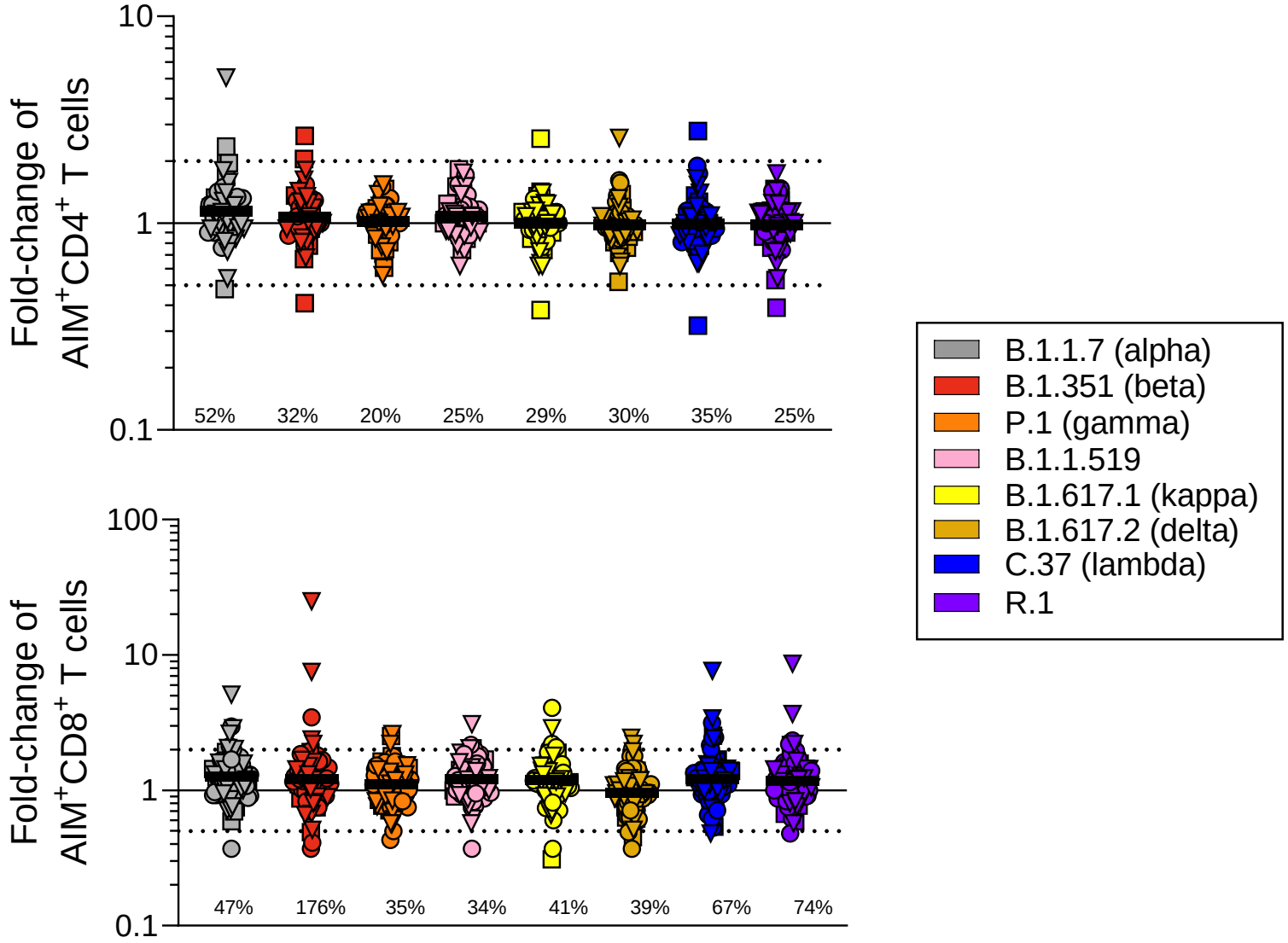
Different COVID-19 vaccinations

mRNA-1273

Ad26.COV2.S

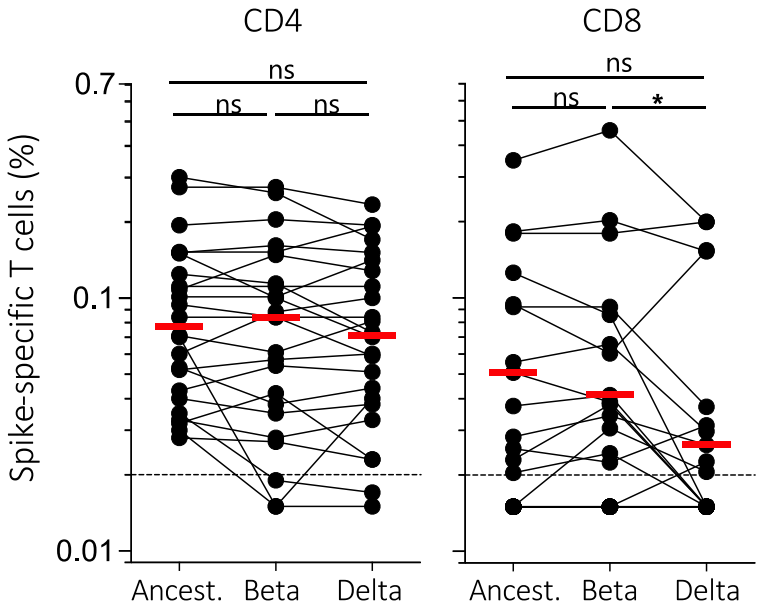
BNT162b2





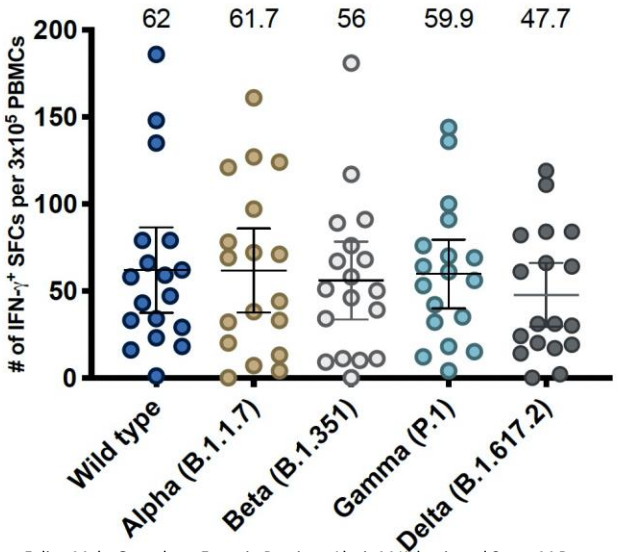
T cell recognition of delta variant following vaccination with different vaccine platforms and in different geographical settings

Ad26.COV2.S vaccination induces T cells that cross-recognize beta and delta variants



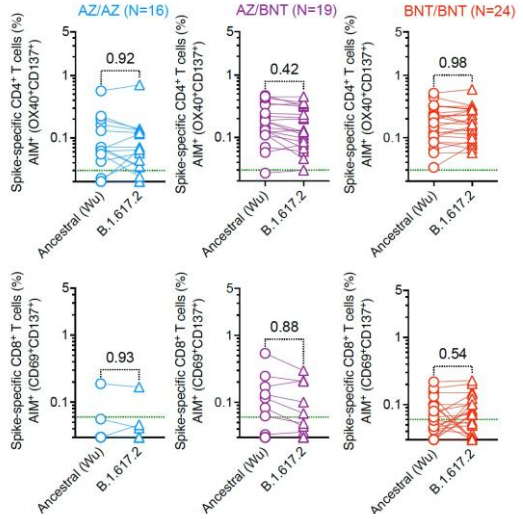
Keeton et al, *Cell Host and Microbe* in press; medRxiv https://doi.org/10.1101/2021.07.24.2126103

CORONAVAC vaccination induces T cells that cross-recognize variants of concern



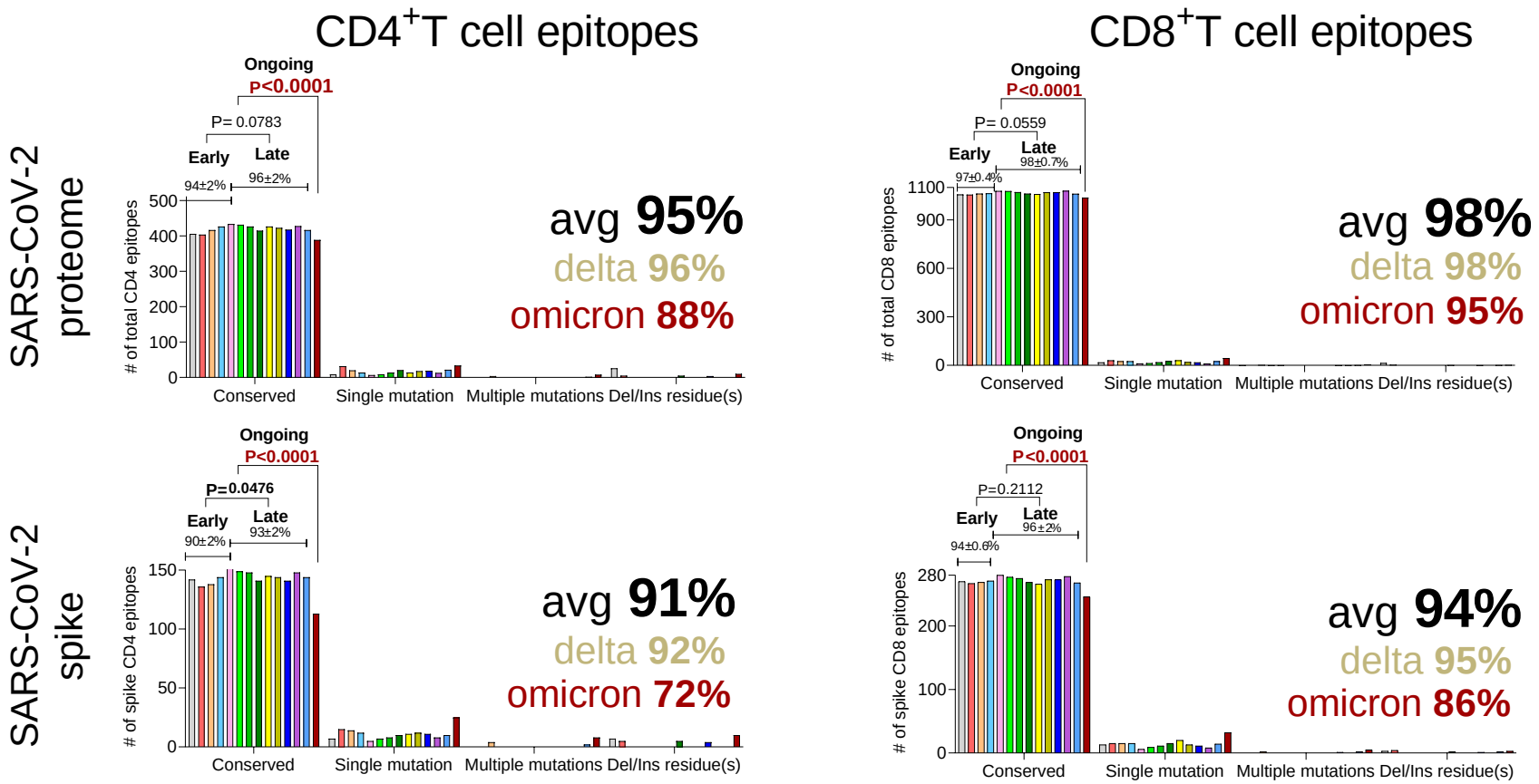
Felipe Melo-Gonzales….Eugenio Ramirez, Alexis M Kalergis and Susan M Bueno
Frontiers in Immunology, in press

Homologous or heterologous vaccination induces T cells that cross-recognize the delta variant



Heterologous ChAdOx1/BNT162b2 vaccination induces stronger immune response than homologous ChAdOx1 vaccination
Zoltán Bánki[1, *], Jose Mateus [2, *], Annika Rössler[1, *]…….Florian Krammer[5, *], Dorothee von Laer[1, *], Daniela Weiskopf [2, *], Janine Kimpel[1, *] (submitted)

Conservation of T cell epitopes in Omicron.

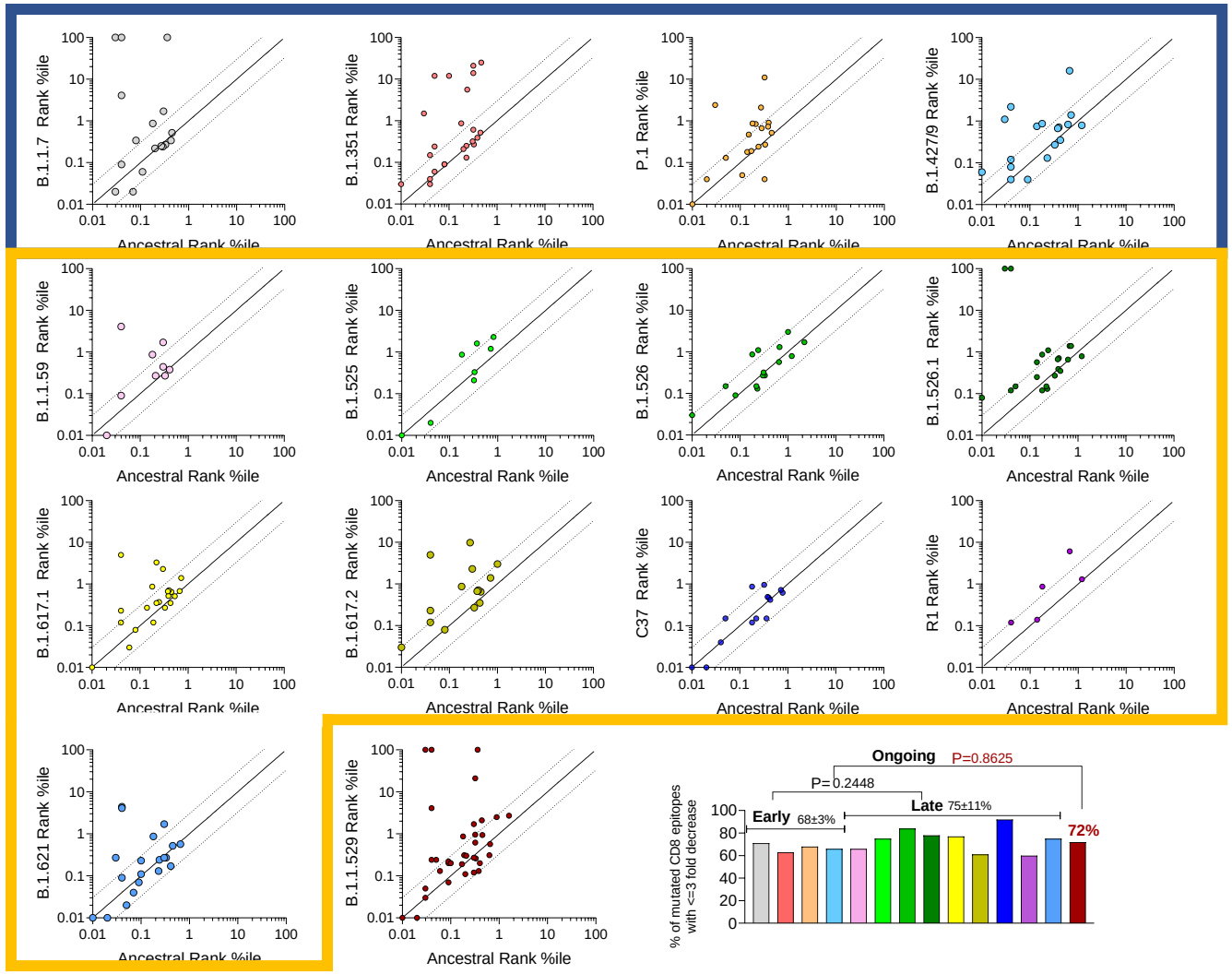


B.1.1.7 (alpha)	B.1.351 (beta)	P.1. (gamma)	B.1.427/429 (epsilon)		Early
B.1.1.519	B.1.525 (eta)	B.1.526 (iota)	B.1.526.1	B.1.621 (Mu)	Late
B.1.617.1 (kappa)	B.1.617.2 (delta)	C37 (lambda)	R1		
B.1.1529 (Omicron)					Ongoing

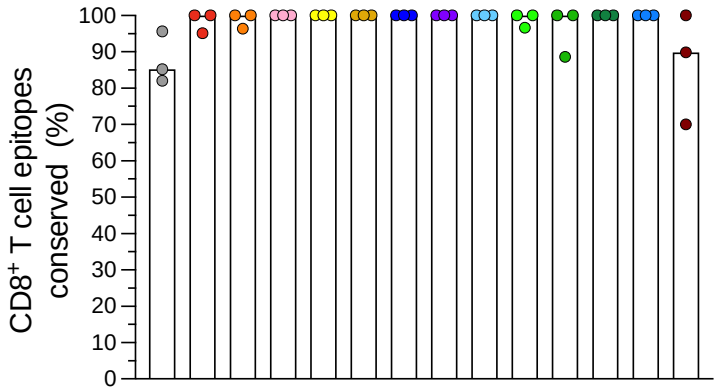
The majority of mutated CD8+T cell epitopes in Omicron are still able to bind HLA class I molecules

Early

Late

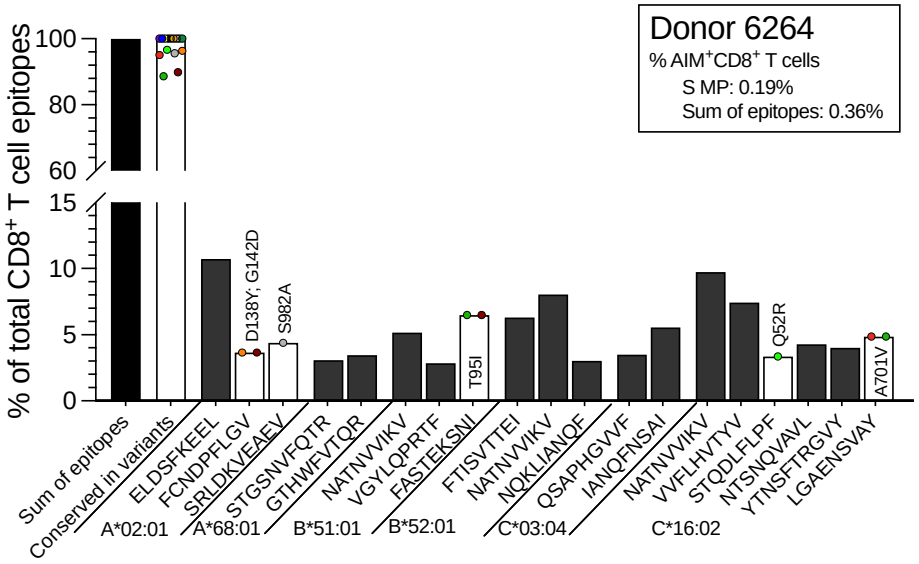


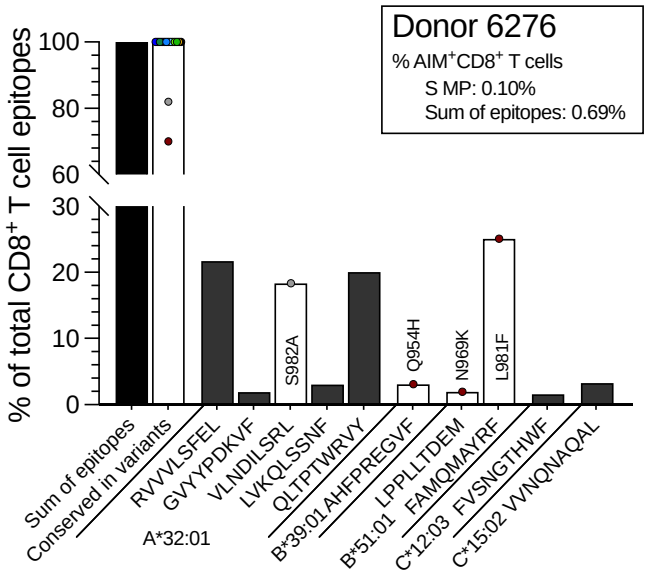
Breadth of CD8 epitope repertoire and its conservation in variants

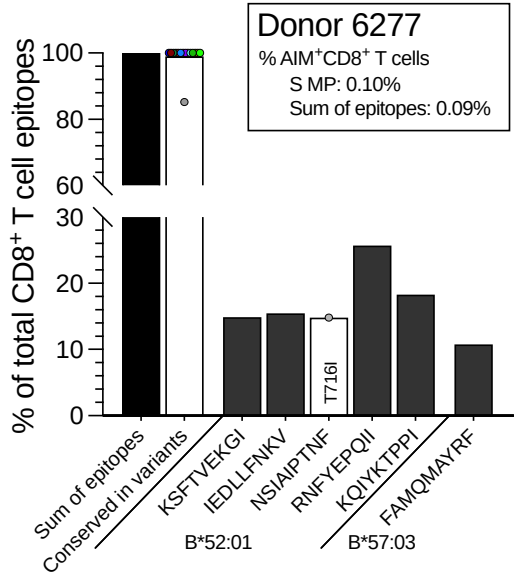


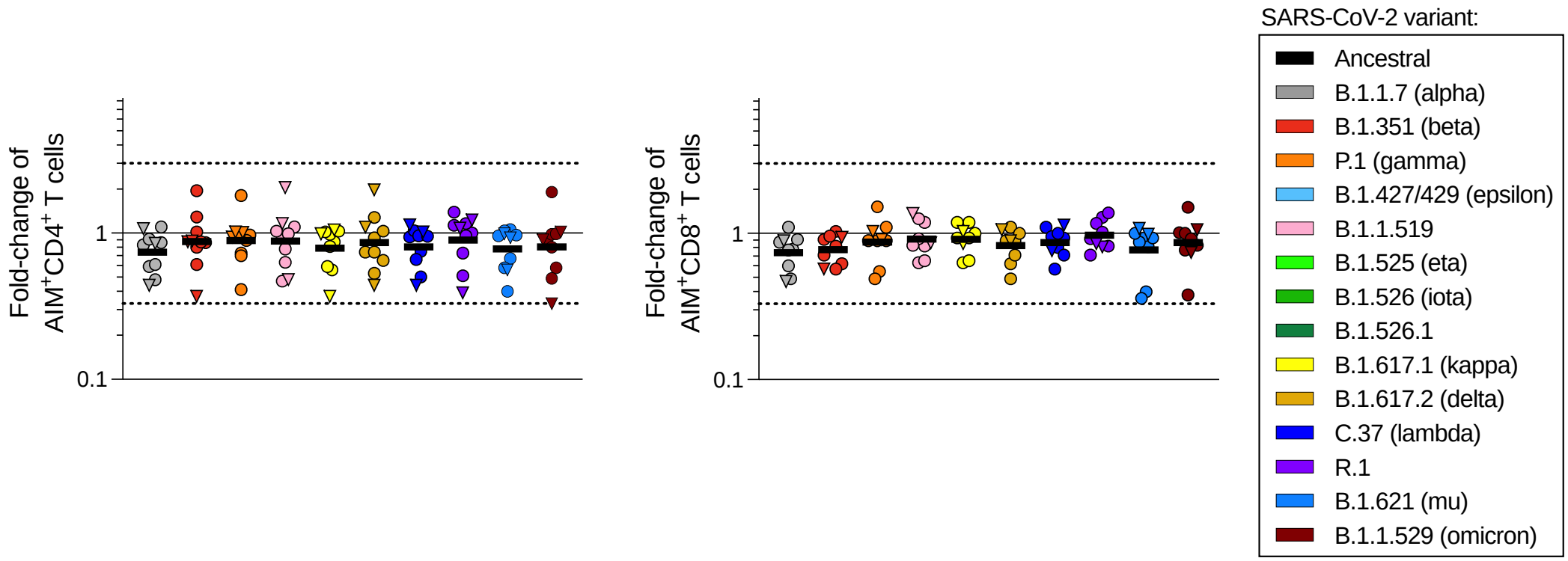
SARS-CoV-2 variant:

- Ancestral
- B.1.1.7 (alpha)
- B.1.351 (beta)
- P.1 (gamma)
- B.1.427/429 (epsilon)
- B.1.1.519
- B.1.525 (eta)
- B.1.526 (iota)
- B.1.526.1
- B.1.617.1 (kappa)
- B.1.617.2 (delta)
- C.37 (lambda)
- R.1
- B.1.621 (mu)
- B.1.1.529 (omicron)








Fold-change of AIM+CD4+ T cells
1
0.1
Fold-change of AIM+CD8+ T cells
1
0.1
SARS-CoV-2 variant:
Ancestral
B.1.1.7 (alpha)
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