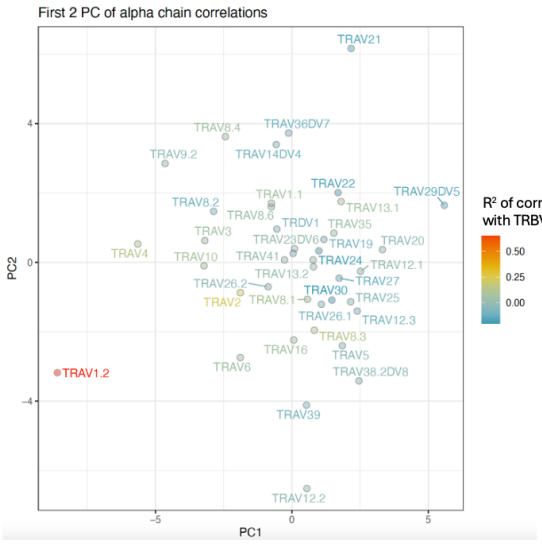
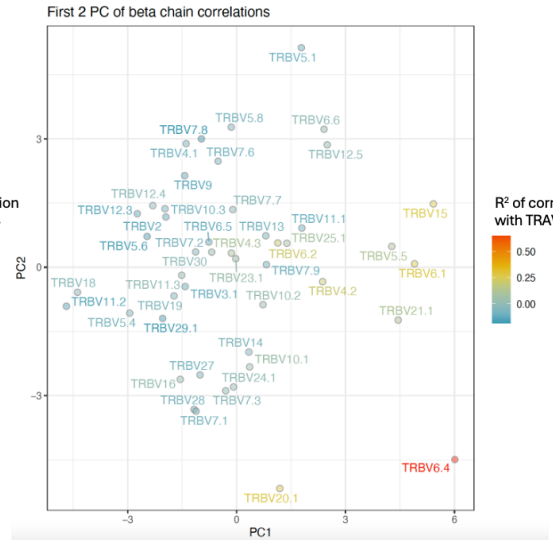
Supplementary Figure 1 Principal components analysis of the correlation matrix of V-gene usage for a) α chain and b) β chain. This demonstrates the first principal component of the α chain is dominated by TRAV1-2 which forms the key TCR for MAIT cells. Correspondingly, the principal components of the β chain correlations reflected this pattern with the first PC dominated by TRBV6-4, the key partner of TRAV1-2

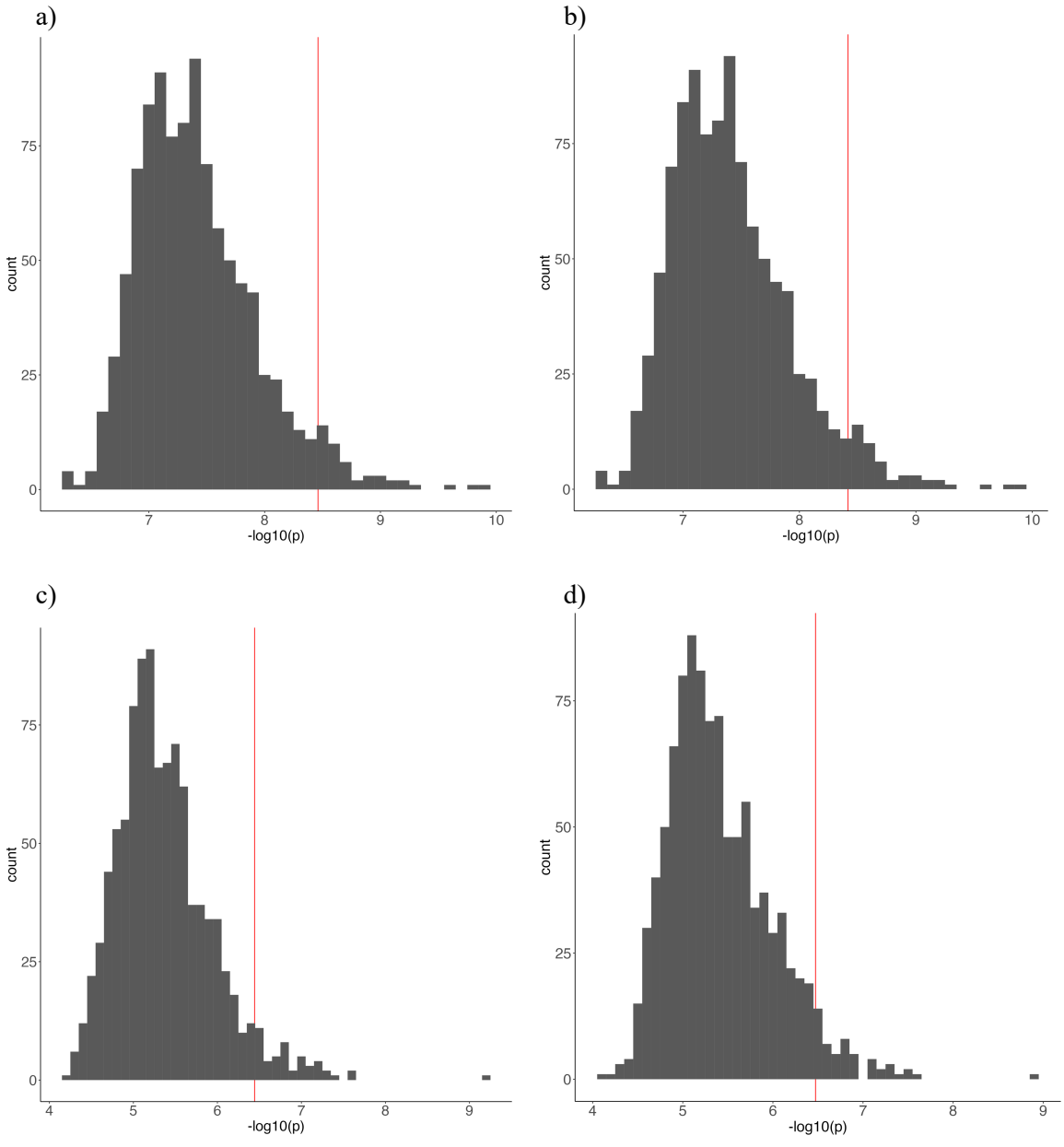
a)



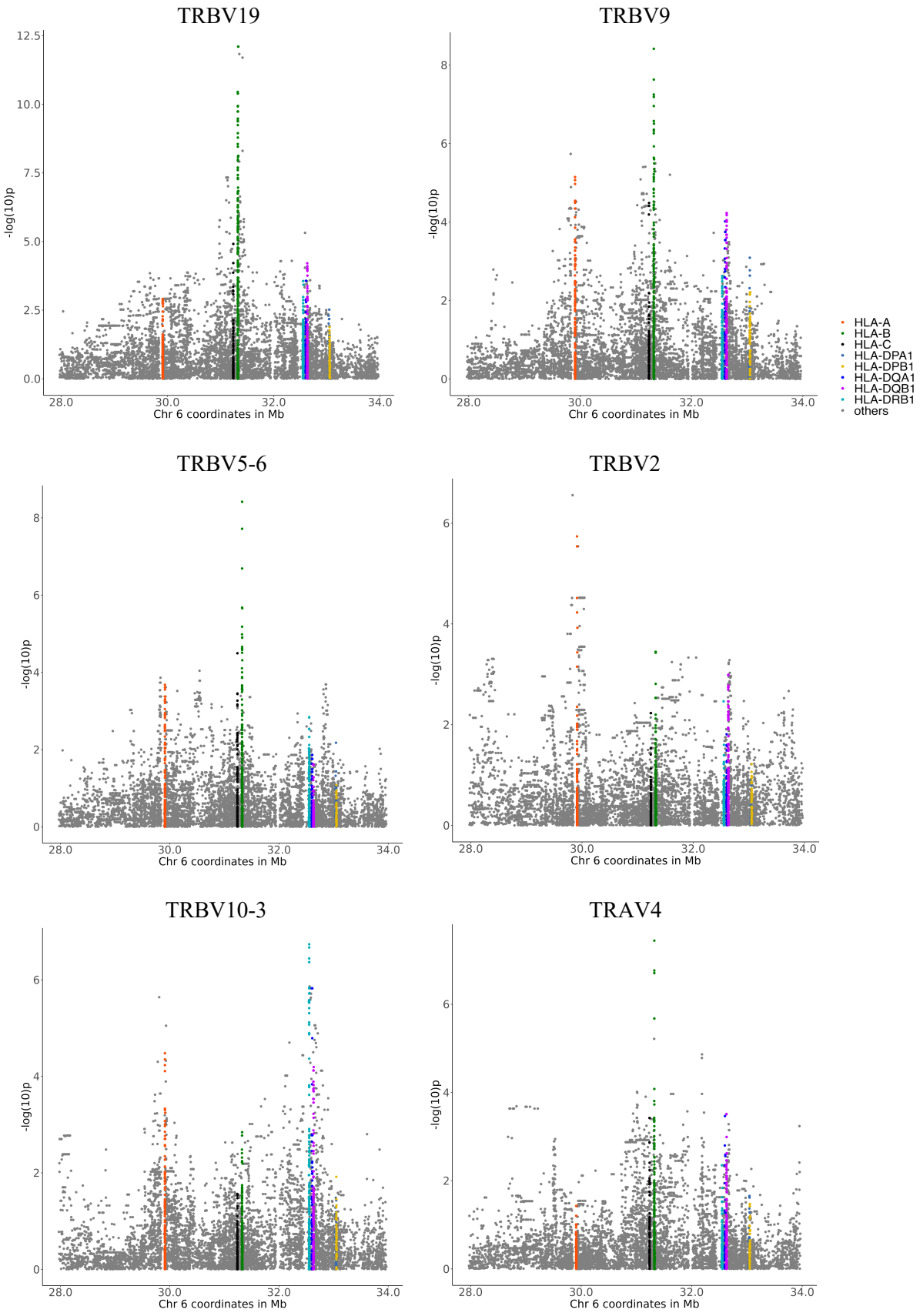
b)

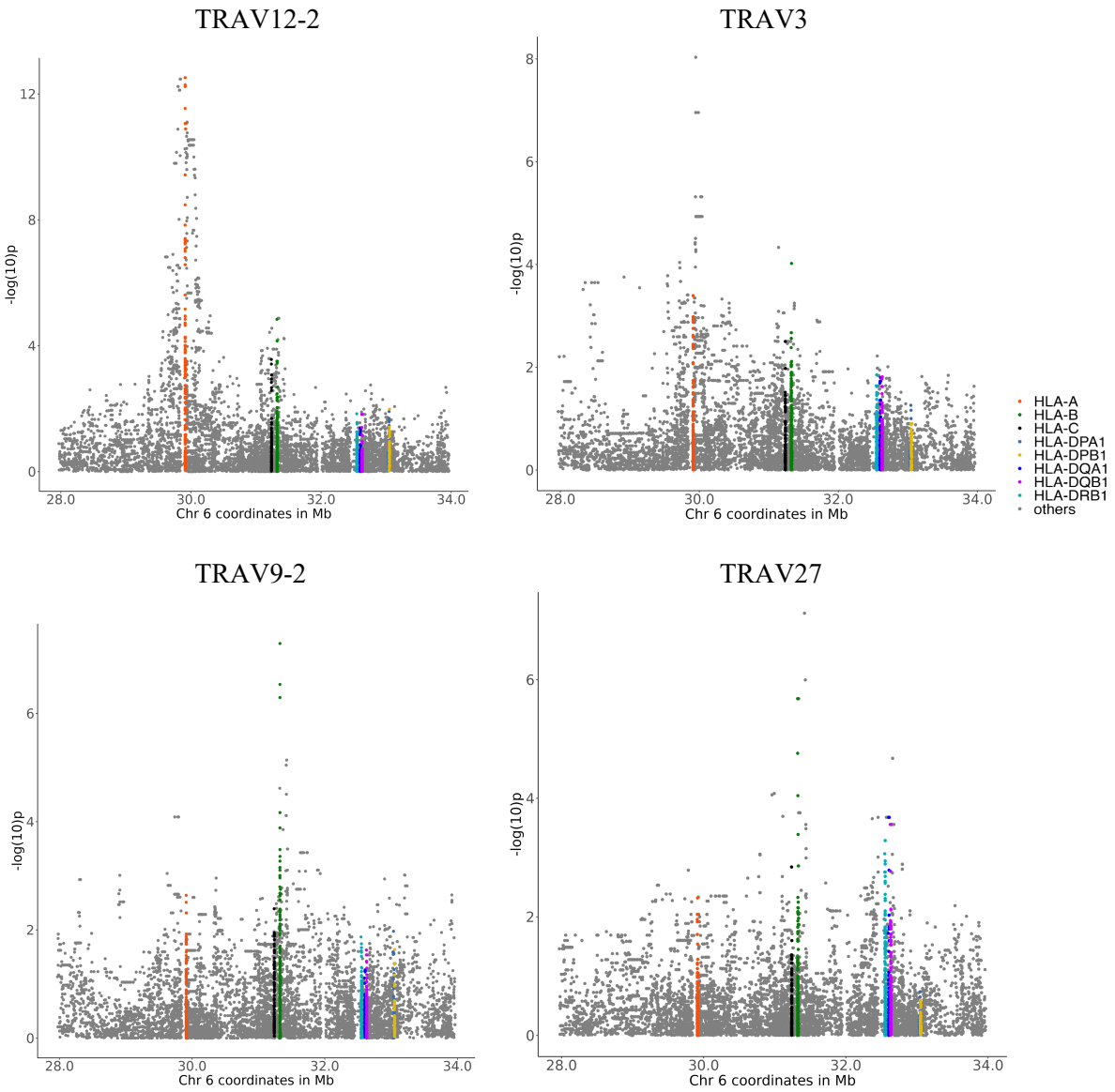


Supplementary Figure 2 Permutation analysis
To account for multiple testing and also correlation between V-gene usage, we permuted the phenotype dataset 1000 times, preserving the V-genes that each individual had but re-ordering the samples. These are histograms of the permutation p values for a) α chain GWAS b) β chain GWAS c) α chain HLA association d) β chain HLA association. The 5% significance threshold is indicated by a red line.

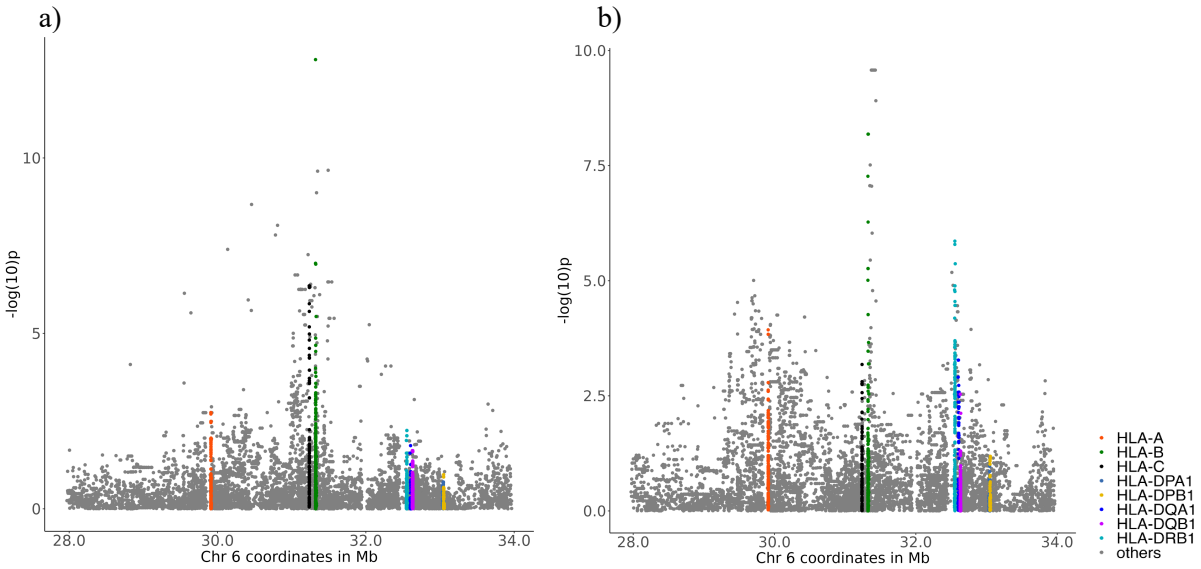


Supplementary Figure 3
Individual locus plots of V-gene HLA associations which pass significance threshold determined by permutation tests. Classical HLA genes are annotated in different colours in the legend.

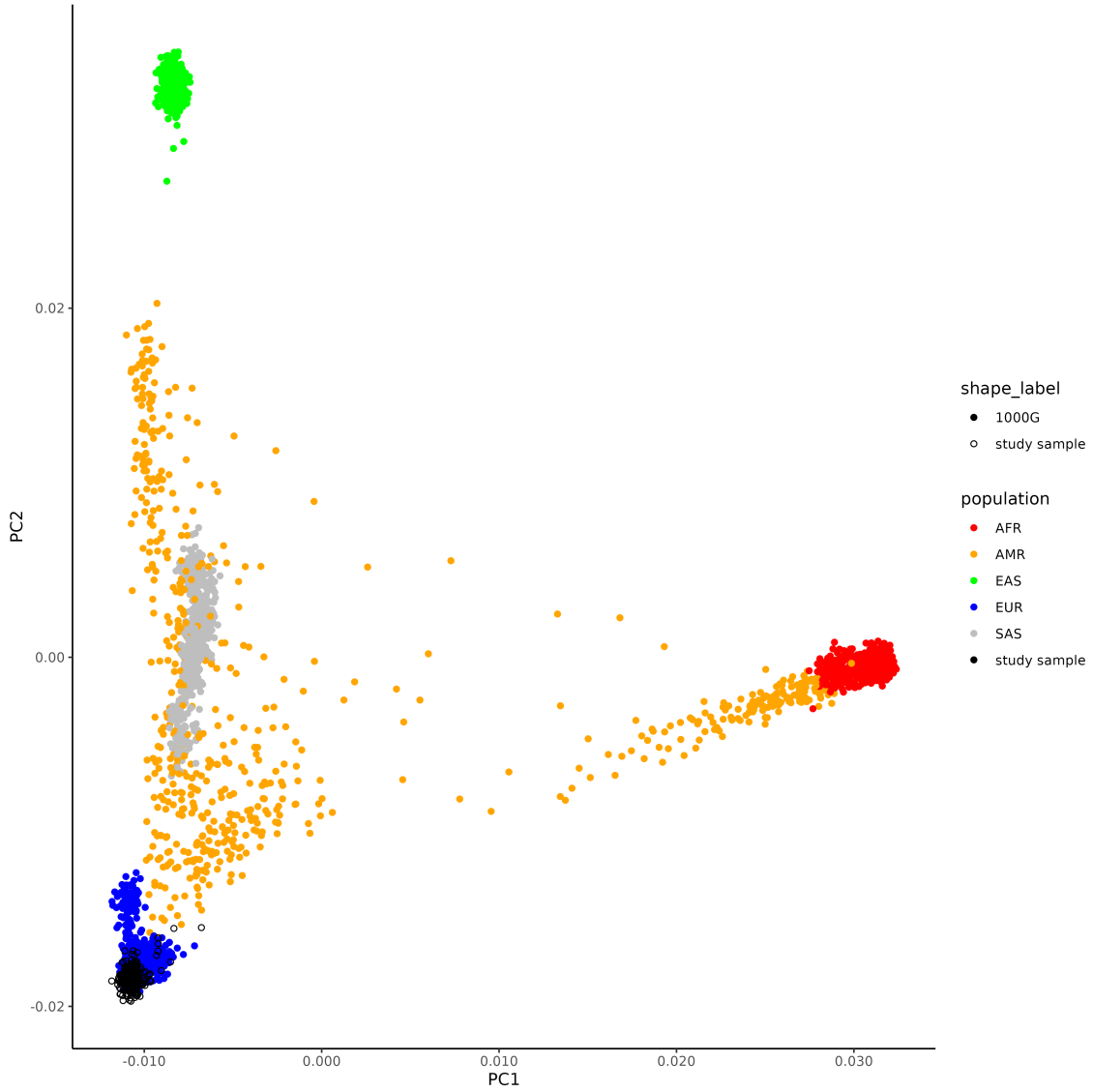



TRAV12-2
TRAV3
TRAV9-2
TRAV27
-log(10)p
Chr 6 coordinates in Mb
28.0
30.0
32.0
34.0
HLA-A
HLA-B
HLA-C
HLA-DPA1
HLA-DPB1
HLA-DQA1
HLA-DQB1
HLA-DRB1
others

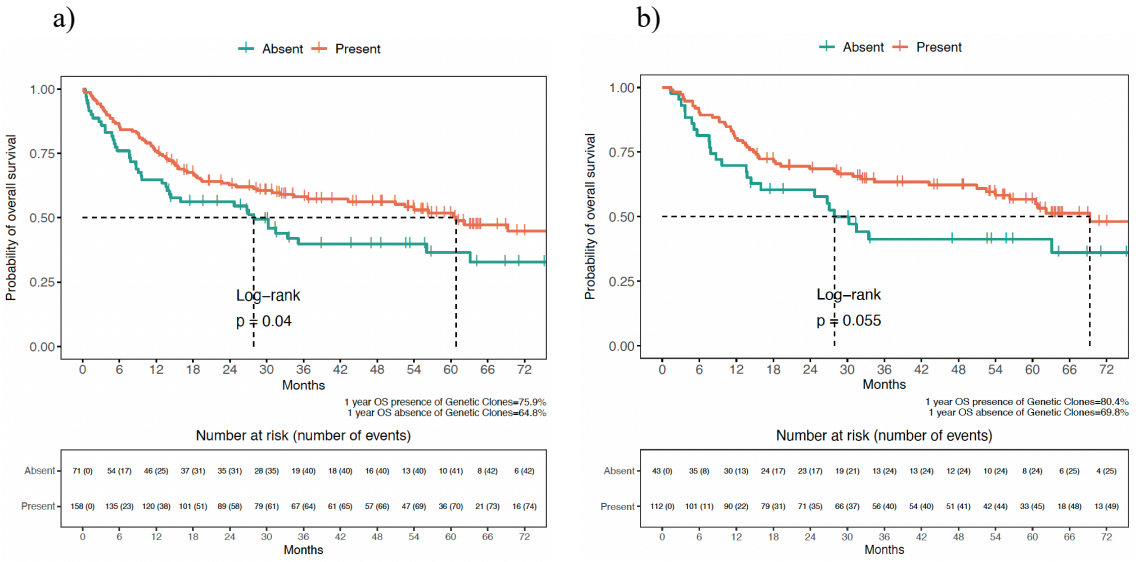
Supplementary Figure 4
Association between TCR CDR3 K-mer usage and germline genetic variation. Locus plot of association between variants in the MHC region and a) TGDSNQP b) TSGDYNE, both of which are on the TCR β chain



Supplementary Figure 5 Principal components of our cohort's genetic data plotted together with the 1000 Genomes project samples demonstrating that our samples are of European ancestry. Each of the dots represent one individual and are coloured by superpopulations. AFR – African, AMR – Ad Mixed American, EAS – East Asian, EUR – European, SAS – South Asian



Supplementary Figure 6a) Survival analysis of all patients receiving ICB for metastatic disease for which we had pre-treatment samples demonstrated that patients carrying HLA-matched clones prior to treatment had improved overall survival b) Survival analysis of patients receiving ICB for metastatic melanoma showed that carriage of HLA-matched clones either before or after treatment improved survival



Supplementary Figure 7 Principal components of V-gene usage for TCR a) α chain b) β chain. Each point represents an individual and each plot shows the points coloured by a different covariate