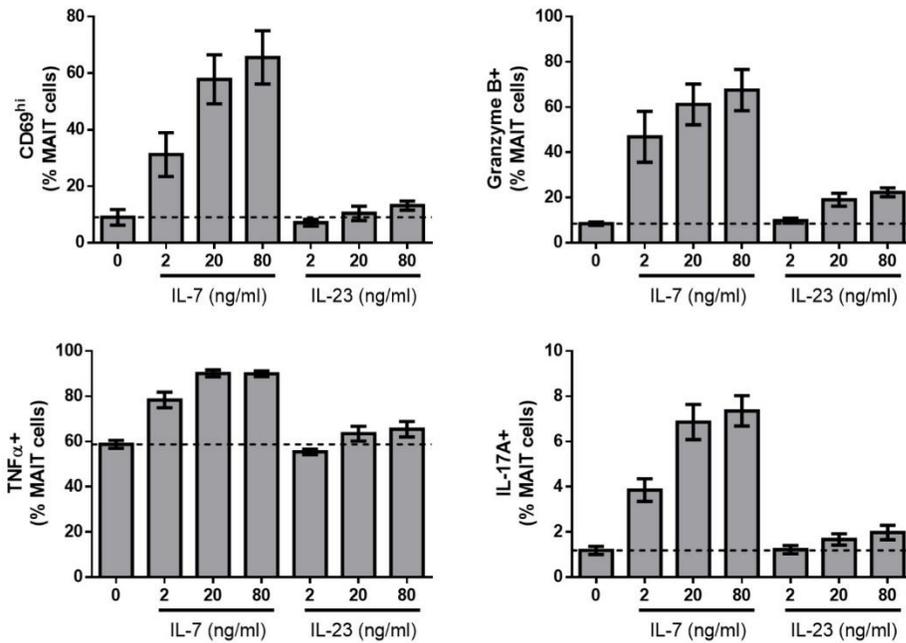
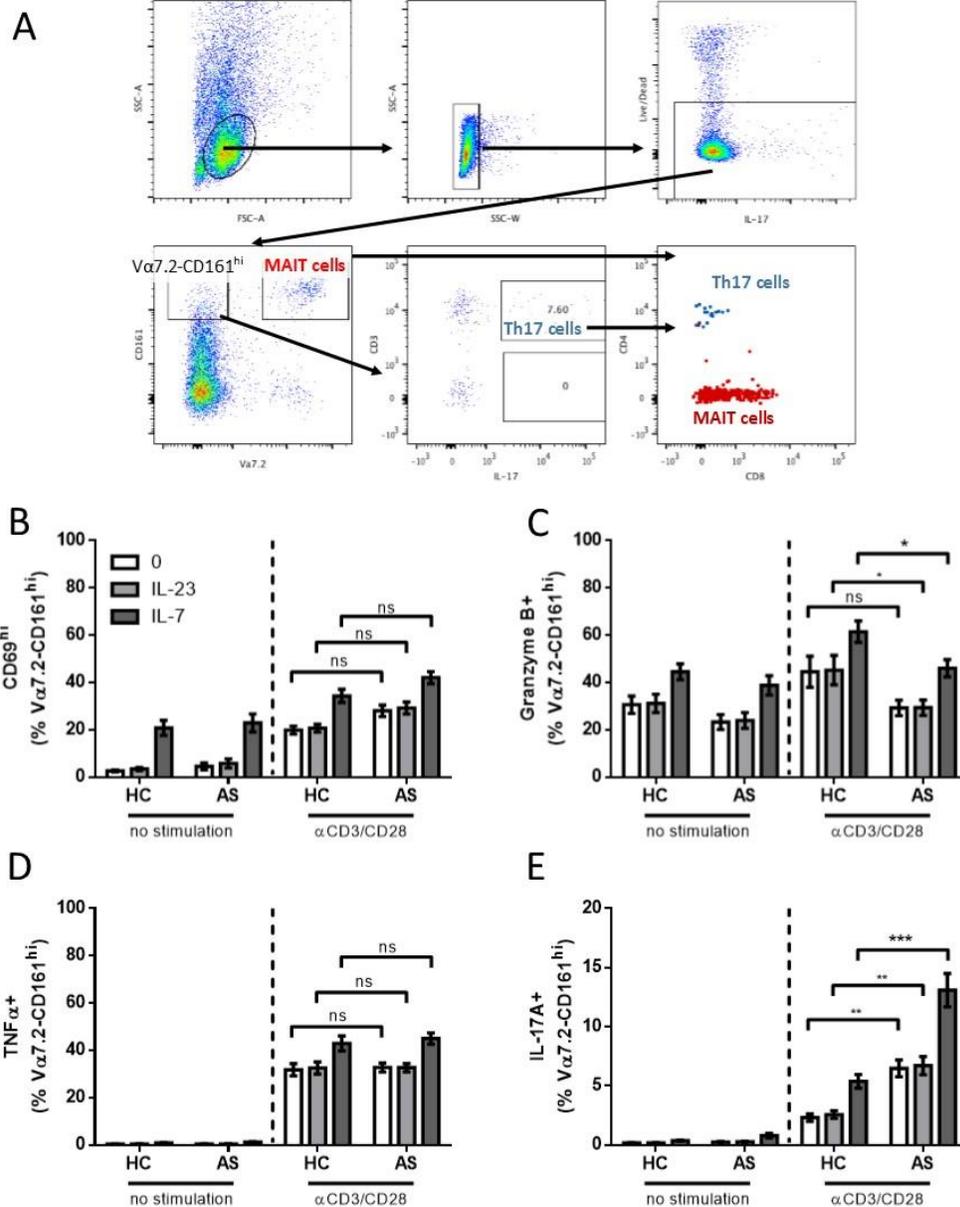


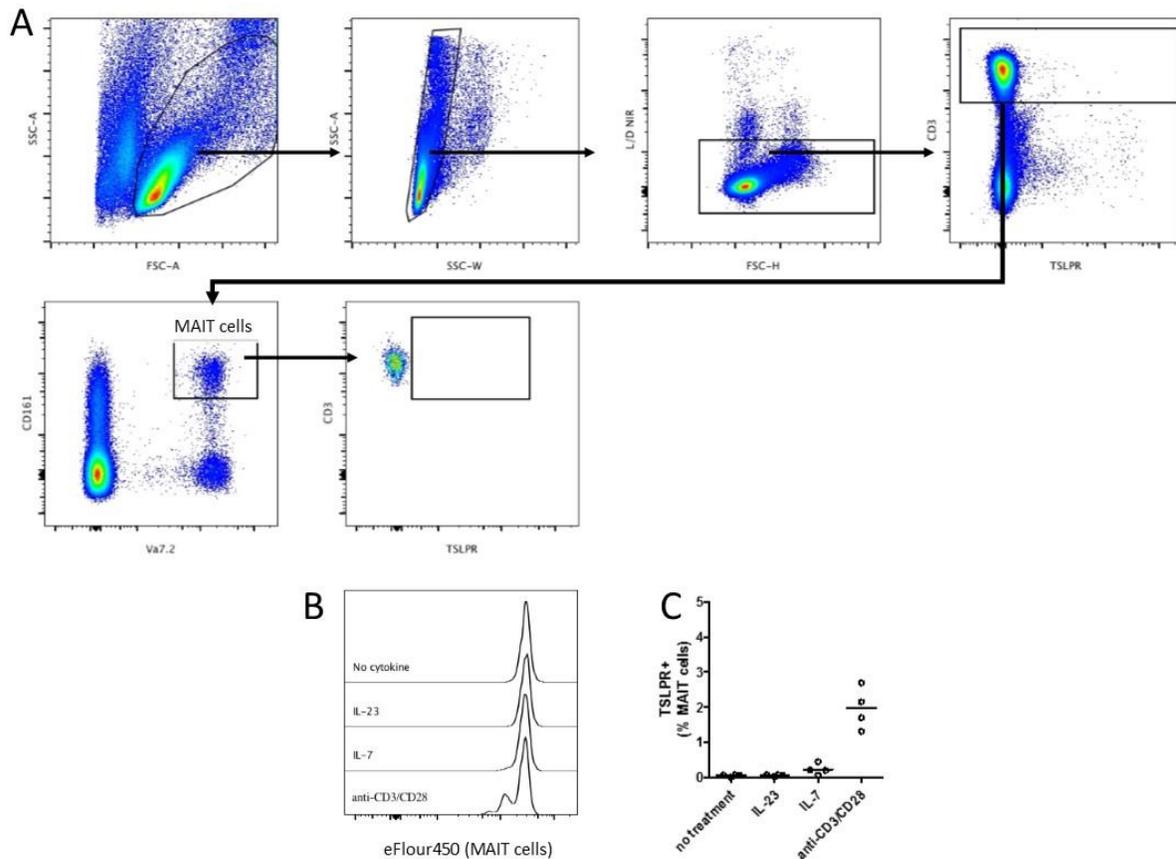
Supplementary figure 1: Titration of *Salmonella* for in vitro MAIT cell assay. THP-1 cells were infected overnight with PFA-killed *Salmonella* at indicated MOI prior to 24 hr co-culture with PBMC. Anti-MR1 blocking antibody (grey) or isotype control (white) were added for the duration of co-culture. Brefeldin A was added for final 4 hr of co-culture. Live, single lymphocytes (FSC^{lo}SSC^{lo}) selected to identify MAIT cells (V α 7.2+CD161^{hi}) by flow cytometry for the indicated factors. Data from duplicate wells of individual experiment, displayed as mean \pm SEM.



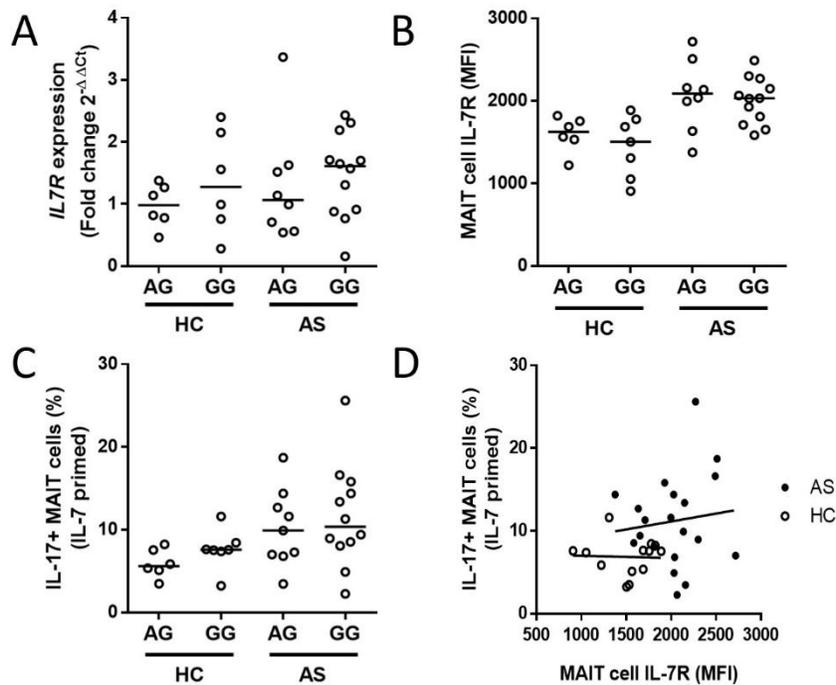
Supplementary figure 2: Titration of IL-7 and IL-23 for in vitro priming assay. PBMC treated for 60 hr with indicated doses of IL-7 or IL-23, with brefeldin A and anti-CD3/CD2/CD28 added for final 12 hr. Cytokine and granzyme production in MAIT cells assessed by flow cytometry. Hashed line represents cytokine/granzyme production in PBMC without IL-7/IL-23 priming. Data pooled from 5 subjects and displayed as mean \pm SEM.



Supplementary figure 3: IL-17A⁺Va7.2-CD161^{hi} cells are CD3⁺CD4⁺CD8⁻ (Th17) cells which are primed by IL-7. PBMC treated for 60 hr with 20 ng/ml IL-7 or IL-23. Brefeldin A with or without anti-CD3/CD2/CD28 added for final 12 hr. Cytokine and granzyme production assessed by flow cytometry. (A) Representative plot of IL-7 primed, TCR stimulated cells stained with the indicated markers to examine CD3, CD4 and CD8 on Va7.2-CD161^{hi}IL-17A⁺ cells (blue) and on MAIT cells (red) as a control. Experiment performed on three subjects with similar results. Va7.2-CD161^{hi} cells examined for (B) CD69, (C) granzyme B, (D) TNFα and (E) IL-17A. Graphs display pooled results from five independent experiments with data displayed as mean ±SEM (AS n = 21, HC n = 13). Data analyzed by repeated measures two-way ANOVA with Bonferroni post-test to compare AS vs. HC.



Supplementary figure 4: IL-7 priming of MAIT cells does not induce MAIT cell proliferation nor upregulation of TSLPR. PBMC labelled with membrane dye (eFlour450) prior to treatment for 48 hr with 20 ng/ml IL-7 or IL-23. Anti-CD3/CD2/CD28 added for 48 hr as positive control. (A) Representative gating strategy from IL-7 primed PBMC shows identification of MAIT cells (CD3+Va7.2-CD161^{hi}) for TSLPR interrogation. (B) eFlour450 plots from single subject representative of four subjects under indicated treatments. (C) TSLPR expression on MAIT cells from four subjects under indicated treatments. Data displayed as scatter plot with median.



Supplementary figure 5: Stratification of IL-7R expression and function by the GWAS-identified, AS-associated SNP (rs11742270). For all graphs, subjects genotyped for risk [G] or protective [A] allele. (A) Stratification by rs11742270 of *IL7R* expression in PBMC from figure 4D. (B) Stratification by rs11742270 of IL-7R expression on MAIT cells from figure 4B. (C) Stratification by rs11742270 of IL-17 production in IL-7 primed MAIT cells from figure 6C. Data in (A-C) displayed as scatter plot with median. (D) No correlation between MAIT cell IL-7R expression level (Fig 4B) and IL-17 production post-IL-7 priming (Fig 6C). Data analyzed by Spearman correlation with trend line calculated by linear regression.

Supplementary table 1: Patient and healthy control cohorts for flow cytometry

	AS	HC	RA	AS-SF	RA-SF
Sex (M/F)	36/18	18/10	5/11	10/0	2/5
age (yr \pm SD)	40 \pm 13	36 \pm 14	53 \pm 14	40 \pm 15	58 \pm 17
HLA-B27+ (%)	78	NA	NA	100	NA
age of backpain (yr)	22	-	-	21	-
ESR (mm/h \pm SD)	10 \pm 10 [^]	-	19 \pm 16	16 \pm 17 [#]	NA
CRP (mg/L \pm SD)	9 \pm 12 [^]	-	14 \pm 16	23 \pm 21 [#]	NA
BASDAI	4.3 [^]	-	-	5.8 [#]	-
Biologics (%)	61	-	33	70	40
NSAID (%)	58	-	40	70	0

[^]Data available for 38/54 patients [#]Data available for 7/10 patients. Biologics are restricted to the TNF-inhibitors. NA = not available. Values represent means where applicable.

Supplementary table 2: Patient and HC cohort for in vitro MAIT cell functional assays and IL-7R expression experiments.

	Salmonella assay		IL-7 assay	
	AS	HC	AS	HC
Sex (M)	10	11	21	13
Age (yr \pm SD)	29 \pm 4	27 \pm 2	30 \pm 4	27 \pm 3
HLA-B27+ (%)	90	NA	90	NA
Age of backpain (yr)	17	-	16	-
ESR (mm/h \pm SD)	12 \pm 26	-	10 \pm 19	-
CRP (mg/L \pm SD)	9 \pm 14	-	7 \pm 10	-
BASDAI	2.2	-	2.3	-
Biologics (%)	60	-	75	-
NSAID (%)	50	-	50	-

Biologics are restricted to the TNF-inhibitors. NA = not available. Values represent means where applicable.