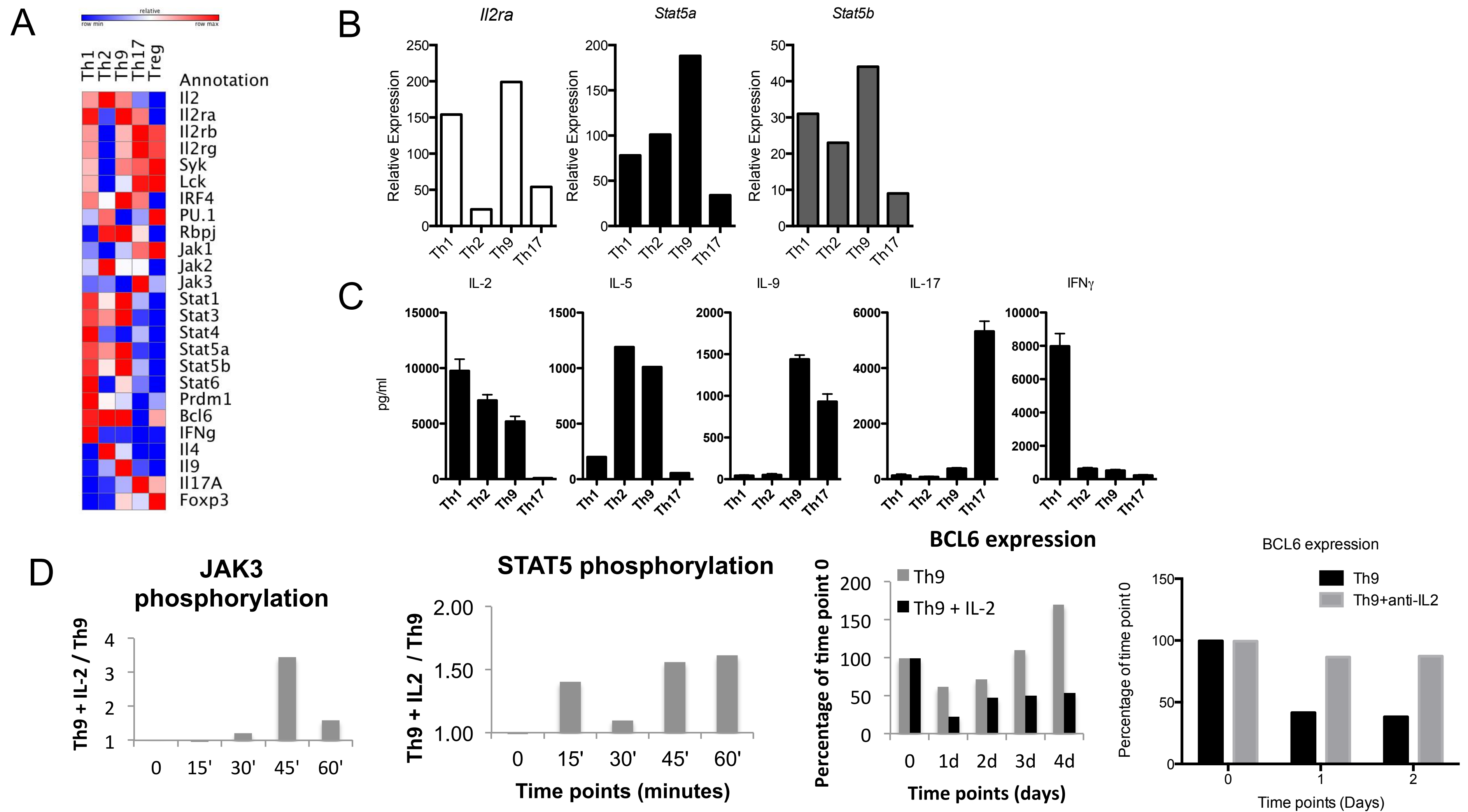
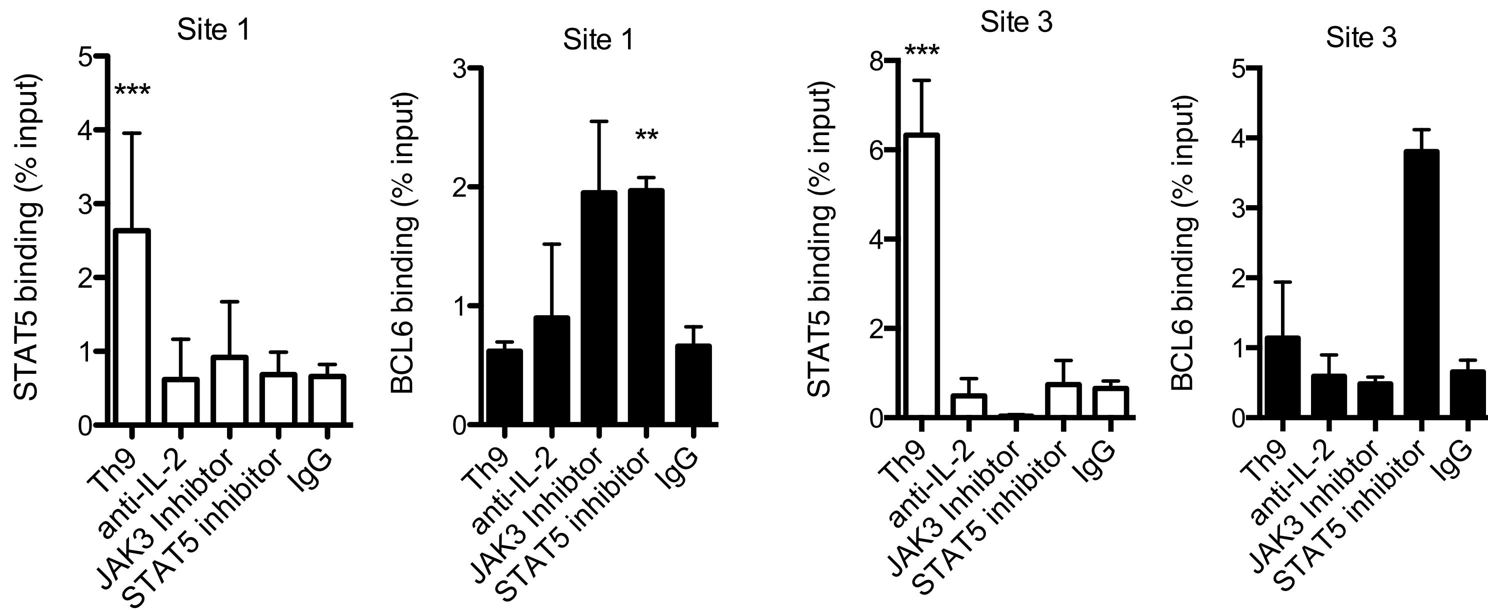
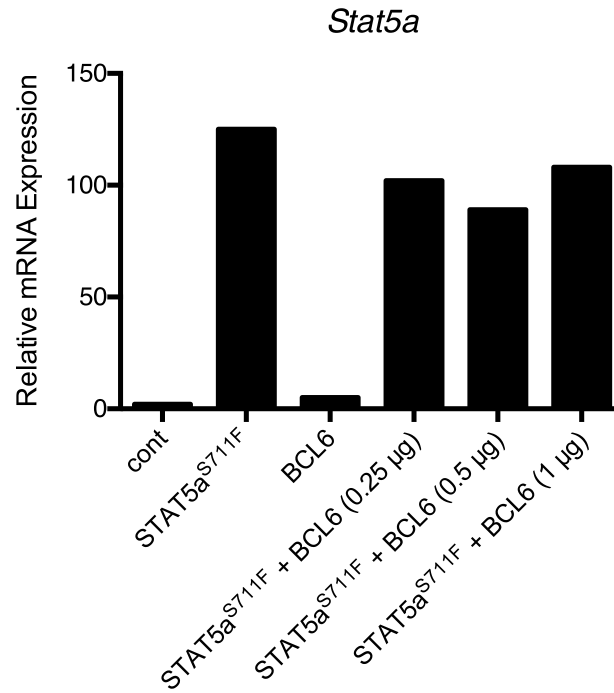


Supplementary Figure 1. (**A**) Heatmap of gene expression downstream of IL-2 signaling in T helper and inducible regulatory CD4+ cells. Naive CD4+ T cells from WT mice were differentiated into Th1, Th2, Th9, Th17 and inducible Tregs according to standard protocols and gene expression was measured by RNA-Seq. (**B**) *Il2ra, Stat5a and Stat5b* mRNA expression in T cell subsets. Naïve CD4+ T cells from WT mice were differentiated into Th1, Th2, Th9 and Th17 cells according to standard protocols and gene expression was measured by Taqman quantitative PCR on day 4 after differentiation. (**C**) IL-2 production in T helper cells. Naïve CD4+ T cells were differentiated into T helper cells according to the protocol described in the methods section and IL-2 production was measured on day 4 after differentiation by bead-based Luminex technology. IFNγ, IL-5, IL-9, and IL-17 production are shown as controls for Th1, Th2, Th9 and Th17 cell polarization, respectively. (**D**) Quantification of phospho-JAK3, phospho-STAT5 and BCL6 expression by densitometry (optical density, OD) of the corresponding X-ray films. Ratio of protein expression in IL-2-treated or untreated Th9 cells is shown.



Supplementary Figure 2. Binding of STAT5 and BCL6 at two sites (1 and 3) in the *Il9* promoter. Naïve CD4+ T cells from WT mice were polarized under Th9 cell conditions for 2 days in the presence of anti-IL-2 neutralizing antibody, JAK3 or STAT5 inhibitor. ChIP-Sybr Green PCR was performed to determine STAT5 and BCL6 binding to the *Il9* promoter. $^{**}p < 0.005$; $^{***} p < 0.0001$ by Student t test.



Supplementary Figure 3. A representative experiment of *Stat5a* gene expression in 293T cells. HEK 293T cells were transfected with mutant STAT5a/S711F, BCL6 or combination of STAT5a/S711F and increasing doses of Bcl6 together with a constant amount of Il9-Luciferase construct. Cells were lyzed 24 hrs after transfection and Stat5a gene expression was assessed by Taqman PCR.