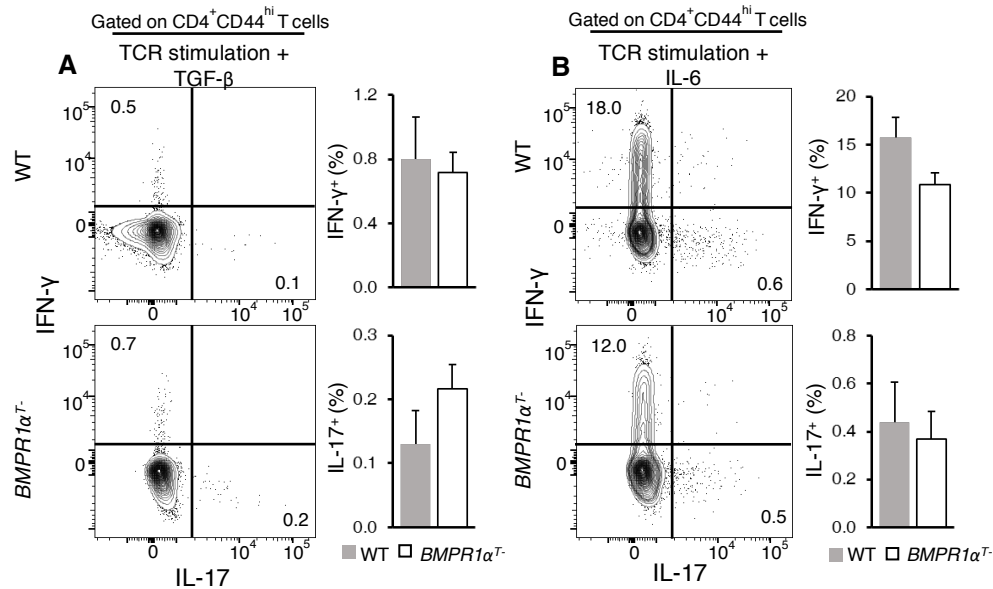
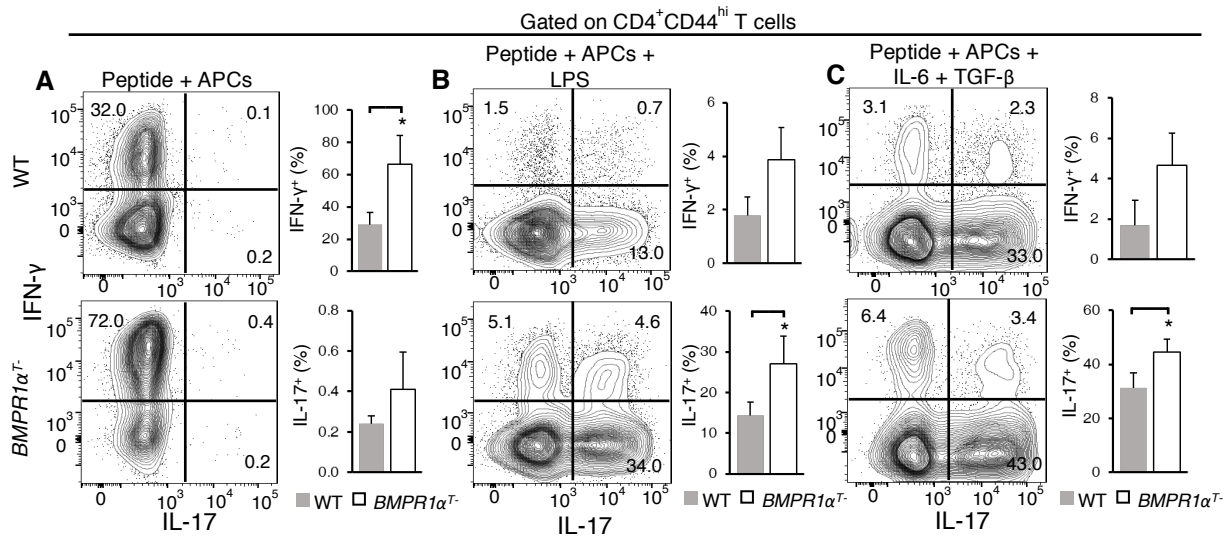


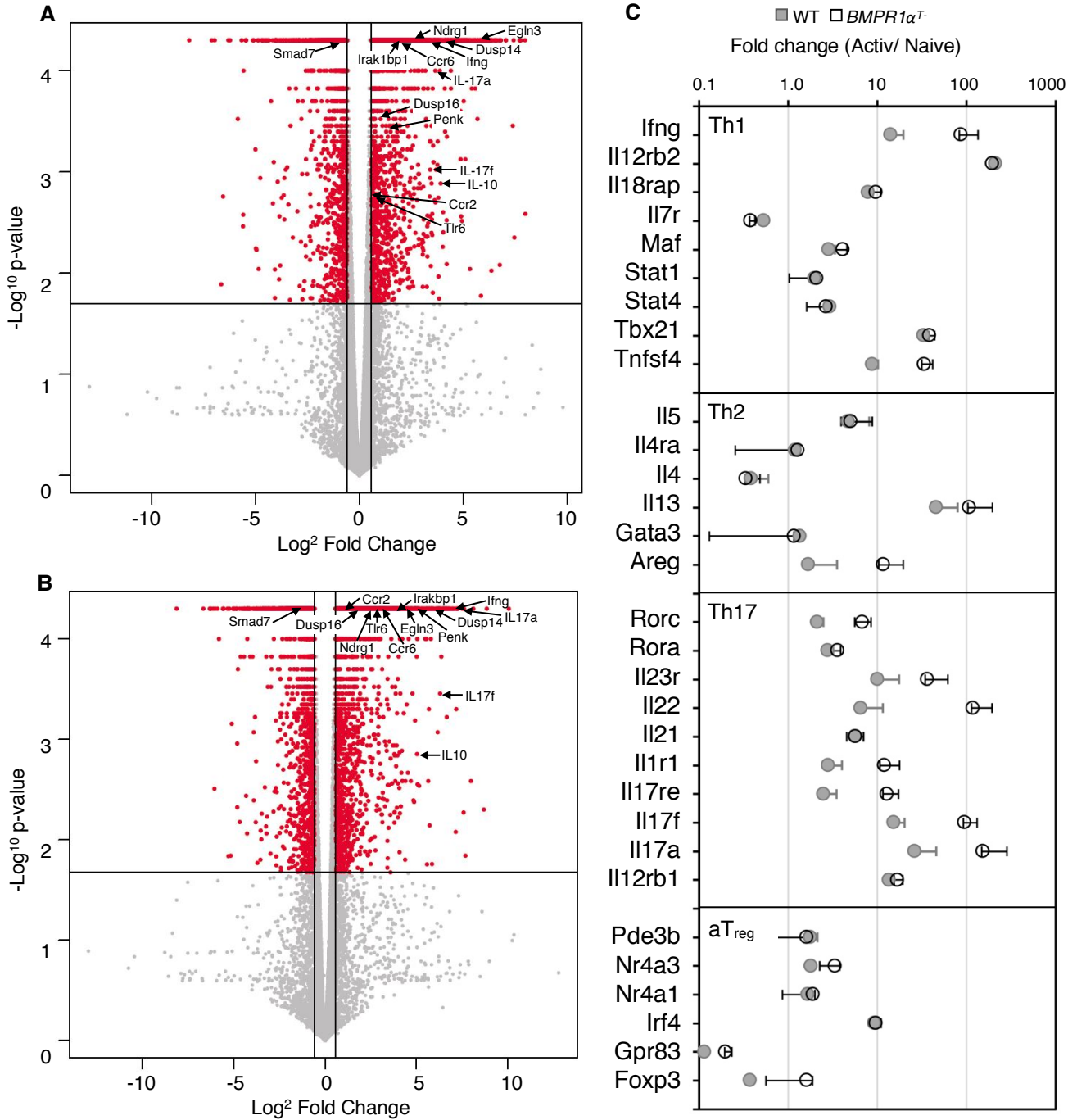
**Fig. S1. Signaling through BMPR1 $\alpha$  alters T cell lineage commitment.** (A) qRT-PCR analysis of *BMPR2* transcripts in CD4<sup>+</sup> T cell subsets. Data are presented as means  $\pm$  SD pooled from three independent experiments. \*\* $p < 0.01$  and \*\*\* $p < 0.001$ , as determined by Student's t-test. (B) PCR analysis of cytokine and transcription factor expression in sorted, naive CD4<sup>+</sup> T cells stimulated for 4 days in Th cell polarizing conditions; either in the absence or presence of BMP2/4/7. Results representative of three independent stimulations.



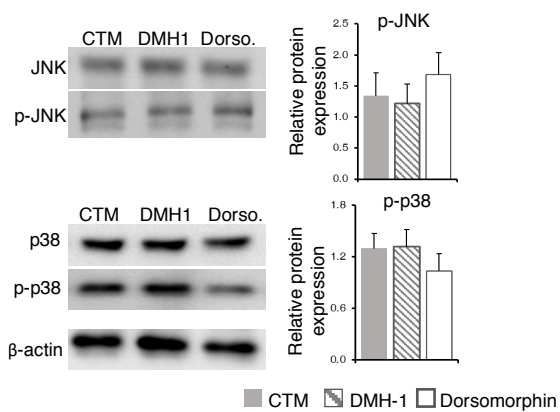
**Fig. S2. Cytokine production in WT and *BMPRIα*-deficient cells activated in the presence of TGF-β or IL-6.** (A and B) Flow cytometry analysis of IFN-γ and IL-17 production by purified WT and *BMPRIα*<sup>-/-</sup> naive CD4<sup>+</sup> T cells that were stimulated with TGF-β (5 ng/ml) (A) or IL-6 (20 ng/ml) (B) alone for 4 days. Contour plots are representative of three independent experiments. The frequency of cytokine producing cells are means ± SD from all experiments.



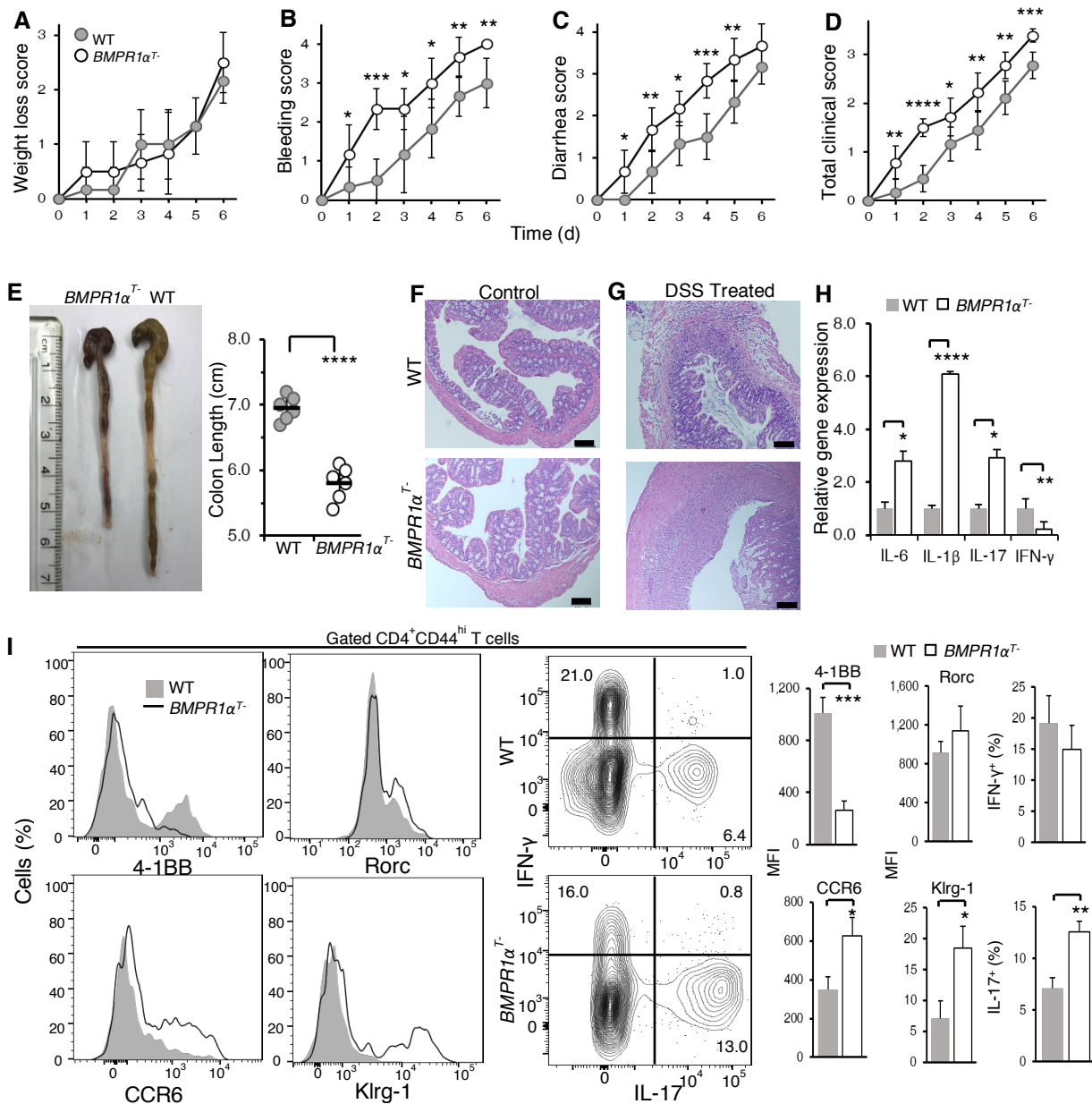
**Fig. S3. Antigen specific *BMPR1α*-deficient CD4<sup>+</sup> T cells generate increased proportion of pro-inflammatory cells.** (A to C) Flow cytometry analysis of IFN-γ and IL-17 in purified CD4<sup>+</sup> T cells from WT and *BMPR1α*<sup>-/-</sup> mice expressing a transgenic TCR and stimulated with antigenic peptide presented by splenocytes alone (A), in the presence of LPS (B) or in Th17 polarizing conditions (C), for 4 days. Data are representative of four independent experiments. The frequency of cells are means ± SD pooled from all experiments. \**p* < 0.05, as determined by Student's t-test.



**Fig. S4. Transcriptional profiles of naive versus activated CD4<sup>+</sup> T cells.** (A and B) Volcano plots of RNAseq analysis of sorted naive and activated WT (A) or *BMPRI1α*-deficient (B) CD4<sup>+</sup> T cells. Plots show analysis of pooled RNAseq data for all replicates. (C) Fold change expression of signature genes that define Th1, Th2, Th17 and aT<sub>reg</sub> cell subsets for naive WT and activated WT and *BMPRI1α*<sup>-/-</sup> CD4<sup>+</sup> T cells. Closed circles represent average fold change gene expression difference between naive WT and activated WT and open circles represent average fold change differences between naive WT and activated *BMPRI1α*<sup>-/-</sup> CD4<sup>+</sup> T cells. Bars represent standard deviations.



**Fig. S5. Membrane proximal signaling in BMPR1 $\alpha$ -deficient and -sufficient CD4<sup>+</sup> T cells.** Western blot analysis of JNK and p38 phosphorylation in lysates of WT CD4<sup>+</sup> T cells stimulated in medium alone or in the presence of DMH1 or dorsomorphin. Blots (left) are representative of three independent experiments. Normalized band intensity (right) are means  $\pm$  SD from all experiments.



**Fig. S6. DSS-induced colitis is more severe in *BMPR1α*<sup>-/-</sup> mice.** (A to D) WT and *BMPR1α*<sup>-/-</sup> mice were treated with DSS. Change in body weight (A), bleeding (B), stool consistency (C), and total clinical score (D) were monitored over 6 days. (E) On day 7 after DSS treatment, colon tissue was isolated from WT and *BMPR1α*<sup>-/-</sup> mice. Representative images of colon length (left) rounded to nearest 1.0 mm were quantified (right). (F and G) Histological analysis colonic cross-sections from control (F) and DSS treated (G) WT and *BMPR1α*<sup>-/-</sup> mice on day 7 after treatment. Scale bars = 100 μm. (H) qRT-PCR analysis of *IL-6*, *IL-1β*, *IL-17* and *IFN-γ* mRNA transcripts in CD4<sup>+</sup> T cells isolated from the colons of WT and *BMPR1α*<sup>-/-</sup> mice treated with DSS on day 7. (I) Flow cytometry analysis of the expression of activation markers, Rorc and cytokines by CD4<sup>+</sup> T cells isolated from the colons of DSS treated WT and *BMPR1α*<sup>-/-</sup> mice on day 7. All results are representative of 3 independent experiments. All quantified data are means ± SD of 6 mice per group pooled from all experiments. \*P < 0.05, \*\*P < 0.01, \*\*\*P < 0.001, \*\*\*\*P < 0.0001, as determined by Student's t-test.