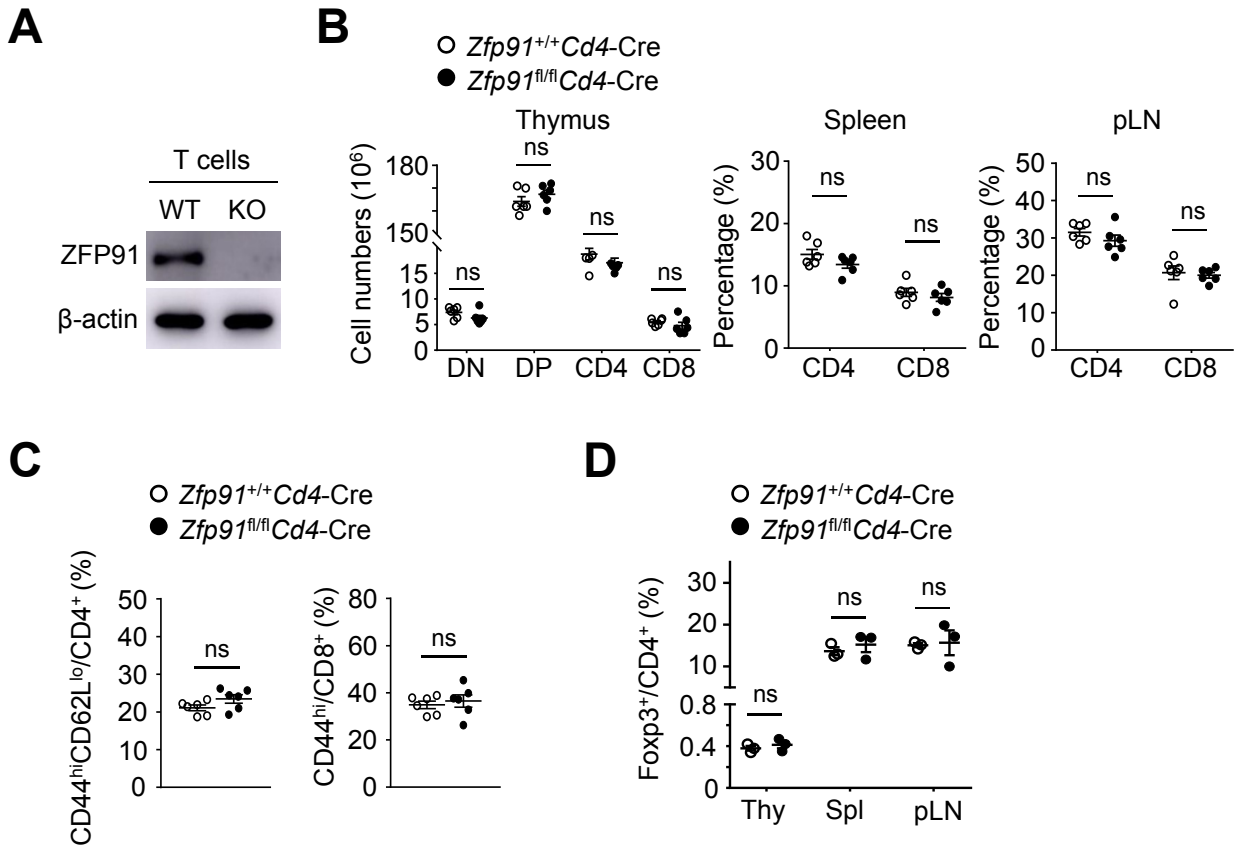
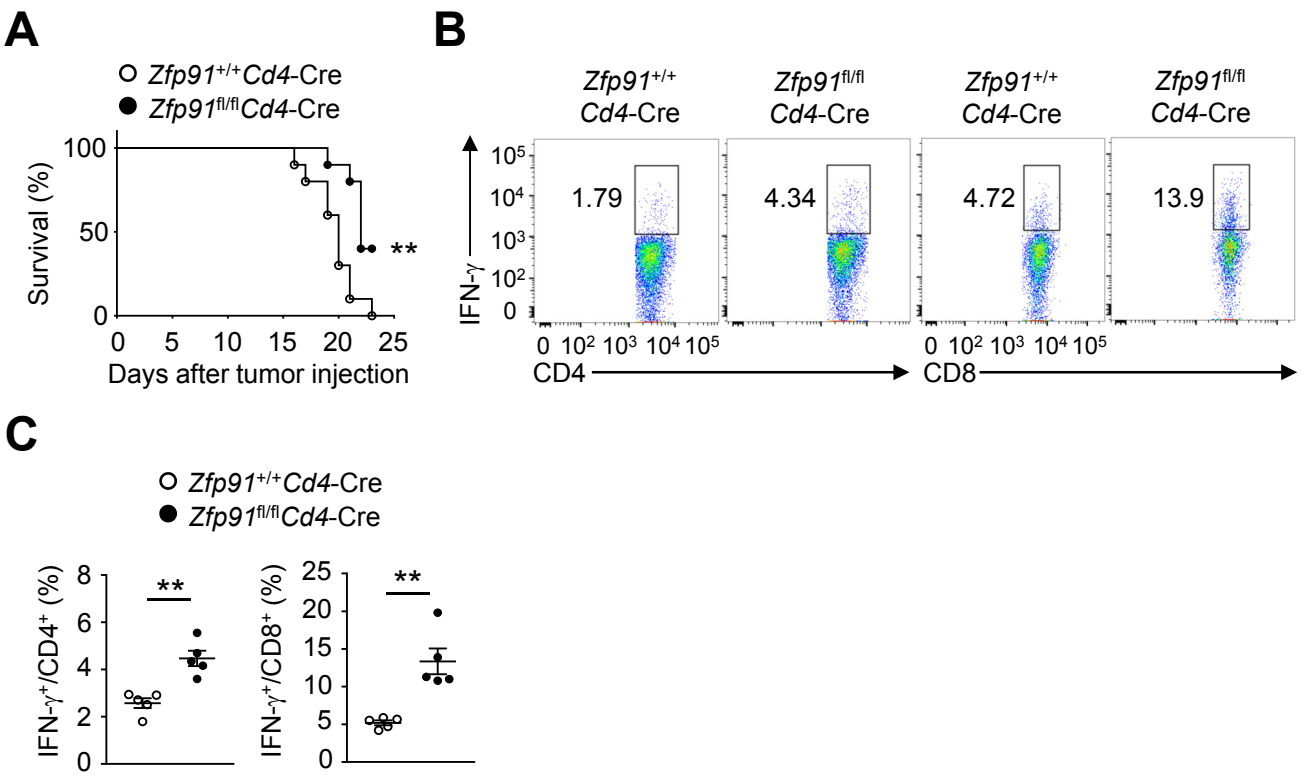
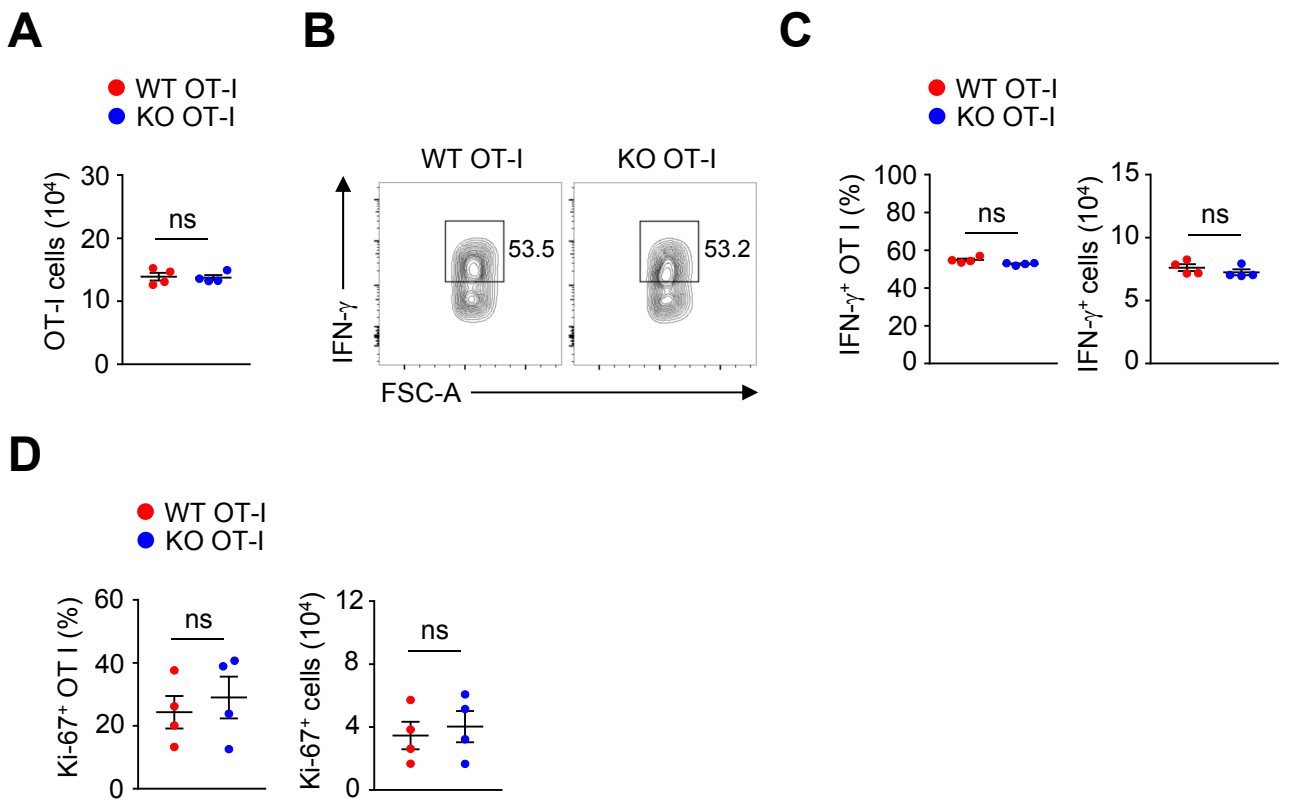


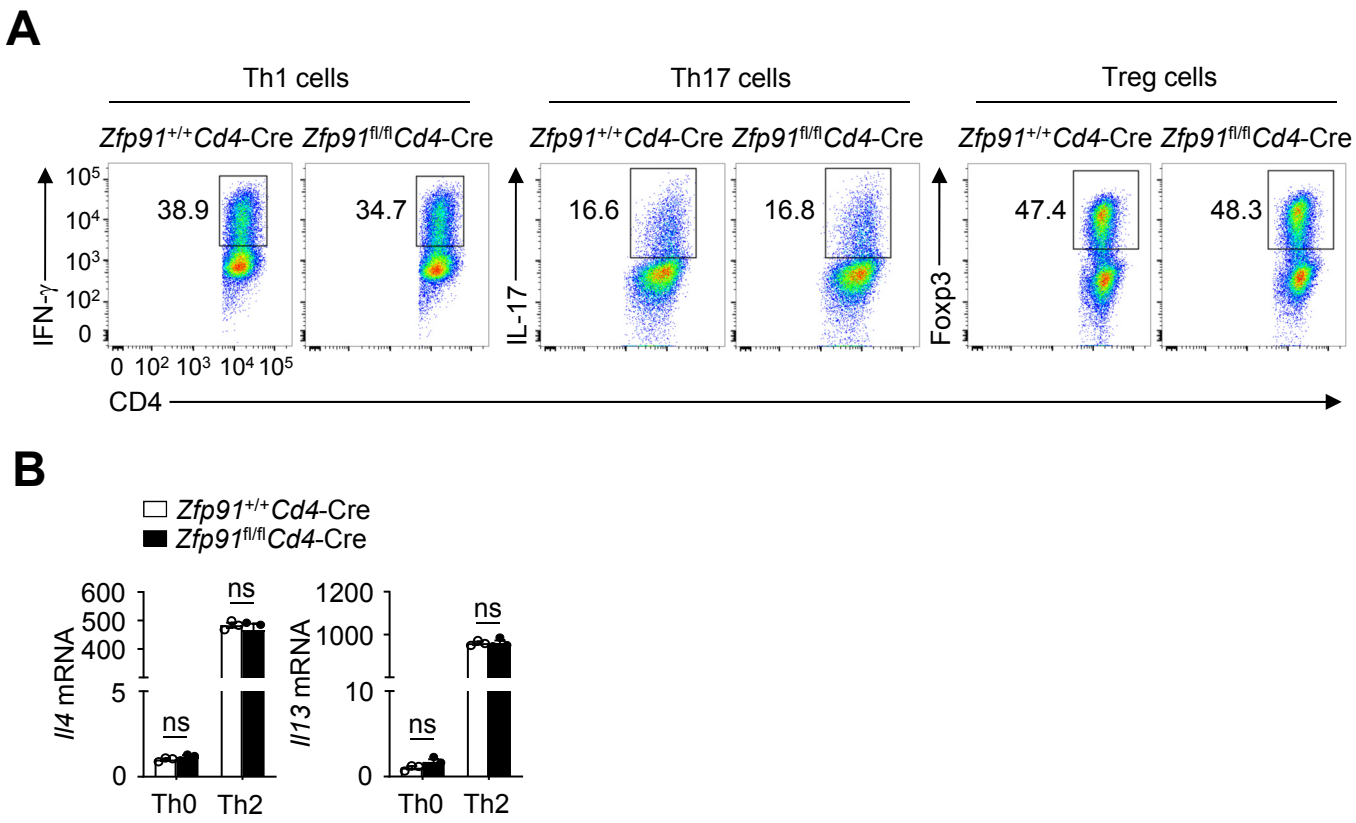
Supplementary Figure 1. T cell development in the *Zfp91*$^{fl/fl}$*Cd4*-Cre mice. (**A**) Immunoblot analysis of ZFP91 in whole-cell lysates of splenic CD4$^+$ T cells from *Zfp91*$^{+/+}$*Cd4*-Cre (WT) mice and *Zfp91*$^{fl/fl}$*Cd4*-Cre (KO) mice. (**B**) Cell numbers of CD4$^-$ CD8$^-$ (DN), CD4$^+$CD8$^+$ (DP), CD4$^+$CD8$^-$ (CD4), CD4$^-$CD8$^+$ (CD8) in the thymus, and percentage of CD4$^+$ and CD8$^+$ T cells in the spleen and peripheral lymph nodes (pLN) of 6-week-old *Zfp91*$^{+/+}$*Cd4*-Cre and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice (n=6). (**C**) Flow cytometric analysis of the percentage of memory-like (CD44^{hi}CD62L^{lo} for CD4$^+$ and CD44^{hi} for CD8$^+$ T cells) CD4$^+$ and CD8$^+$ T cells in total splenocytes from 6-week-old *Zfp91*$^{+/+}$*Cd4*-Cre and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice (n=6). (**D**) Flow cytometric analysis of the percentage of Foxp3$^+$ Treg cells in the thymus (Thy), spleen (Spl) and peripheral lymph nodes (pLN) from 6-week-old *Zfp91*$^{+/+}$*Cd4*-Cre and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice (n=3). Data are representative of three independent experiments. ns, not statistically significant; two-tailed Student's t test.



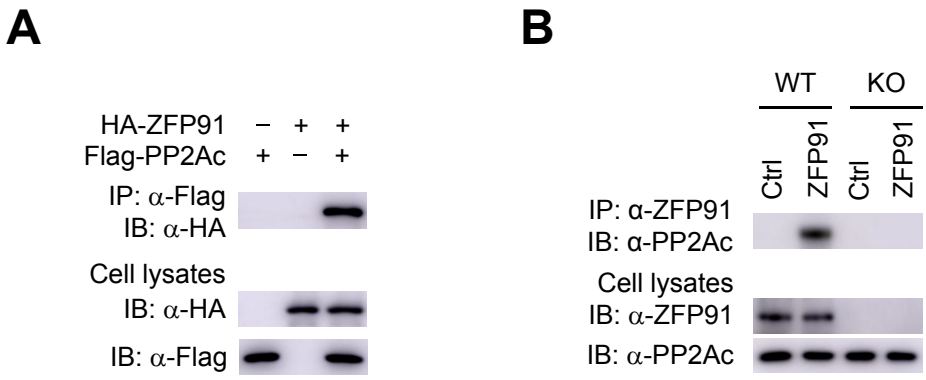
Supplementary Figure 2. Antitumor immune responses in the *Zfp91*$^{fl/fl}$*Cd4*-Cre mice. (**A**) Survival curves of *Zfp91*$^{+/+}$*Cd4*-Cre and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice given subcutaneous injection of 5×10^5 B16-F10 melanoma cells (n=10). (**B** and **C**) Flow cytometric analysis of T cells in tumors of *Zfp91*$^{+/+}$*Cd4*-Cre and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice injected s.c. with B16-F10 melanoma cells (day 14). The data are presented as representative plots (**B**) and as summary graphs (**C**, n=5). Data are representative of two independent experiments. Data are presented as the mean ± SEM. **, $P < 0.01$. (**A**) was analyzed by log-rank (Mantel-Cox) test and (**C**) was analyzed by two-tailed Student's t test.



Supplementary Figure 3. Splenic T cell activity of tumor-bearing mice with transferred OT-I cells. (**A**) Number of OT-I cells in spleen from MC38-OVA tumor bearing mice with transferred CFSE-labeled WT OT-I and CTV-labeled KO OT-I cells (at day 7 after OT-I cells adoptive transfer) (n=4). (**B-D**) Percentage and number of IFN-γ⁺ OT-I cells (**B, C**) or Ki-67⁺ OT-I cells (**D**) in spleen from MC38-OVA tumor bearing mice with transferred OT-I cells (at day 7 after OT-I cells adoptive transfer) (n=4). Data are representative of three independent experiments. ns, not statistically significant; two-tailed Student's t test.



Supplementary Figure 4. Th cell differentiations in *Zfp91*$^{+/+}$*Cd4*-Cre and *Zfp91*$^{fl/fl}$*Cd4*-Cre T cells. (**A**) Naïve CD4^{+} T cells from *Zfp91*$^{+/+}$*Cd4*-Cre mice and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice were stimulated under standard Th1, Th17 or Treg conditions and harvested on day 5 for flow cytometric analysis. (**B**) Naïve CD4^{+} T cells from *Zfp91*$^{+/+}$*Cd4*-Cre mice and *Zfp91*$^{fl/fl}$*Cd4*-Cre mice were stimulated under standard Th0 or Th2 conditions and harvested on day 5 for qRT-PCR analysis (n=3). Data are representative of three independent experiments. ns, not statistically significant; two-tailed Student's t test.



Supplementary Figure 5. ZFP91 interacts with PP2Ac. (**A**) Lysates from HEK293T cells transfected with the indicated expression vectors were subjected to IP using an antibody against Flag. (**B**) Lysates from T cells from *Zfp91*$^{+/+}$*Cd4*-Cre (WT) mice and *Zfp91*$^{fl/fl}$*Cd4*-Cre (KO) mice stimulated with anti-CD3 and anti-CD28 antibodies for 4 hours were subjected to IP using an antibody against ZFP91. Data are representative of three independent experiments.