**Supplemental Data**

**Supplemental Figure 1.**

Nucleotide sequences for retroviral constructs used in experiments.

**Supplemental Figure 2.**

Representative flow cytometry gating strategies for the T cell, immune cell, and regulatory T cell population analysis.

**Supplemental Figure 3.**

**(A)** Flow cytometry demonstrating equivalent retroviral transduction into mouse T cells, detected with anti-mouse CD19 antibody. Data shown is mean +/- s.e.m. of five independent experiments. **(B)** Flow cytometry of antigen-positive B16F10 tumors showing lack of CD80/CD86 co-stimulatory molecules, detected with anti-mCD80 or anti-mCD86 antibody compared to EL4 (CD80+, CD86-) tumor cells. Data shown is representative plot of three independent experiments.

**Supplemental Figure 4.**

**(A)** Schematic of *in vivo* experimental protocol**.** C57BL/6 host mice were inoculated with 5x105 B16F10 tumor cells and allowed to grow for ten days. 5x106 armored or control modified pmel-1 T cells were then infused and overall survival was monitored (\*\*\*\*p<0.0001 and \*\*p<0.01). P-values for survival determined by long-rank Mantel-Cox Test, with 95% confidence interval. Data shown are from two independent experiments. **(B)** On Day 6 after pmel-1 T cell infusion, there was no significant difference in the number of total macrophages in the tumor samples from control mCD19t or armored IL-12 or IL-18 pmel-1 T cell treated mice. Data shown is mean +/- s.e.m. from two independent experiments. **(C)** Representative flow cytometry plots for data shown in Figures 2D-G.

**Supplemental Figure 5.**

**(A)** Adoptively transferred pmel-1 T cells were analyzed by flow cytometry on day 0 and day 6 after treatment. There was no significant difference in the ratio of Naïve (CD62L+, CD44-), Effector Memory (CD62L-, CD44+), Central Memory (CD62L+, CD44+), or Double Negative (CD62L-, CD44-) T cell phenotype among the groups on each day. Data shown as mean of three independent experiments. **(B)** Representative flow cytometry plots for data shown in Figures 3B-D. **(C)** Representative flow cytometry plots for data shown in Figures 3E. **(D)** *Ex vivo* cytotoxicity of B16F10 GFP/luc (gp100+; CD80/86-) tumor cells following a 24 hour co-culture at a 2:1 ratio with pmel-1 T cells that were isolated and sorted from tumor samples of mice six or thirteen days after treatment with armored or control modified pmel-1 T cells (\*\*\*p<0.001, \*\*p<0.01, and \*p<0.05 by two-way ANOVA). *Ex vivo* data obtained from two independent experiments and is shown mean +/- s.e.m.

**Supplemental Figure 6.**

**(A)** Mean fluorescence intensity of CD19+ T cells among the pmel-1 treatment groups, demonstrating similar vector expression. **(B)** Schematic of *in vivo* experimental protocol. C57BL/6 host mice were inoculated with 5x105 B16F10 tumor cells and allowed to grow for ten days. One day prior to the first T cell infusion, the tumor bearing mice were sublethally irradiated with 5 Gy irradiation. 5x106 armored or control modified pmel-1 T cells were then infused weekly for three total injections and tumor growth and overall survival was monitored. **(C)** Tumor regression and **(D)** survival of sublethally irradiated C57BL/6 mice bearing established B16F10 tumors and treated with armored or control modified pmel-1 T cells (\*\*\*\*p<0.0001). P-values for tumor growth determined by Mann Whitney test and survival by long-rank Mantel-Cox Test, with 95% confidence interval. Data shown are from two independent experiments. **(E)** Representative flow cytometry plots for data shown in Figures 4E-G.

**Supplemental Figure 7.**

**(A)** *In vitro* cytotoxicity of B16F10 GFP/luc (gp100+; CD80/86-) tumor cells by armored or control modifed pmel-1 or pmel+/+, IL18R-/- T cells in a 24 hour luciferase killing assay (\*\*p<0.01, and \*p<0.05 by one-way ANOVA). Data shown is mean +/- s.e.m. of three independent experiments. Complete **(B)** tumor growth and **(C)** survivalcurve of untreated, control mCD19t pmel-1, control mCD19t pmel+/+, IL18R-/-, mCD19tmIL18 pmel-1, and mCD19tmIL18 pmel+/+, IL18R-/- T cell treated tumor-bearing mice in either C57BL6 or IL18R-/- host mice.

**Supplemental Figure 8.**

**(A)** Flow cytometry demonstrating equivalent retroviral transduction into human T cells, detected with human HLA-A\*02:01 NY-ESO-1 (SLLMWITQC) iTAg Tetramer. Data shown is mean +/- SD of six independent experiments. **(B)** Flow cytometry of antigen-positive A375 tumors showing lack of human CD80 and CD86 co-stimulatory molecules, detected with anti-hCD80 or anti-hCD86 antibody and compared to an unstained sample and a 3T3hCD80 (CD80+, CD86-) sample. Data shown is representative plot of three independent experiments.