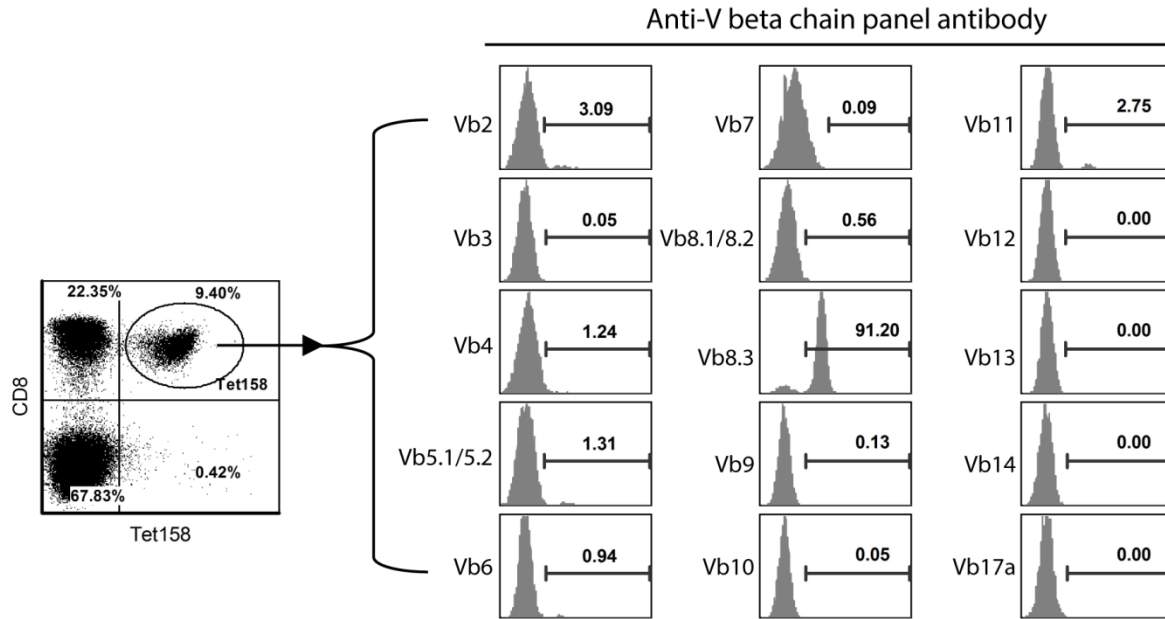
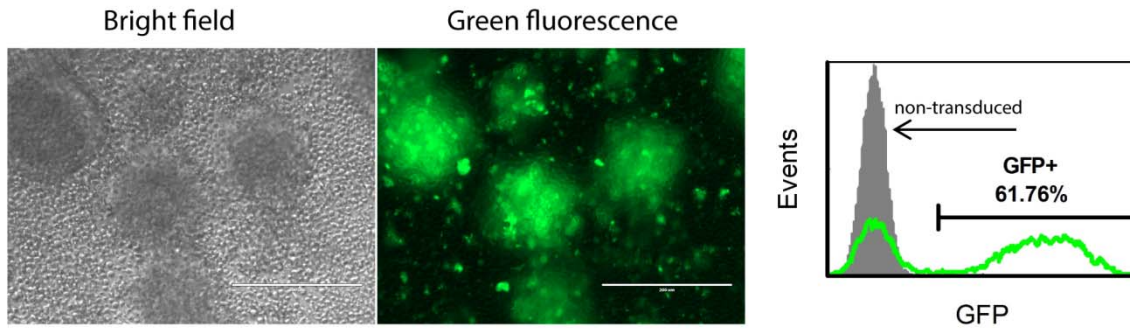


Supplemental data

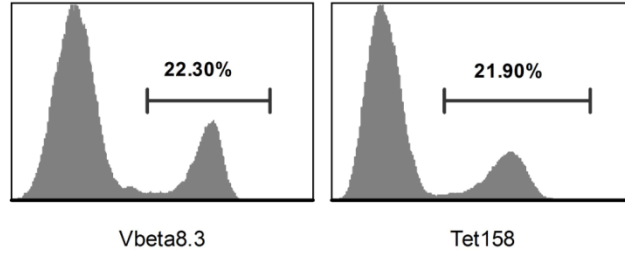


Supplemental Fig S1. Majority (>90%) of the HLA-A2/hAFP158 Tetramer positive CD8 T cells has the TCR Vbeta 8.3. Splenocytes from immunized mice were stained with CD8, Tet158 and different anti-Vbeta chain antibodies. The Tet158+ cells were analyzed for their Vbeta expression. The experiment was repeated twice with similar data

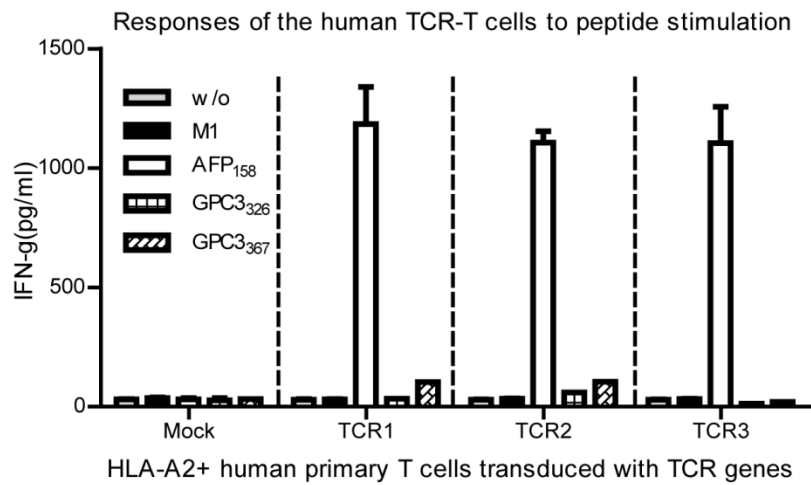
GFP expressing recombinant lv, GFP-lv:



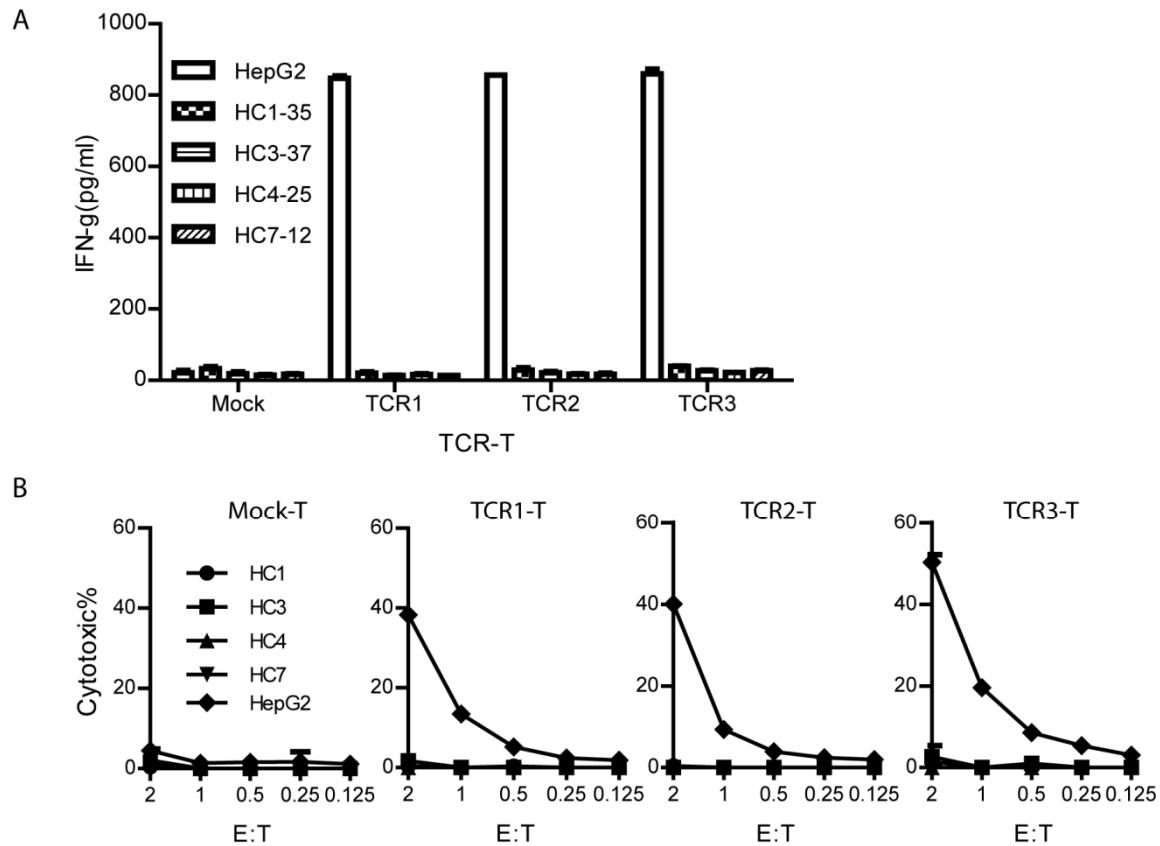
Supplemental Fig S2. Transduction of primary human T cells with recombinant lv. Primary human T cells were stimulated with CD3/CD28 for 2 days and then transduced with GFP-lv. After another week, GFP was analyzed. Approximately 50-60% of T cells were transduced by GFP-lv.



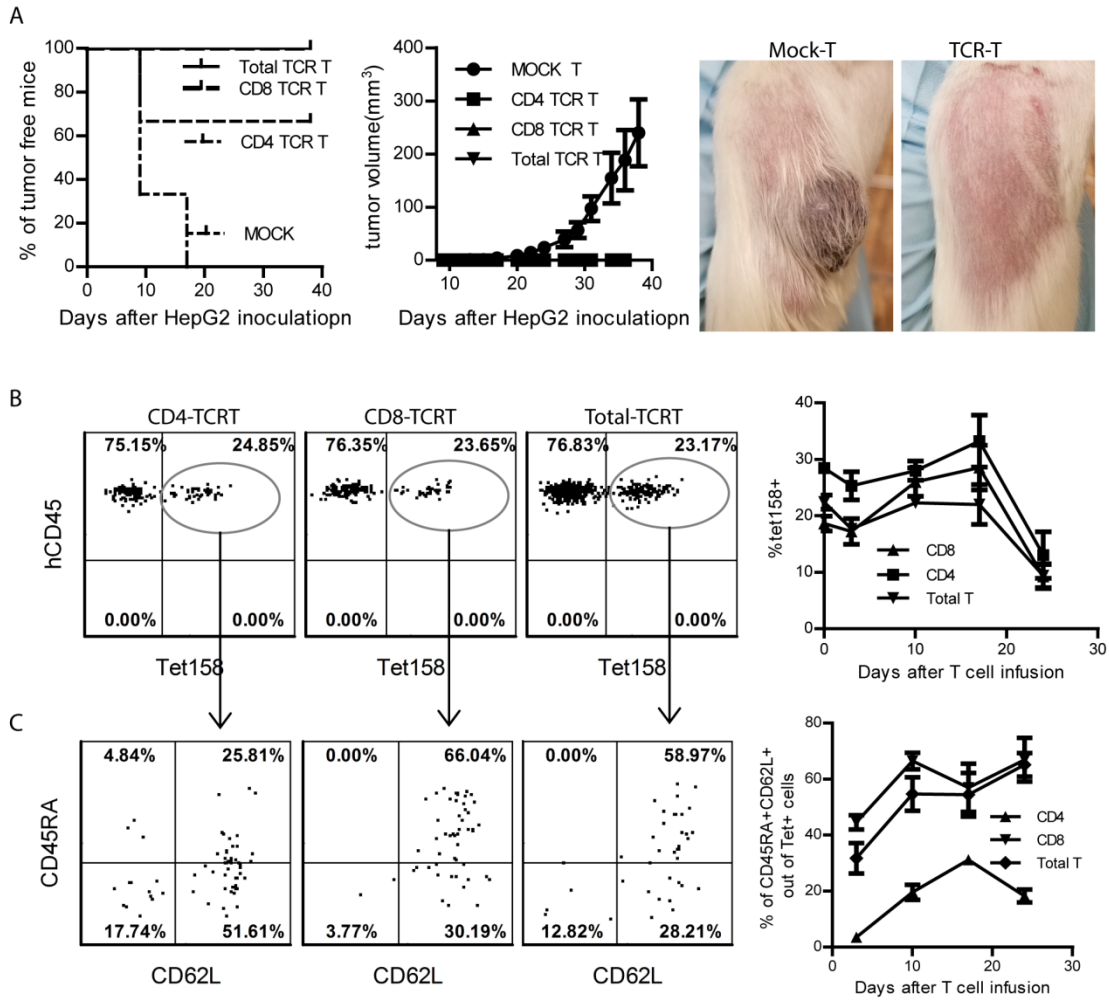
Supplemental Fig. S3. Staining of human TCR-T with anti-Vbeta chain antibody or Tet158 tetramer. The approximately same percent of Tet158+ T cells and TCR Vb8.3+ cells suggest that there is no significant mispairing between exogenous murine TCR chains and endogenous human TCR chains.



Supplemental Fig. S4: IFN $\gamma$  production by human TCR-T after stimulation with T2 cells pulsed different peptide. One hundred thousands TCR-T cells were cultured with 20 thousands of T2 cells in the media containing 1  $\mu$ g/ml of indicated peptides for 20 hours. The supernatant was examined for IFN $\gamma$  by ELISA. The experiment was repeated twice with similar data.



Supplemental Fig. S5. TCR-T cells do not recognize and kill normal hepatocytes. One hundred thousands of TCR-T cells or mock transduced T cells were cultured with 50 thousands of HepG2 or 4 normal primary hepatocytes (HC1-35, HC3-37, HC4-25, and HC7-12), 2 of them were HLA-A2+, for 20hours. (A) The media were collected and tested for IFN $\gamma$  by ELISA assay. (B) The media was also analyzed for LDH activity to measure the cytotoxicity of TCR-T cells.



Supplemental Fig. S6. Both CD4 and CD8 TCR-T cells can generate antitumor effect in vivo. TCR-T cells were generated by transducing human T cells with TCR2 gene. The CD4 and CD8 T cells were isolated by magnetic beads. 15 millions of cells were transferred into NSG mice with 4 day HepG2 tumors. (A) Tumor growth was recorded and measured. The picture was taken 38days after tumor inoculation. (B) The human CD45+ cells were stained by Tet158. The kinetics of Tet+ cells were determined. (C) The cell phenotype analysis showed that a significant portion of human T cells in the mice was CD45RA+ and CD62L+.