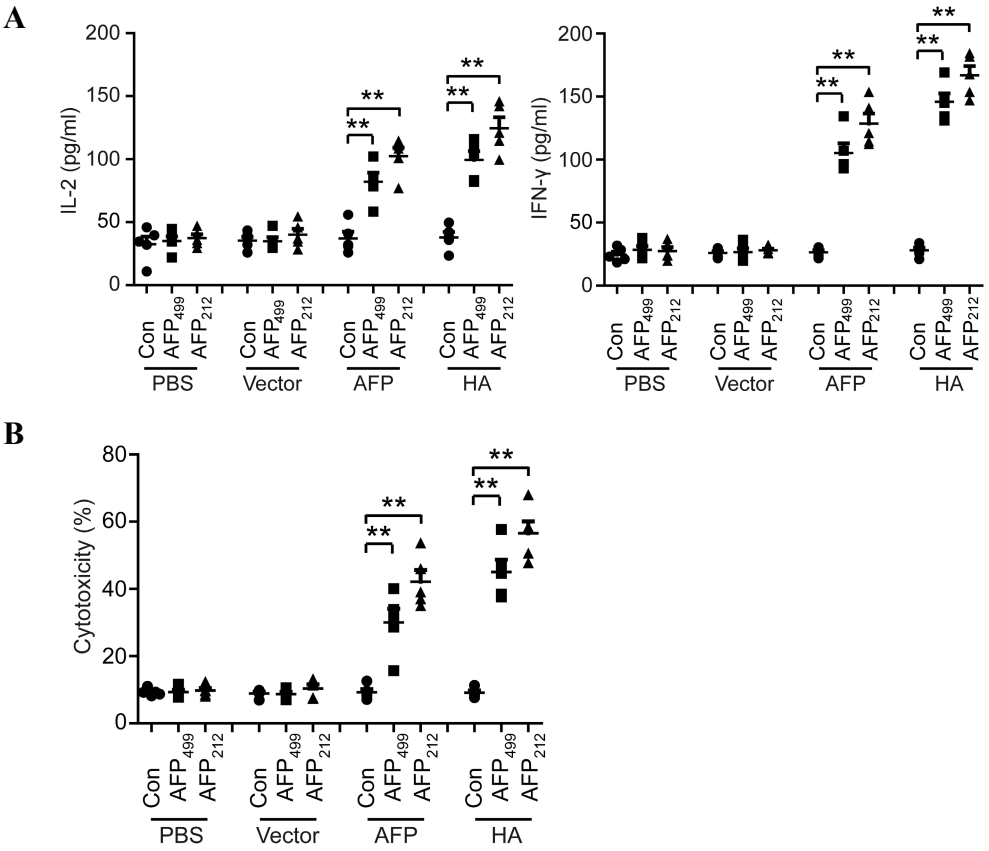
Supplementary Figures

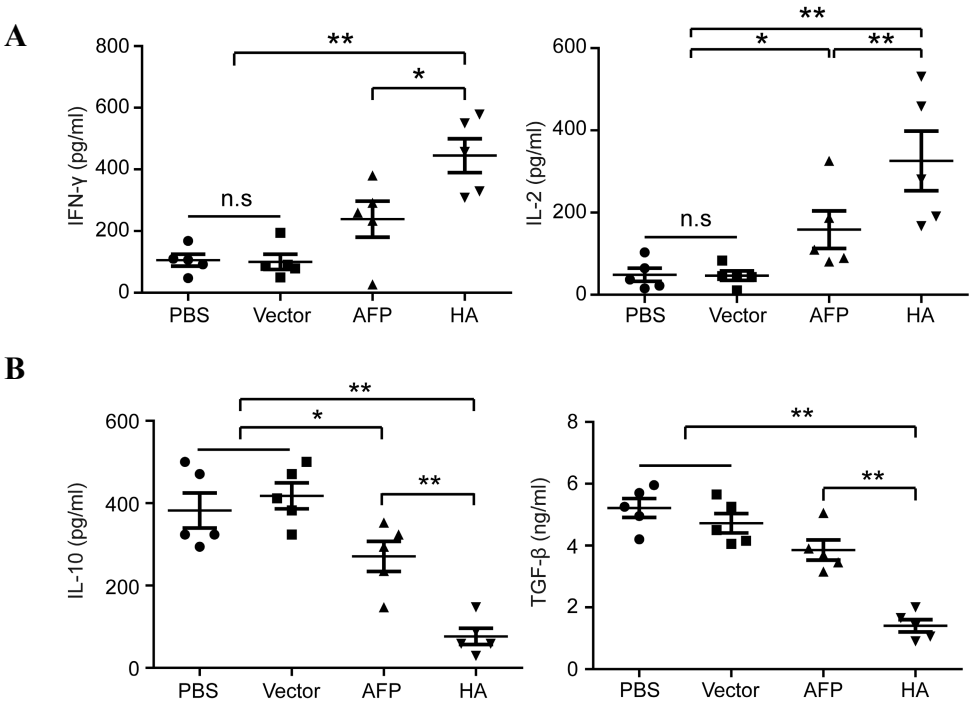
Supplementary Figure 1



Supplementary Figure 1. *In vitro* antigen-specific assay for lenti-HA and lenti-AFP. Day-7 established ectopic HCC mice were treated with lenti-HA, lenti-AFP or lentivirus containing empty vectors ($3x10^7$ copies) per week for 3 weeks subcutaneously. Mixed splenic T lymphocytes were harvested from treated HCC mice 3 days after last injection. **(A)** Measurement of IFN-γ and IL-2 in supernatants of mixed splenic T lymphocytes from different treatment groups stimulated with control peptide (Con), AFP_{212} and AFP_{499} for 72 hrs. (**B**) Cytolysis rates against murine Hepa1-6 cells with effector T cells (activated splenic T lymphocytes) at the E: T ratio of 10:1 (n=5, **P<0.01). N.s denotes not significant. Two-tailed test was used for

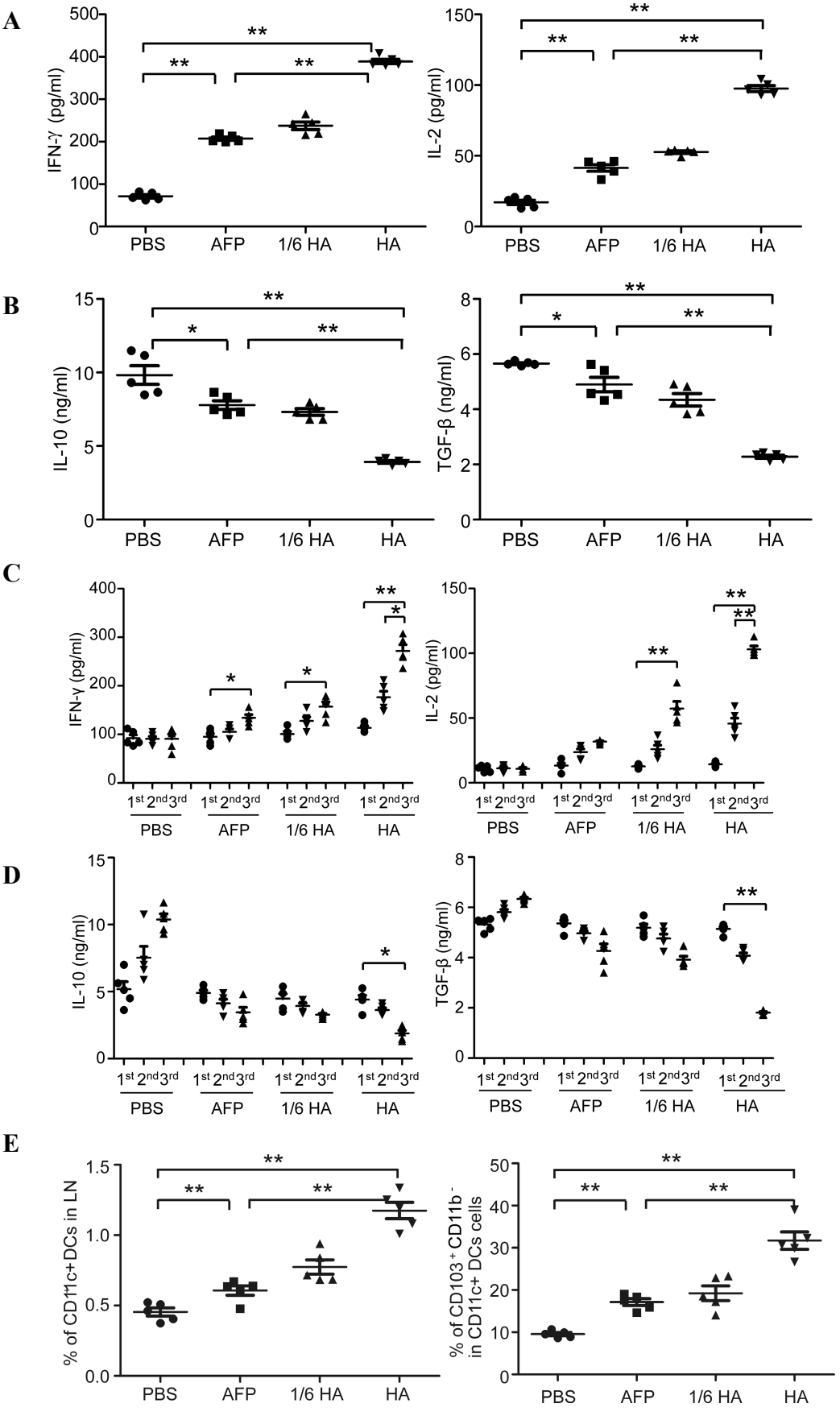
statistical analysis.

Supplementary Figure 2



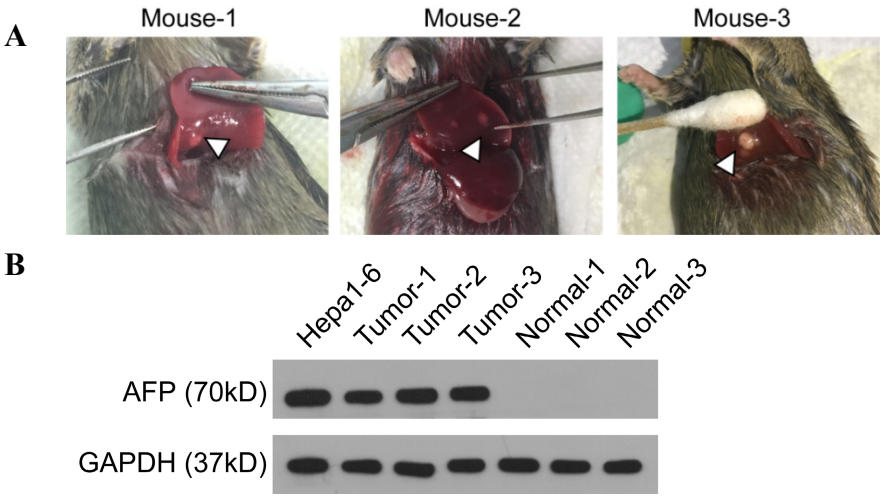
Supplementary Figure 2. Measurement of IFN-γ and IL-2 (**A**) or IL-10 and TGF-β (**B**) in tumor lysates from ectopic HCC mice treated with lenti-HA or lenti-AFP ($3x10^7$ copies) (n=5, *P<0.05; **P<0. 01). N.s denotes not significant. Two-tailed t test was used for statistical analysis and all the experiments were repeated twice (two repeated experiments yielded similar results and thus one representative result was shown).

Supplementary Figure 3



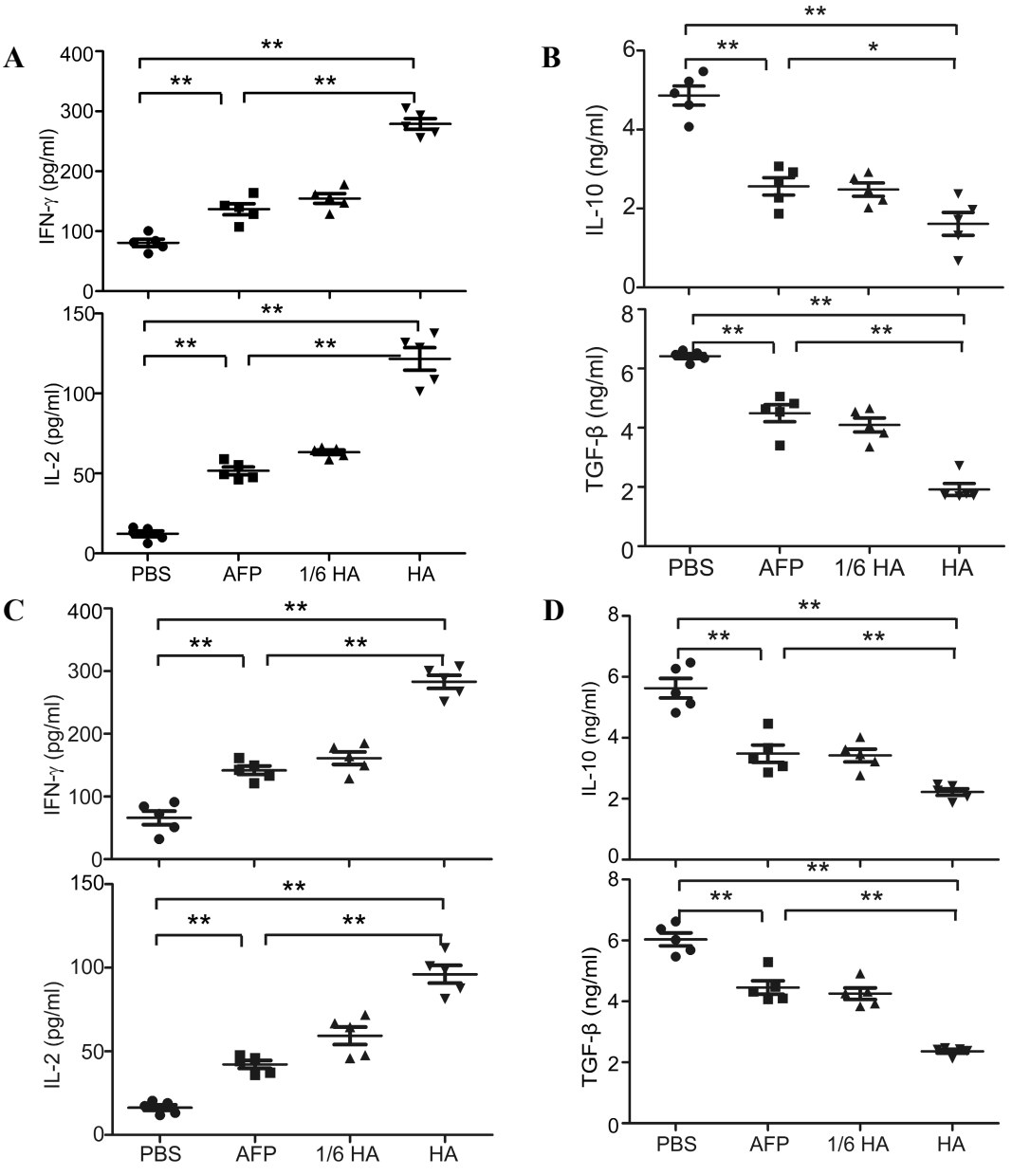
Supplementary Figure 3. Examination on tumor microenvironment and cumulative immune responses in orthotopic HCC mice treated with lentiviral vaccines weekly for 3 weeks. Measurement of IFN-γ and IL-2 (**A**) or IL-10 and TGF-β (**B**) in tumor tissues from orthotopic HCC mice treated with lenti-HA or lenti-AFP 3 days after last injection (n=5, *P<0.05; **P<0.01). Measurement of IL-2 and IFN-γ (**C**) or IL-10 and TGF-β (**D**) in blood from orthotopic HCC mice treated with lentiviral vaccines at different time-points (n=5, *P<0.05; **P<0.01). Blood was collected from orthotopic HCC mice 3 days after each injection via retro-orbital bleeding. (**E**) Flow cytometric analysis of CD11c+ and $CD103^{+}CD11b^{-}$ DCs in inguinal lymph nodes from orthotopic C57BL/6 HCC mice treated with PBS, lenti-AFP or lenti-HA 3 days after last injection (n=5, **P<0.01). Two-tailed t test was used for statistical analysis and all the experiments were repeated twice (two repeated experiments yielded similar results and thus one representative result was shown).

Supplementary Figure 4



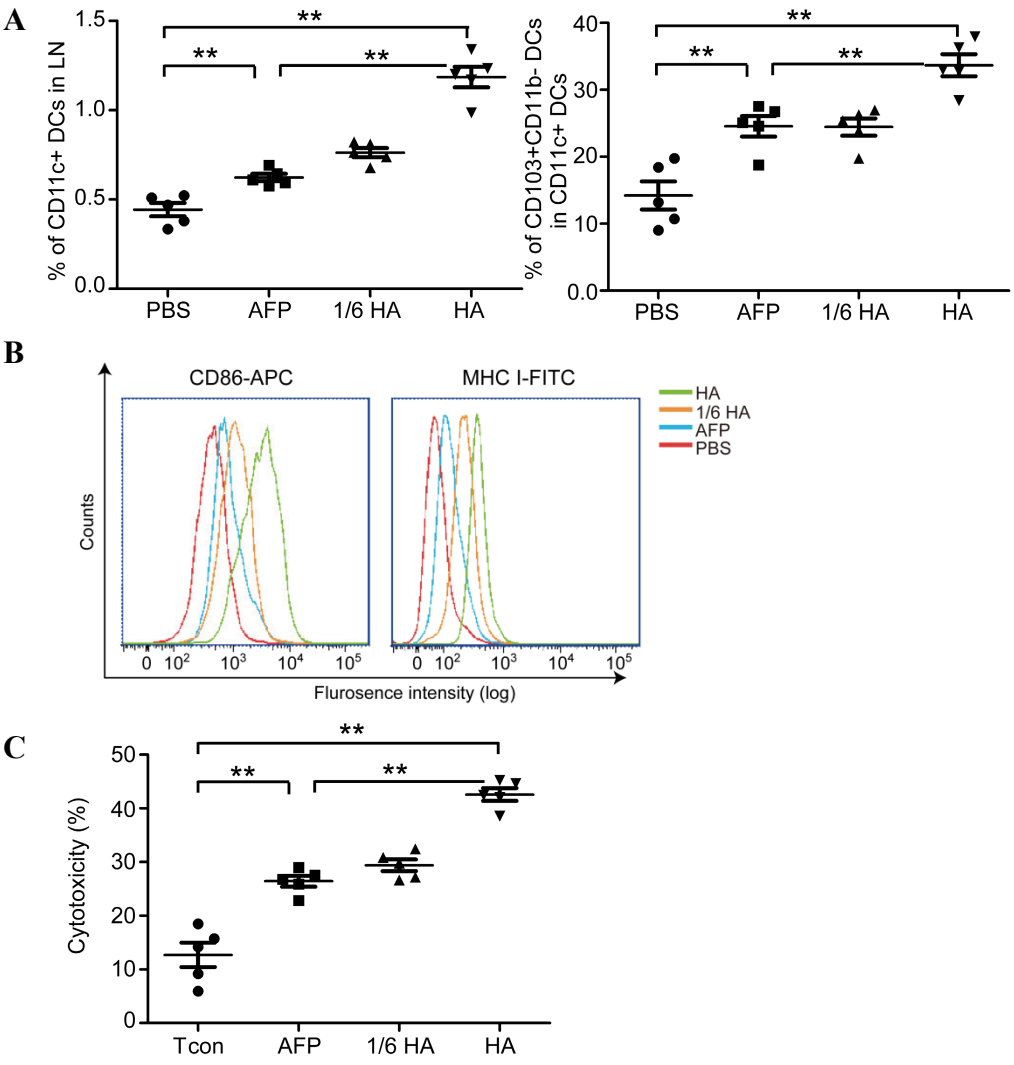
Supplementary Figure 4. Characterization of DENA-induced autochthonous HCC mice. (**A**) Morphological examination of micronodules in DENA-induced autochthonous HCC mice at 7.5 months after induction. Arrowheads point to the micronodules. (**B**) Western blot analysis for detecting the expression of AFP in tumor tissues from DENA-induced autochthonous HCC mice. Total protein (30 μg) was loaded and GAPDH was used as a loading control.

Supplementary Figure 5



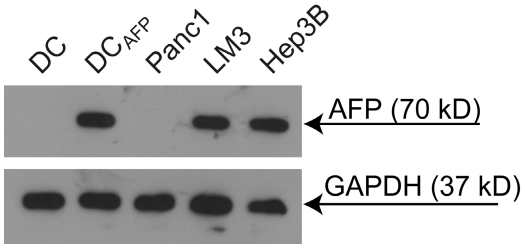
Supplementary Figure 5. Examination on immune microenvironment in DENA-induced autochthonous HCC mice treated with lentiviral vaccines weekly for 3 weeks. Measurement of IFN-γ and IL-2 (**A**) or IL-10 and TGF-β (**B**) in blood from autochthonous HCC mice treated with lenti-HA or lenti-AFP 3 days after last injection. Measurement of IFN-γ and IL-2 (**C**) or IL-10 and TGF-β (**D**) in tumor tissues from autochthonous HCC mice treated with lenti-HA or lenti-AFP 3 days after last injection (n=5, **P<0.01). Two-tailed t test was used for statistical analysis.

Supplementary Figure 6



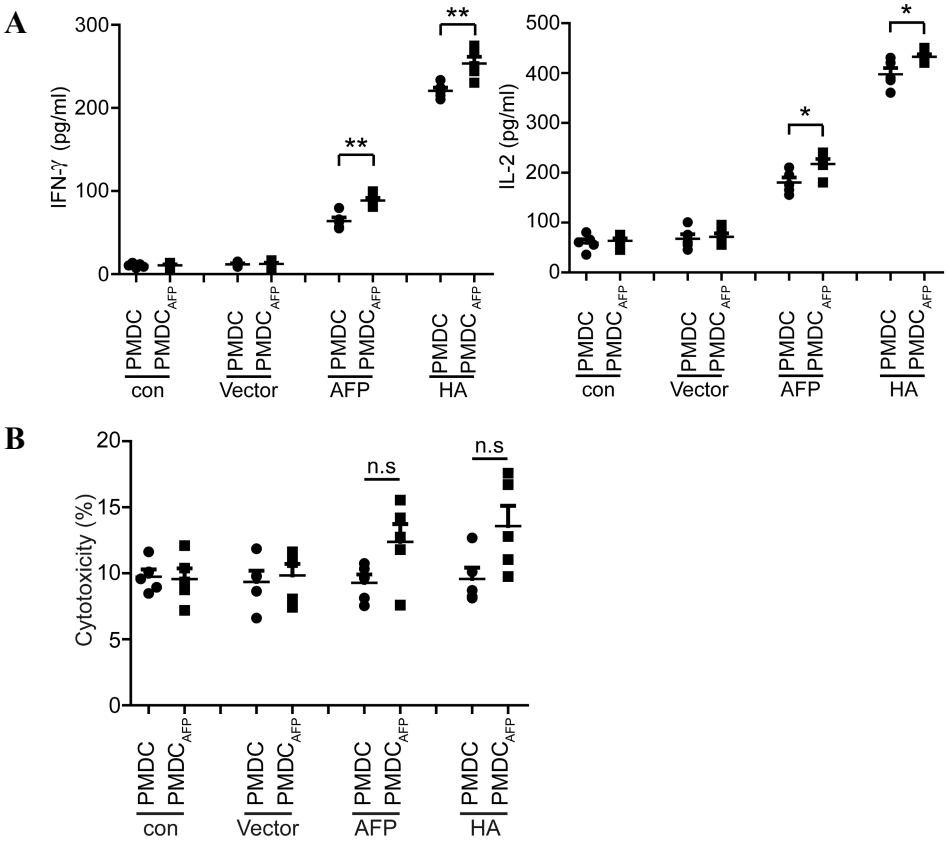
Supplementary Figure 6. Analysis of immune cells in inguinal lymph nodes from treated autochthonous HCC mice and *in vitro* activity assay. (**A**) Flow cytometric analysis of immune cells in inguinal lymph nodes (LN) from HCC mice treated with lenti-HA, lenti-AFP or PBS weekly for 3 weeks (n=5, **P<0.01). (**B**) Flow cytrometric analysis of surface markers and co-stimulatory molecules on $CD103^{+}CD11b^{-}$ DCs from treated HCC mice. (**C**) Cytolysis assay for murine Hepa1-6 cells with effector T cells at the Effector: Target (E: T) ratio of 10:1 (n=5, **P<0.001). Two-tailed t test was used for statistical analysis.

Supplementary Figure 7



Supplementary Figure 7. **Western blot analysis for detecting the expression of AFP in different cell lysates**. DC_{AFP} was used as a control. Total protein (30 μg) was loaded and GAPDH was used as a loading control.

Supplementary Figure 8



Supplementary Figure 8. ***In vitro*** **antigen-specific assay for human lenti-HA or lenti-AFP.** (**A**) Measurement of IL-2 and IFN-γ in supernatants of human lymphocytes primed by lentivirus-transduced PMDCs, followed by further stimulation with recombinant AFP loaded PMDCs ($PMDC_{AFP}$) or unpulsed PMDCs (PMDC), with ELISA (n=5, *P<0.05; **P<0.01). (**B**) Cytolysis assay for recombinant human AFP loaded PMDCs with lymphocytes primed by lenti-HA or lenti-AFP transduced PMDCs at the E: T (Effector: Target) ratio of 10:1 (n=5). N.s refers to not significant. Two-tailed t test was used for statistical analysis.