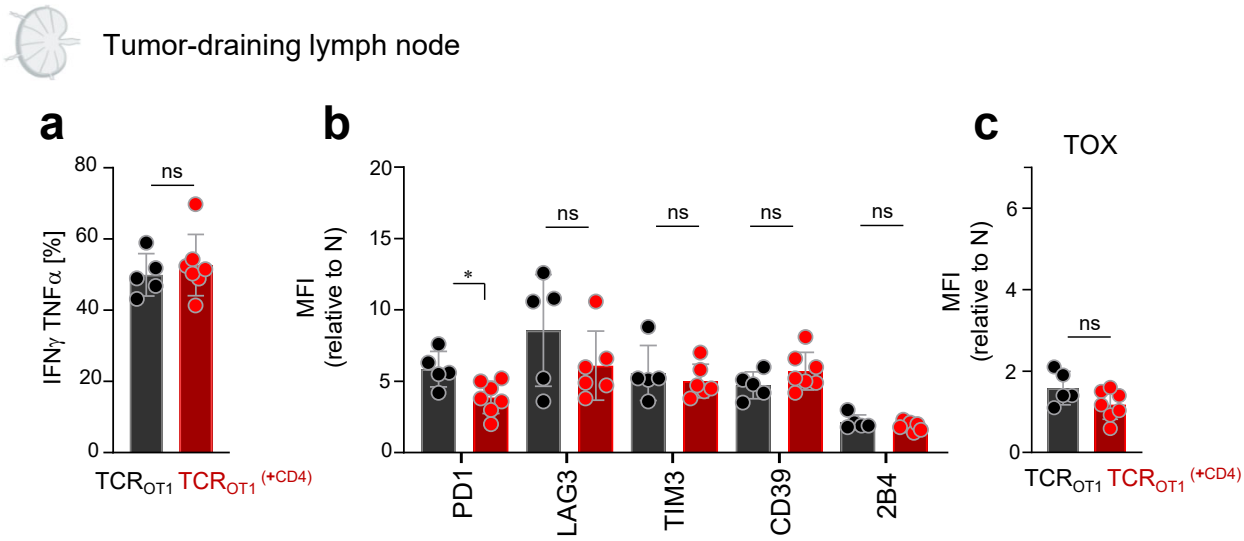
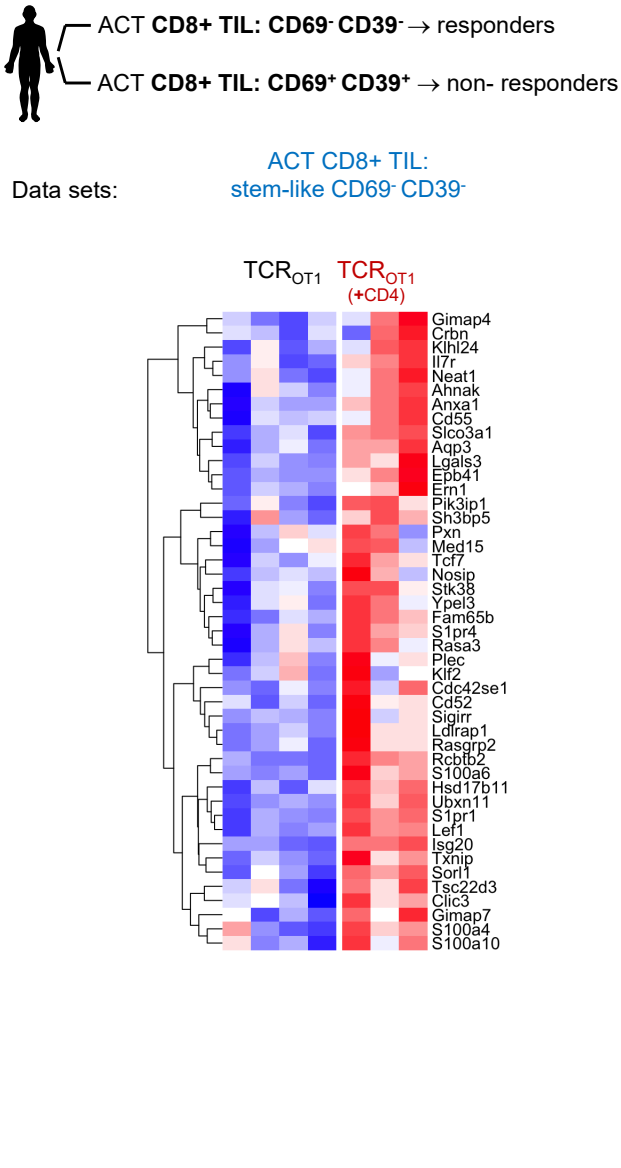


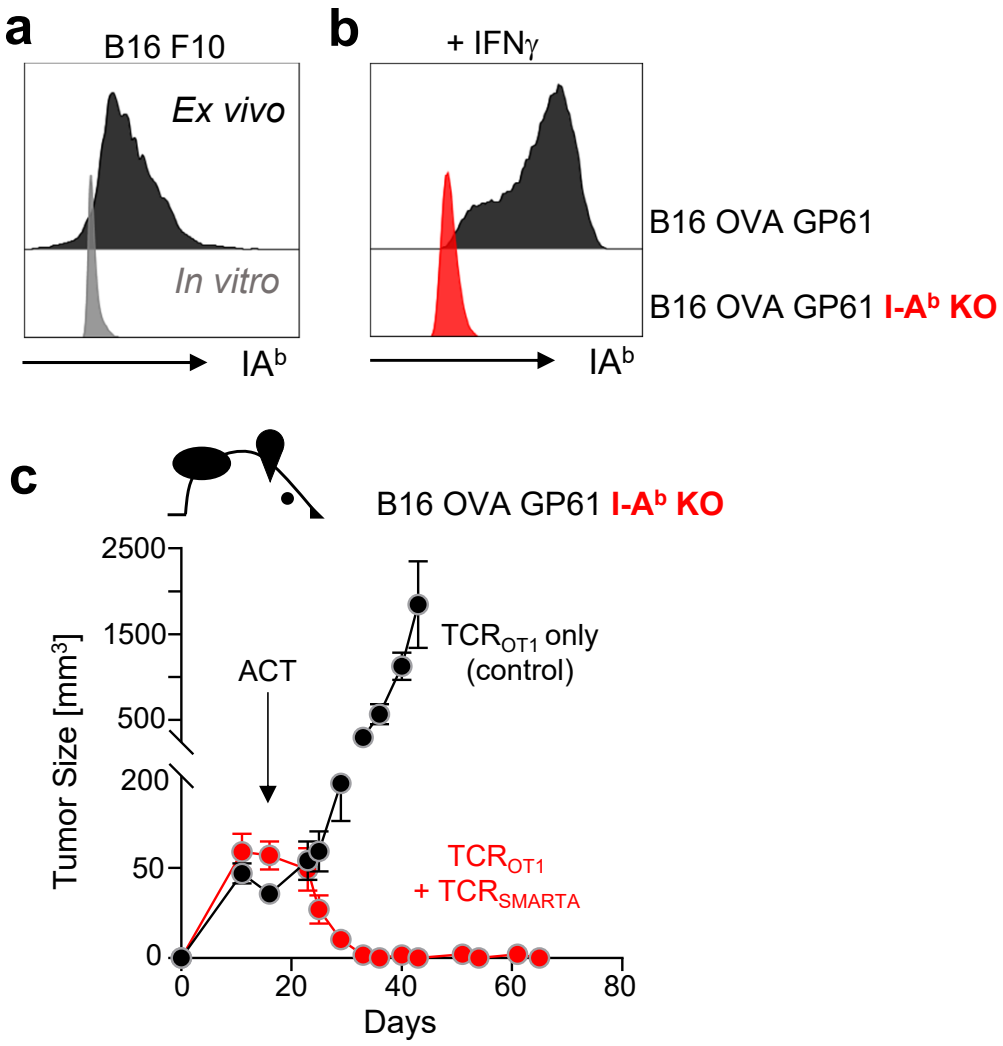
Supplementary Figure 1: a. IFNγ and TNFα production, **b.** inhibitory receptor expression, and **c.** TOX expression of TCR_{OTI} isolated from tumor-draining lymph nodes of B16-OG tumor-bearing mice 8-9 days post transfer +/- TCR_{SMARTA}. Cytokine production was assessed after 4-hr peptide stimulation *ex vivo*. Data show 2 pooled independent experiments (n=5-7). Data are shown as mean ± SEM. *p<0.05, using unpaired two-tailed Student's *t* test. ns, not significant.

Supplementary Figure 1



Supplementary Figure 2: Enrichment of gene sets in TCR_{OT1} and TCR_{OT1} (+CD4), respectively, described for human tumor infiltrating (TIL) CD8 T cells from metastatic melanoma patients receiving *ex vivo* expanded CD8+ TIL in in adoptive T cell transfers (ACT) (S. Krishna *et al*, *Science* 2020). ACT responders contained CD69- CD39- stem-like CD8+ TIL, which were lacking in ACT-non-responders. ACT non-responders contained CD69+ CD39+ terminally differentiated CD8+ TIL. TCR_{OT1} (+CD4) are enriched in genes observed in CD69- CD39- stem-like T cells/TIL and are negatively enriched for genes from CD69+ CD39+ terminally differentiated CD8 T cells/TIL. Significantly differentially expressed, enriched genes are shown. See also main Figure 2g.

Supplementary Figure 2



Supplementary Figure 3: a. Flow cytometric analysis of MHC class II I-A^b expression on parental B16 tumor cells cultured *in vitro* (grey) or after isolation from tumor bearing B6 WT mice *ex vivo* (black). **b.** I-A^b expression on B16-OG tumor cells (parental; black) or CRISPR/Cas9 gene-edited B16 OG *I-A^b*-deficient cells (KO; red) after 48 hours IFNγ treatment *in vitro*. **c.** Outgrowth of B16-OG *I-A^b*-deficient tumors in B6 WT mice receiving adoptively transferred *in vitro* activated TCR_{OT1} and TCR_{SMARTA} (red) or TCR_{OT1} only (black).

Supplementary Figure 3