**Supplementary Table 1** Differentially expressed (DE) genes (n=79) in the comparison between MUC1-Tg mice receiving anti-PDL1 and rat IgG (3 doses, bi-weekly)

<table>
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<tr>
<th>Genes</th>
<th>lfc&lt;sup&gt;a,b&lt;/sup&gt; (PD-L1/IgG)</th>
<th>p value&lt;sup&gt;b&lt;/sup&gt;</th>
<th>q value&lt;sup&gt;b&lt;/sup&gt;</th>
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<sup>a</sup> log fold change, lfc

<sup>b</sup> The 79 DE genes were sorted by directionality, p value and finally q value. Negative lfc values signify genes downregulated and positive lfc denote genes upregulated in PD-L1 treated mice.
**Supplementary Table 2** Differentially expressed genes (n=59) in the comparison between wild type (WT) mice receiving weekly anti-PDL1 + IFNα (n=4) and rat IgG (controls, n=4)

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<th>q b value</th>
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Genes | lfc (anti-PD-L1+IFNα/IgG) | p_value | q_value
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Klrd1 | 2.437499791 | 0.005508951 | 0.125410349
Thy1 | 2.429916609 | 0.005672389 | 0.125410349
Tcf7 | 2.266255948 | 0.006094709 | 0.125410349
Cd3e | 2.330146856 | 0.006967377 | 0.125791454
Cd5 | 2.304539409 | 0.008273009 | 0.125791454
Cd247 | 2.195327139 | 0.009332702 | 0.125791454
Lck | 2.153690508 | 0.009698326 | 0.125791454
Cd6 | 2.304775351 | 0.010315762 | 0.125791454
Lef1 | 2.475182117 | 0.010367818 | 0.125791454
Il18r1 | 2.145856415 | 0.011080595 | 0.125791454
Cd96 | 2.671973538 | 0.011285962 | 0.125791454
Il7r | 2.01294242 | 0.012799761 | 0.131609076
Cd27 | 2.134725049 | 0.013657664 | 0.132851825
Klra6 | 2.678621744 | 0.014852216 | 0.139402377
Cd8a | 2.285934115 | 0.016026351 | 0.146749424

\(^a\)log fold change, lfc
\(^b\)The 59 DE genes were sorted by directionality, p value and finally q value.
Negative lfc values signify genes downregulated and positive lfc denote genes upregulated in WT mice receiving weekly doses of anti-PDL1 + IFNα.
**Supplementary Table 3** Differentially expressed genes (N=39) detected among five different mouse groups

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* These genes are identified as differentially expressed across any two or more of the five groups. ANOVA analysis (q< 0.025) of Nanostring data from MUC1 Tg and WT treated biweekly with anti-PD-L1 or its isotype control IgG, and WT treated weekly with the combination of anti-PD-L1 and IFNα.
Supplementary Table 4 Differentially expressed genes (n=136) in the comparison between mice responding to anti-PDL1 treatment (n=10) and the IgG controls (n=9)

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a log fold change, lfc
b The 136 DE genes were sorted by directionality, p value and finally q value. Negative lfc values signify genes downregulated and positive lfc denote genes upregulated in responder mice (includes M-tg receiving bi-weekly doses of anti-PDL1 and WT mice receiving weekly doses of anti-PDL1 + IFNα) compared to rat IgG control treated M-Tg and WT mice and non-responding WT mice treated with biweekly anti-PD-L1 antibody.
Intracellular IFNγ production by CD3+ (A), CD4+ (B) and CD8+ T cells (C) in splenocytes from MUC1.Tg mice treated IP with 200 μg anti-PD-L1 or control rat IgG, every two weeks, for a total of 3 doses, starting at day 21.
Supplementary Figure 2. Foxp3 expression by IHC, in tumors from anti-PD-L1-treated (right column) and control IgG-treated mice (left column). Tumors from six different mice, three representative from each group, are shown.
Supplementary Figure 3. A Flow cytometry of cell surface PD-1 expression by splenic T cells from MUC1Tg (n=5) and wild type (Wt, n=4) mice (ns; not significant). B Tumor PD-L1 expression by IHC in tumors from MUC1.Tg and WT mice. Representative tumors are shown.
Supplementary Figure 4. Heat map of top 65 DE genes (p<0.05; included in n=136 genes listed in Supplementary Table 4) from the comparison of WT mice receiving weekly doses of anti-PD-L1 plus IFNα (n=4) versus WT mice treated weekly with anti-PD-L1 (n=4). The DE gene cluster upregulated in IFNα-treated mice (blue highlighted box) is listed in the right table inset.
Supplementary Figure 5. Tumor PD-L1 by flow cytometry in response to stimulation with IFNα and IFNγ. A 2F8 cells were cultured for 24 h in the presence of varying concentrations of IFNα (250, 500, 750, 1000 and 10,000 IU/ml). B IFNγ was used at 10, 1.0, 0.1 ng/ml. Isotype control (grey tint) and baseline unstimulated control cells (orange tint), cultured for 24 h, were used for gating. Percentages of PD-L1 positive cells by flow cytometry are shown in the bar graphs at right.