

Figure S1. CD8 T cell response. Percentage of CD8+ T cells producing IFN γ after in vitro stimulation with influenza HA and NP immunodominant MHC class I restricted peptides (measured by intracellular cytokine staining). Shown are mean values with SEM ($n = 4$).

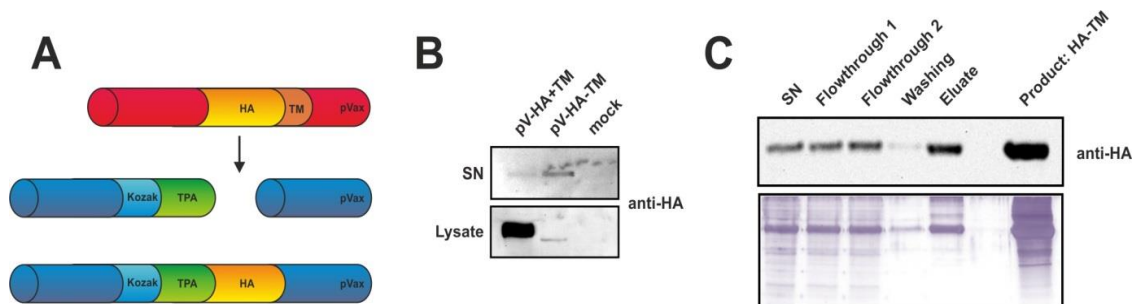


Figure S2. Generation and expression of soluble HA. (A) HA without transmembrane domain (TM) was cleaved out by enzymatic restriction and inserted into a pVax vector following a Kozak sequence and TPA leader sequence to improve secretion. (B) HA plasmids with and without TM were transfected in 293T cells. Three days after transfection, supernatants (SN) were collected, cells lysed and proteins analyzed by SDS-PAGE following sera staining and detection via an HRP-conjugated anti-mouse IgG antibody. (C) Soluble HA (coating antigen) produced in 293F cells with quality and purity validated by Western Blot and Silver staining.

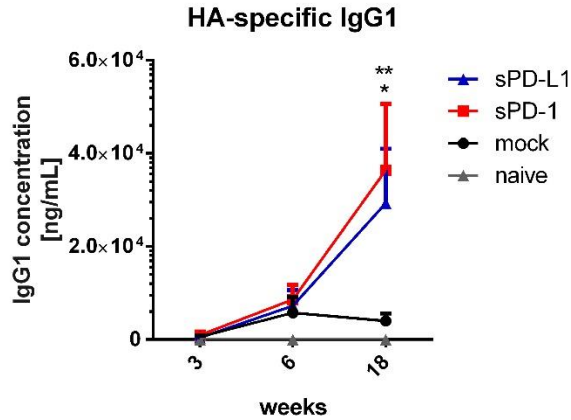


Figure S3. Quantitative amounts of HA-specific IgG1. HA-specific IgG1 amounts assessed by quantitative ELISA using a monoclonal HA IgG1 antibody as standard. Measured amounts of HA-specific IgG1 in ng/mL in sera of BALB/c mice after i.m. electroporation over a time-period of 18 weeks. Shown are mean values with SEM ($n = 12-18$) and significant differences between immunized groups (two-way ANOVA analyses followed by Tukey's multiple comparison test, * $p < 0.05$ for sPD-L1 group compared to mock, ** $p < 0.01$ for sPD-1 group compared to mock).

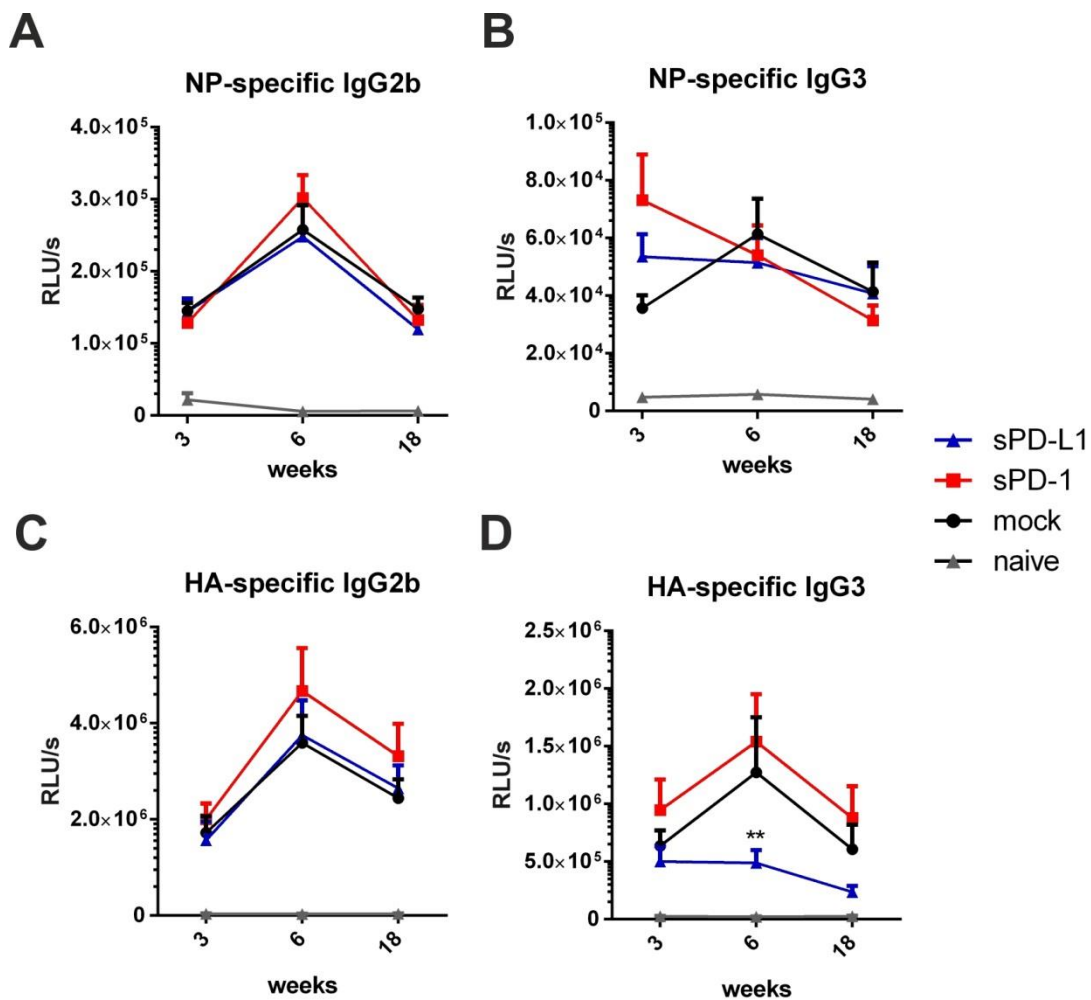


Figure S4. NP- and HA-specific IgG2b and IgG3 responses. NP-specific IgG2b (A) and IgG3 (B) and HA-specific IgG2b (C) and IgG3 (D) antibody responses in the sera of BALB/c mice after i.m. electroporation over a time-period of 18 weeks analyzed by ELISA. Shown are mean values with SEM ($n = 9-18$) and significant differences between the groups (two-way ANOVA analyses followed by Tukey's multiple comparison test, (D) ** $p < 0.01$ for sPD-L1 group compared to sPD-1 group).

Table S1. Vaccine-induced reciprocal neutralization titers against influenza A/PR/8/34 *.

EXPERIMENTAL GROUPS				
TITER	Naive	Mock	sPD-1	sPD-L1
20	18	0	0	0
80	0	1	0	0
320	0	0	2	2
640	0	6	2	7
1280	0	9	7	5
2560	0	2	7	2
5120	0	0	0	1

* shown for serum samples obtained at week 18. Represents number of samples with corresponding neutralization titer for each experimental group.