

**Table S2. Antigens with outlier signals among 6-month responders vs. non-responders at baseline.** Ninety-two antigens were identified using PIWAS comparing baseline samples of 6-month responders (n = 10) vs. non-responders (n = 19), with an outlier sum false discovery rate < 0.05 and *p*-value < 0.05 by Mann-Whitney U test. These antigens were annotated with cancer testis antigens (30), secretome (31), surfaceome (32), tissue expression in the prostate (31), immune proteins (33-35) including cytokines, chemokines, and other immune molecules, and tumor suppressors and oncogenes (36).

OutlierSum_P_FDR	MW_Pvalue	CancerTestisAntigen	Membrane_or_secreted	Surface_protein	Tissue_expression	Immune_protein	Tumor_suppressor	Oncogene
0.03	0	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
3.56E-07	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0	0	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0	0	No	Membrane_only	Not_Surface	Expressed_w_low_specificity	No	No	No
0.01	0	No	Membrane_only	Surface_Receptors	Not_expressed_in_prostate	No	No	No
0	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.04	0	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No
5.36E-07	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.02	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No

0.04	0	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0	0	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No
0.03	0	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0.03	0	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.04	0	No	Membrane_only	Surface_Receptors	Not_expressed_in_prostate	No	No	No
0.05	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.04	0	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0.01	0	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0	No	Membrane_only	Not_Surface	Expressed_w_low_specificity	No	No	No
0.03	0	No	Membrane_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0.02	0	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0	0.01	No	Membrane_only	Surface_Enzymes	Not_expressed_in_prostate	No	No	No
0	0.01	No	Membrane_only	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.01	0.01	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.01	0.01	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.02	0.01	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No
0.03	0.01	No	Membrane_only	Not_Surface	Expressed_w_low_specificity	No	No	No
4.48E-07	0.01	No	Membrane_only	Not_Surface	Expressed_w_low_specificity	No	No	No
0.01	0.01	No	Membrane_only	Surface_Unclassified	Expressed_w_low_specificity	No	No	No

0.02	0.01	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.02	0.01	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0.03	0.01	No	Membrane_only	Surface_Enzymes	Expressed_in_prostate_elevated_in_other	No	No	No
0.05	0.01	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	Yes
0	0.01	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0.01	0.01	No	Membrane_only	Surface_Receptors	Expressed_w_low_specificity	No	No	No
0.02	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.03	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	Yes
0.01	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.01	0.01	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0.01	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0.01	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	Yes	No	No
0.03	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0.01	No	Membrane_only	Surface_Receptors	Not_expressed_in_any_tissue	No	No	No
0.03	0.01	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0.04	0.01	No	Membrane_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0.04	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.05	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
3.56E-07	0.01	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No

0.02	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0	0.01	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.01	0.01	No	Membrane_only	Surface_Receptors	Expressed_w_low_specificity	No	No	Yes
0.02	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.04	0.01	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0	0.01	No	Membrane_only	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.01	0.01	No	Membrane_only	Not_Surface	Not_expressed_in_prostate	No	No	No
0.01	0.01	No	Secreted_only	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.04	0.01	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0.02	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.02	0.02	Yes	Membrane_only	Surface_Enzymes	Not_expressed_in_prostate	No	No	No
0.02	0.02	No	Membrane_only	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0	0.02	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No
0	0.02	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0.04	0.02	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	Yes	No	No

0	0.02	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.03	0.02	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No
0.04	0.02	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	No	No
0.01	0.02	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.02	0.02	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.03	0.02	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.01	0.03	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0	0.03	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.03	0.03	No	Secreted_only	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0	0.03	No	Not_Annotated	Surface_Receptors	Not_annotated	No	No	No
0.01	0.03	No	Intracellular	Not_Surface	Not_expressed_in_prostate	No	Yes	Yes
0.01	0.03	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0	0.04	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0.01	0.04	No	Membrane_only	Surface_Miscellaneous	Not_expressed_in_prostate	No	No	No
0.01	0.04	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0.02	0.04	No	Membrane_only	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.02	0.04	No	Not_Annotated	Not_Surface	Not_annotated	No	No	No
0.02	0.04	No	Secreted_only	Not_Surface	Not_expressed_in_prostate	No	No	No

7.58E-12	0.04	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.03	0.04	No	Intracellular	Not_Surface	Expressed_in_prostate_elevated_in_other	No	No	No
0.04	0.04	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No
0	0.05	No	Membrane_only	Surface_Enzymes	Expressed_w_low_specificity	No	No	No
0.05	0.05	No	Membrane_only	Surface_Receptors	Expressed_w_low_specificity	No	No	No
0.05	0.05	No	Intracellular	Not_Surface	Expressed_w_low_specificity	No	No	No