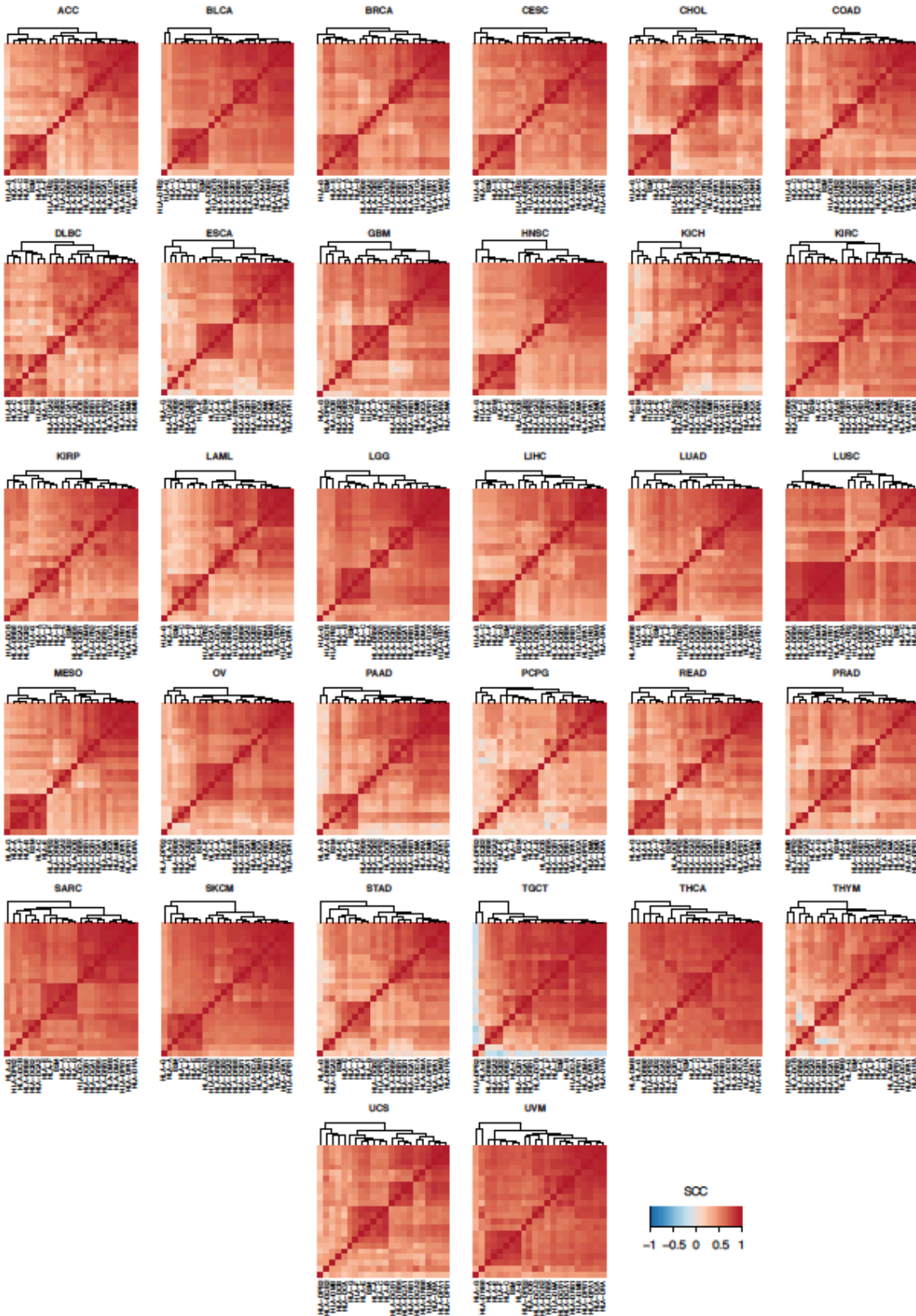


Supplementary Materials

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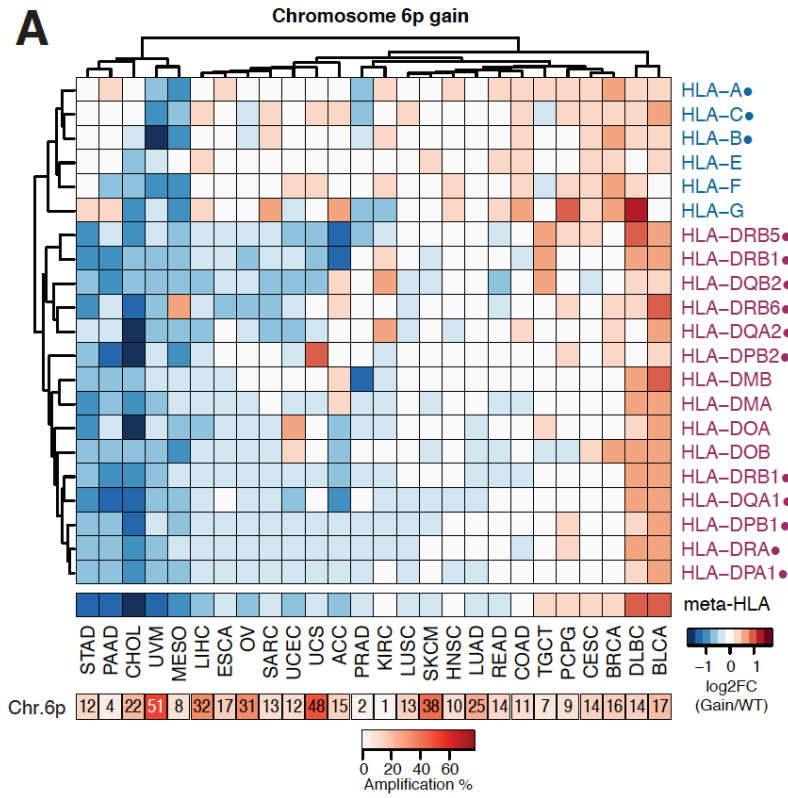
Association of HLA gene expression with cancer prognosis and immunotherapy efficacy

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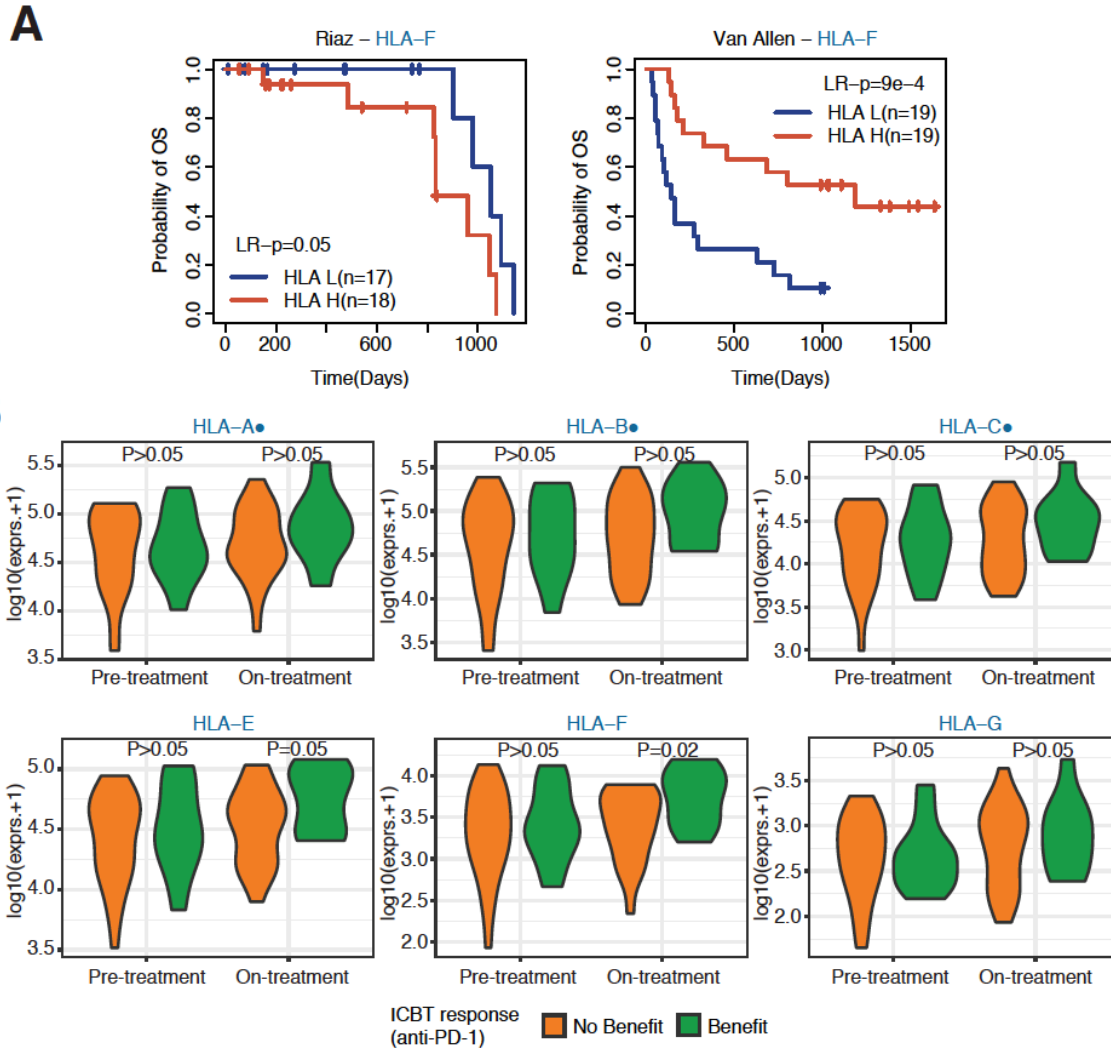
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9 **Supplemental Figure 1.** Correlation matrices of HLA/B2M gene expression for all investigated
10 cancer types. SCC = Spearman correlation coefficient.

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Supplemental Figure 2. A. Heatmap of the log2 fold change (log2fc) comparing HLA and B2M expression between patients with chr6p gain and patients without chr6p CNV.



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Supplemental Figure 3. A. KM plot comparing overall survival between patients with low and high HLA-F expression in the Riaz and Van Allen datasets. Significance indicated by Log-rank tests. **B.** Violin plots comparing the gene expression of 6 class I HLA genes between patients who benefitted or did not benefit from anti-PD-1 treatment in pre- or on-treatment biopsies in the Riaz dataset. Significance calculated by two-sided Student's t-tests.

27 **Supplementary Table 1.** TCGA datasets and number of patients included in this study.
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CancerType	Normal	Tumor
ACC	0	79
BLCA	19	408
BRCA	112	1093
CESC	0	304
CHOL	0	36
COAD	41	285
DLBC	0	48
ESCA	11	184
GBM	160	676
GBMLGG	0	676
HNSC	44	520
KICH	25	66
KIPAN	129	889
KIRC	72	533
KIRP	32	290
LAML	0	173
LGG	676	516
LIHC	50	371
LUAD	59	515
LUSC	51	501
MESO	0	87
OV	0	304
PAAD	0	178
PCPG	0	179
PRAD	52	497
READ	51	379
SARC	0	259
SKCM	0	469
STAD	35	415
TGCT	0	150
THCA	59	501
THYM	0	120
UCEC	24	177
UCS	0	57
UVM	0	80

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31 **Supplementary Table 2.** Proportion of variance explained by the first 5 PCs.
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	PC1	PC2	PC3	PC4	PC5
ACC	0.585	0.104	0.074	0.049	0.035
BLCA	0.688	0.071	0.049	0.032	0.023
BRCA	0.555	0.107	0.089	0.039	0.031
CESC	0.637	0.084	0.057	0.038	0.032
CHOL	0.561	0.120	0.087	0.055	0.046
COAD	0.570	0.171	0.065	0.038	0.028
DLBC	0.571	0.104	0.084	0.048	0.040
ESCA	0.500	0.152	0.099	0.050	0.039
GBM	0.500	0.169	0.080	0.039	0.035
HNSC	0.605	0.122	0.062	0.036	0.035
KICH	0.593	0.092	0.088	0.048	0.035
KIRC	0.620	0.092	0.085	0.032	0.029
KIRP	0.548	0.108	0.097	0.051	0.033
LAML	0.653	0.095	0.054	0.036	0.027
LGG	0.708	0.081	0.046	0.025	0.023
LIHC	0.565	0.118	0.086	0.038	0.034
LUAD	0.583	0.108	0.074	0.043	0.032
LUSC	0.668	0.079	0.062	0.029	0.028
MESO	0.533	0.149	0.106	0.040	0.034
OV	0.529	0.146	0.070	0.046	0.034
PAAD	0.588	0.099	0.075	0.045	0.037
PCPG	0.410	0.141	0.095	0.055	0.048
PRAD	0.482	0.109	0.082	0.079	0.037
READ	0.526	0.198	0.061	0.041	0.033
SARC	0.706	0.067	0.065	0.031	0.023
SKCM	0.715	0.071	0.051	0.029	0.020
STAD	0.509	0.153	0.079	0.043	0.037
TGCT	0.610	0.133	0.084	0.034	0.028
THCA	0.729	0.058	0.043	0.032	0.022
THYM	0.474	0.172	0.074	0.053	0.042
UCEC	0.557	0.124	0.066	0.038	0.036
UCS	0.570	0.090	0.072	0.060	0.043
UVM	0.694	0.078	0.064	0.029	0.023

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35 **Supplementary Table 3.** Incidence of genomic alterations of HLA genes in TCGA cancer types.
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	CNV								Mutations								
	Samples	Samples with CNV data	# Normal	# Loss	# Gain	% Normal	% Loss	% Gain	Samples with mutation data	# HLA-A WT	# HLA-A mut	# HLA-B WT	# HLA-B mut	# HLA-C WT	# HLA-C mut	# B2M WT	# B2M mut
ACC	79	74	45	18	11	60.81	24.32	14.86	79	79	0	79	0	79	0	78	1
BLCA	408	353	215	78	60	60.91	22.10	17.00	408	403	5	403	5	406	2	405	3
BRCA	1100	929	659	126	144	70.94	13.56	15.50	1048	1041	7	1044	4	1047	1	1045	3
CESC	306	264	198	30	36	75.00	11.36	13.64	304	282	22	283	21	302	2	298	6
CHOL	36	36	23	5	8	63.89	13.89	22.22	36	35	1	36	0	36	0	35	1
COAD	478	433	355	32	46	81.99	7.39	10.62	451	428	23	431	20	442	9	431	20
DLBC	48	44	38	0	6	86.36	0.00	13.64	7	0	5	0	7	0	1	0	7
ESCA	185	144	87	32	25	60.42	22.22	17.36	184	181	3	182	2	183	1	182	2
GBM	166	154	129	21	4	83.77	13.64	2.60	163	160	3	162	1	163	0	162	1
HNSC	522	470	366	59	45	77.87	12.55	9.57	504	484	20	487	17	502	2	498	6
KICH	66	65	14	50	1	21.54	76.92	1.54	66	66	0	66	0	66	0	66	0
KIRC	534	476	391	78	7	82.14	16.39	1.47	339	337	2	339	0	339	0	339	0
KIRP	291	276	250	23	3	90.58	8.33	1.09	288	284	4	288	0	285	3	287	1
LAML	173	109	109	0	0	100.00	0.00	0.00	7	5	2	3	1	0	0	0	0
LGG	530	509	486	22	1	95.48	4.32	0.20	527	520	7	526	1	527	0	527	0
LIHC	373	340	214	16	110	62.94	4.71	32.35	371	367	4	365	6	369	2	370	1
LUAD	517	447	261	75	111	58.39	16.78	24.83	515	508	7	511	4	512	3	508	7
LUSC	501	401	261	86	54	65.09	21.45	13.47	494	479	15	486	8	492	2	487	7
MESO	87	79	65	8	6	82.28	10.13	7.59	83	82	1	83	0	83	0	83	0
OV	307	210	106	39	65	50.48	18.57	30.95	220	219	1	220	0	220	0	219	1
PAAD	179	143	92	46	5	64.34	32.17	3.50	177	175	2	177	0	177	0	177	0
PCPG	184	162	146	2	14	90.12	1.23	8.64	184	182	2	184	0	184	0	184	0
PRAD	498	466	450	9	7	96.57	1.93	1.50	498	498	0	497	1	497	1	498	0
READ	167	149	112	16	21	75.17	10.74	14.09	153	153	0	150	3	153	0	148	5
SARC	263	224	147	48	29	65.63	21.43	12.95	257	256	1	257	0	257	0	257	0
SKCM	472	411	202	51	158	49.15	12.41	38.44	472	467	5	466	6	466	6	467	5
STAD	415	357	272	41	44	76.19	11.48	12.32	413	395	18	391	22	405	8	396	17
TGCT	156	148	122	16	10	82.43	10.81	6.76	156	155	1	156	0	156	0	156	0
THCA	509	468	465	2	1	99.36	0.43	0.21	498	496	2	498	0	498	0	497	1
THYM	120	101	83	18	0	82.18	17.82	0.00	119	119	0	119	0	118	1	119	0
UCEC	547	498	425	14	59	85.34	2.81	11.85	542	524	18	527	15	534	8	524	18
UCS	57	50	22	4	24	44.00	8.00	48.00	57	57	0	56	1	56	1	57	0
UVM	80	80	39	0	41	48.75	0.00	51.25	80	80	0	80	0	80	0	80	0