PNAS

Supporting Information for

The glioblastoma multiforme tumor site promotes the commitment of tumor infiltrating lymphocytes to the T$_H$17 lineage in humans

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Other supporting materials for this manuscript include the following:

>Datasets S1 and S2 (xlsx files)

TH1 SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TH1_GSE43863_TH1_VS_LY6C_INT_CXCR5POS_EFFECTOR_CD4_TCELL_UP	197	1.458	0.04848	1.854	0.00805	1.732	0.01768
TAG+TH1_GSE2770_IL12_VS_IL4_TREATED_ACT_CD4_TCELL_48H_UP	199	1.320	0.04102	1.675	0.00000	1.671	0.00406
TAG+TH1_GSE2770_UNTREATED_VS_TGFB_AND_IL12_TREATED_ACT_CD4_TCELL_2H_DN	196	1.521	0.00407	1.893	0.00000	1.618	0.00000
TAG+TH1_GSE43863_TH1_VS_LY6C_LOW_CXCR5NEG_EFFECTOR_CD4_TCELL_UP	200	1.520	0.01961	1.878	0.00406	1.601	0.02049
TAG+TH1_GSE2770_IL12_ACT_VS_ACT_CD4_TCELL_6H_UP	190	1.352	0.03922	1.688	0.00202	1.570	0.00203
TAG+TH1_GSE2770_TGFB_AND_IL4_VS_IL12_TREATED_ACT_CD4_TCELL_2H_DN	196	1.916	0.00000	2.044	0.00000	1.537	0.04867
TAG+TH1_GSE2770_IL12_AND_TGFB_VS_IL4_TREATED_ACT_CD4_TCELL_2H_UP	196	1.511	0.01394	1.704	0.00410	1.508	0.01978
TAG+TH1_GSE2770_IL12_AND_TGFB_VS_IL4_TREATED_ACT_CD4_TCELL_6H_UP	200	1.266	0.03633	1.739	0.00000	1.492	0.01556
TAG+TH1_GSE2770_IL12_ACT_VS_ACT_CD4_TCELL_2H_UP	192	1.291	0.05871	1.687	0.00203	1.474	0.00813
TAG+TH1_GSE2770_UNTREATED_VS_IL12_TREATED_ACT_CD4_TCELL_2H_DN	200	1.689	0.00000	1.936	0.00000	1.454	0.00194
TAG+TH1_GSE2770_TGFB_AND_IL4_VS_TGFB_AND_IL12_TREATED_ACT_CD4_TCELL_2H_DN	194	1.443	0.01538	1.759	0.00000	1.453	0.00885
TAG+TH1_GSE14308_TH1_VS_NAIVE_CD4_TCELL_UP	198	1.307	0.06092	1.730	0.00000	1.433	0.00840
TAG+TH1_GSE2770_IL12_AND_TGFB_ACT_VS_ACT_CD4_TCELL_2H_UP	195	1.626	0.00193	1.903	0.00000	1.413	0.03194
TAG+TH1_GSE46242_TH1_VS_ANERGIC_TH1_CD4_TCELL_WITH_EGR2_DELETED_UP	197	1.668	0.00000	1.854	0.00000	1.405	0.03704
TAG+TH1_GSE2770_TGFB_AND_IL4_VS_IL12_TREATED_ACT_CD4_TCELL_48H_DN	197	1.552	0.02209	1.808	0.00000	1.389	0.07692
TAG+TH1_GSE32901_NAIVE_VS_TH1_CD4_TCELL_DN	164	1.672	0.00204	1.840	0.00000	1.304	0.06904
TAG+TH1_GSE2770_IL12_AND_TGFB_ACT_VS_ACT_CD4_TCELL_48H_UP	195	1.356	0.01000	1.597	0.00411	1.302	0.02000
TAG+TH1_GSE2770_IL12_AND_TGFB_VS_IL4_TREATED_ACT_CD4_TCELL_48H_UP	196	1.258	0.06110	1.512	0.00598	1.298	0.01224
TAG+TH1_GSE2770_UNTREATED_VS_IL12_TREATED_ACT_CD4_TCELL_48H_DN	199	1.102	0.25794	1.559	0.00584	1.294	0.06432
TAG+TH1_GSE43863_NAIVE_VS_LY6C_LOW_CXCR5NEG_CD4_EFF_TCELL_D6_LCMV_DN	192	1.295	0.03571	1.542	0.00000	1.272	0.04356
TAG+TH1_GSE43863_TH1_VS_LY6C_INT_CXCR5POS_MEMORY_CD4_TCELL_UP	198	-1.007	0.44231	1.273	0.04280	1.257	0.08316
TAG+TH1_GSE2770_IL12_VS_TGFB_AND_IL12_TREATED_ACT_CD4_TCELL_48H_UP	198	1.500	0.01167	1.623	0.00593	1.229	0.11181
TAG+TH1_GSE43863_DAY6_EFF_VS_DAY150_MEM_TH1_CD4_TCELL_DN	197	1.203	0.15830	1.584	0.00591	1.201	0.16090
TAG+TH1_GSE2770_IL12_VS_IL4_TREATED_ACT_CD4_TCELL_6H_UP	198	1.010	0.44071	1.473	0.00000	1.184	0.07872
TAG+TH1_GSE2770_IL12_ACT_VS_ACT_CD4_TCELL_48H_UP	199	1.423	0.02953	1.563	0.01198	1.166	0.15368
TAG+TH1_GSE2770_IL12_VS_IL4_TREATED_ACT_CD4_TCELL_2H_UP	145	-1.191	0.11530	1.209	0.08745	1.158	0.14619
TAG+TH1_GSE2770_IL12_VS_TGFB_AND_IL12_TREATED_ACT_CD4_TCELL_6H_UP	193	1.063	0.28986	1.275	0.02101	1.030	0.36653
TH2 SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TH2_GSE2770_IL12_AND_TGFB_VS_IL4_TREATED_ACT_CD4_TCELL_48H_DN	191	1.199	0.14907	1.798	0.00000	1.693	0.00417
TAG+TH2_GSE2770_IL4_ACT_VS_ACT_CD4_TCELL_2H_UP	198	1.547	0.01025	1.833	0.00000	1.606	0.00204
TAG+TH2_GSE2770_UNTREATED_VS_IL4_TREATED_ACT_CD4_TCELL_6H_DN	197	0.931	0.61602	1.583	0.00196	1.599	0.00000
TAG+TH2_GSE2770_UNTREATED_VS_IL4_TREATED_ACT_CD4_TCELL_48H_DN	197	1.347	0.04808	1.726	0.00604	1.597	0.01004
TAG+TH2_GSE2770_TGFB_AND_IL4_VS_IL4_TREATED_ACT_CD4_TCELL_6H_DN	197	1.351	0.08481	1.689	0.00593	1.575	0.00000
TAG+TH2_GSE14308_TH2_VS_NAIVE_CD4_TCELL_UP	194	1.329	0.00202	1.524	0.00596	1.390	0.01720
TAG+TH2_GSE2770_IL4_ACT_VS_ACT_CD4_TCELL_48H_UP	198	1.022	0.42520	1.354	0.00794	1.321	0.01271
TAG+TH2_BOSCO_ALLERGEN_INDUCED_TH2_ASSOCIATED_MODULE	148	1.325	0.10000	1.598	0.01807	1.181	0.20851
TH17 SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TH17_GSE27241_WT_VS_RORGT_KO_TH17_POLARIZED_CD4_TCELL_UP	158	1.502	0.02196	2.024	0.00200	1.929	0.00405
TAG+TH17_GSE27241_CTRL_VS_DIGOXIN_TREATED_RORGT_KO_CD4_TCELL_IN_TH17_POLARIZING_CONDITIONS_UP	193	1.103	0.24056	1.669	0.00401	1.687	0.00000
TAG+TH17_GSE43955_1H_VS_60H_ACT_CD4_TCELL_WITH_TGFB_IL6_UP	193	1.569	0.00977	1.879	0.00000	1.583	0.00217
TAG+TH17_GSE21670_IL6_VS_TGFB_AND_IL6_TREATED_STAT3_KO_CD4_TCELL_UP	200	1.172	0.15048	1.885	0.00000	1.487	0.01212
TAG+TH17_GSE14308_TH17_VS_NAIVE_CD4_TCELL_UP	197	1.112	0.20117	1.537	0.00000	1.474	0.00593
TAG+TH17_GSE43955_1H_VS_10H_ACT_CD4_TCELL_WITH_TGFB_IL6_UP	195	1.410	0.01822	1.806	0.00000	1.439	0.01217
TAG+TH17_GSE43955_TH0_VS_TGFB_IL6_IL23_TH17_ACT_CD4_TCELL_60H_DN	194	1.520	0.00190	1.826	0.00000	1.432	0.01099
TAG+TH17_GSE43955_TH0_VS_TGFB_IL6_IL23_TH17_ACT_CD4_TCELL_52H_DN	198	1.737	0.00000	1.812	0.00000	1.409	0.01636
TAG+TH17_GSE21670_STAT3_KO_VS_WT_CD4_TCELL_DN	198	-1.033	0.40833	1.207	0.19010	1.388	0.05870
TAG+TH17_GSE43955_1H_VS_20H_ACT_CD4_TCELL_WITH_TGFB_IL6_UP	197	1.299	0.03520	1.604	0.00000	1.323	0.02070
TAG+TH17_GSE14308_TH17_VS_NATURAL_TREG_UP	198	0.993	0.48185	1.538	0.00388	1.254	0.05714
TAG+TH17_GSE43955_10H_VS_30H_ACT_CD4_TCELL_WITH_TGFB_IL6_DN	198	1.543	0.00000	1.642	0.00198	1.243	0.06388
TAG+TH17_GSE43955_1H_VS_42H_ACT_CD4_TCELL_WITH_TGFB_IL6_UP	193	1.489	0.00407	1.696	0.00000	1.181	0.13665
TAG+TH17_GSE43955_TH0_VS_TGFB_IL6_TH17_ACT_CD4_TCELL_60H_DN	197	1.395	0.01341	1.674	0.00000	1.163	0.13449
TAG+TH17_GSE43955_TH0_VS_TGFB_IL6_TH17_ACT_CD4_TCELL_52H_DN	194	1.576	0.00201	1.753	0.00000	1.156	0.11728
TAG+TH17_GSE43955_1H_VS_42H_ACT_CD4_TCELL_WITH_TGFB_IL6_DN	198	1.451	0.00396	1.754	0.00000	1.123	0.20582
TREG SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TREG_GSE24634_NAIVE_CD4_TCELL_VS_DAY10_IL4_CONV_TREG_DN	200	1.911	0.00000	2.156	0.00000	2.099	0.00207
TAG+TREG_GSE24634_NAIVE_CD4_TCELL_VS_DAY7_IL4_CONV_TREG_DN	198	1.764	0.00000	2.145	0.00000	2.066	0.00210
TAG+TREG_GSE24634_TREG_VS_TCONV_POST_DAY7_IL4_CONVERSION_UP	196	1.839	0.00000	2.042	0.00000	1.902	0.00000
TAG+TREG_GSE24634_NAIVE_CD4_TCELL_VS_DAY3_IL4_CONV_TREG_DN	199	1.711	0.00000	1.951	0.00000	1.821	0.00207
TAG+TREG_GSE24634_TREG_VS_TCONV_POST_DAY10_IL4_CONVERSION_UP	199	1.678	0.00025	1.956	0.00204	1.817	0.00000
TAG+TREG_GSE24634_NAIVE_CD4_TCELL_VS_DAY5_IL4_CONV_TREG_DN	198	1.550	0.02574	1.896	0.00214	1.647	0.01062
TAG+TREG_GSE24634_TREG_VS_TCONV_POST_DAY3_IL4_CONVERSION_UP	199	1.164	0.21386	1.791	0.00412	1.624	0.01381
TAG+TREG_GSE14350_IL2RB_KO_VS_WT_TREG_DN	199	1.640	0.00000	1.801	0.00000	1.480	0.00424
TAG+TREG_GSE15659_NAIVE_CD4_TCELL_VS_ACTIVATED_TREG_DN	193	1.396	0.00994	1.814	0.00000	1.432	0.01092
TAG+TREG_GSE15659_CD45RA_NEG_CD4_TCELL_VS_ACTIVATED_TREG_DN	193	-1.016	0.44512	1.348	0.02140	1.376	0.02893
TAG+TREG_GSE15659_CD45RA_NEG_CD4_TCELL_VS_RESTING_TREG_DN	190	-0.971	0.47166	-1.475	0.01619	-1.405	0.03080
TFH SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TFH_GSE43863_TFH_VS_LY6C_INT_CXCR5POS_MEMORY_CD4_TCELL_UP	196	1.560	0.00795	1.881	0.00000	1.500	0.03542
TAG+TFH_GSE43863_DAY6_EFF_VS_DAY150_MEM_TFH_CD4_TCELL_DN	195	1.633	0.00000	1.814	0.00000	1.384	0.01037
TAG+TFH_GSE43863_TFH_VS_LY6C_LOW_CXCR5NEG_EFFECTOR_CD4_TCELL_UP	199	1.282	0.09478	1.578	0.01025	1.366	0.07261
TAG+TFH_GSE43863_TH1_VS_TFH_MEMORY_CD4_TCELL_DN	200	1.461	0.00986	1.732	0.00000	1.360	0.01414
TAG+TFH_GSE43863_TH1_VS_LY6C_LOW_CXCR5NEG_EFFECTOR_CD4_TCELL_DN	198	1.471	0.00189	1.598	0.00000	1.251	0.05051
TAG+TFH_GSE21380_TFH_VS_GERMINAL_CENTER_TFH_CD4_TCELL_DN	196	1.080	0.23946	1.331	0.02231	1.218	0.09072
TAG+TFH_GSE21380_NON_TFH_VS_TFH_CD4_TCELL_DN	196	1.113	0.25253	1.368	0.03383	1.148	0.17647
TAG+TFH_GSE21380_NON_TFH_VS_GERMINAL_CENTER_TFH_CD4_TCELL_DN	199	0.803	0.77515	1.007	0.46654	1.067	0.30123

**Supplementary Figure 1 | Gene signatures tested for CD4$^+$ TILs.**

Canonical T cell signatures (T$_H$1, T$_H$2, T$_H$17, T$_{FH}$, and T$_{REG}$) tested for enrichment in CD4$^+$ T cells isolated from normal appearing brain (N) vs blood (B), tumor (T) vs blood (B), and tumor (T) vs normal appearing brain (N). Gene set enrichment analysis (1).

TEFF SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TEFF_GSE15750_DAY6_VS_DAY10_EFF_CD8_TCELL_UP	199	1.298	0.14342	2.110	0.00000	2.111	0.00000
TAG+TEFF_KAECH_NAIVE_VS_DAY8_EFF_CD8_TCELL_DN	200	1.878	0.00000	2.132	0.00000	2.095	0.00000
TAG+TEFF_GOLDRATH_EFF_VS_MEMORY_CD8_TCELL_UP	199	1.823	0.00000	2.074	0.00000	2.092	0.00000
TAG+TEFF_KAECH_DAY8_EFF_VS_MEMORY_CD8_TCELL_UP	200	1.796	0.00000	2.162	0.00000	2.064	0.00000
TAG+TEFF_GOLDRATH_NAIVE_VS_EFF_CD8_TCELL_DN	199	1.915	0.00000	2.097	0.00000	2.047	0.00000
TAG+TEFF_GSE30962_PRIMARY_VS_SECONDARY_ACUTE_LCMV_INF_CD8_TCELL_UP	200	1.423	0.01815	2.144	0.00000	2.039	0.00000
TAG+TEFF_KAECH_DAY8_EFF_VS_DAY15_EFF_CD8_TCELL_UP	197	1.374	0.08498	2.088	0.00000	2.039	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_72H_IN_VITRO_STIM_CD8_TCELL_DN	198	1.508	0.00587	2.135	0.00000	2.035	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_72H_IN_VITRO_STIM_TRICHOSTATINA_CD8_TCELL_DN	197	1.455	0.00810	2.016	0.00000	2.027	0.00000
TAG+TEFF_GSE10239_NAIVE_VS_DAY4.5_EFF_CD8_TCELL_DN	200	1.530	0.00409	2.069	0.00000	2.022	0.00000
TAG+TEFF_GSE10239_NAIVE_VS_KLRG1HIGH_EFF_CD8_TCELL_DN	198	1.533	0.00202	2.019	0.00000	2.016	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_72H_IN_VITRO_STIM_IFNAB_CD8_TCELL_DN	199	1.438	0.01581	2.065	0.00000	2.009	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_24H_IN_VITRO_STIM_IL12_CD8_TCELL_DN	198	1.203	0.16024	1.895	0.00000	1.965	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_24H_IN_VITRO_STIM_CD8_TCELL_DN	198	1.089	0.28571	1.841	0.00000	1.924	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_24H_IN_VITRO_STIM_INFAB_CD8_TCELL_DN	198	1.228	0.11934	1.853	0.00000	1.909	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_48H_IN_VITRO_STIM_CD8_TCELL_DN	199	1.218	0.13772	1.919	0.00000	1.897	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_72H_IN_VITRO_STIM_IL12_CD8_TCELL_DN	198	1.788	0.00000	2.064	0.00000	1.790	0.00000
TAG+TEFF_KAECH_NAIVE_VS_DAY15_EFF_CD8_TCELL_DN	200	1.934	0.00000	2.063	0.00000	1.776	0.00210
TAG+TEFF_GSE10239_MEMORY_VS_KLRG1INT_EFF_CD8_TCELL_DN	200	1.382	0.01336	1.903	0.00000	1.736	0.00000
TAG+TEFF_GSE10239_MEMORY_VS_KLRG1HIGH_EFF_CD8_TCELL_DN	200	1.126	0.20958	1.893	0.00000	1.728	0.00000
TAG+TEFF_GSE15930_NAIVE_VS_48H_IN_VITRO_STIM_IL12_CD8_TCELL_DN	200	1.227	0.13718	1.830	0.00000	1.706	0.00203
TAG+TEFF_GSE19825_NAIVE_VS_DAY3_EFF_CD8_TCELL_DN	199	1.520	0.00197	1.881	0.00000	1.687	0.00205
TAG+TEFF_GSE10239_MEMORY_VS_DAY4.5_EFF_CD8_TCELL_DN	198	1.082	0.31102	1.720	0.00000	1.528	0.01253
TAG+TEFF_GSE19825_NAIVE_VS_IL2RAHIGH_DAY3_EFF_CD8_TCELL_DN	198	1.348	0.00588	1.656	0.00000	1.501	0.00412
TAG+TEFF_GSE10239_KLRG1INT_VS_KLRG1HIGH_EFF_CD8_TCELL_DN	195	1.350	0.06870	1.583	0.00199	1.410	0.01190
TAG+TEFF_GSE26890_CXCR1_NEG_VS_POS_EFFECTOR_CD8_TCELL_DN	200	1.544	0.00000	1.856	0.00000	1.261	0.06992
TAG+TEFF_GSE19825_CD24LOW_VS_IL2RA_HIGH_DAY3_EFF_CD8_TCELL_DN	199	1.178	0.12621	1.303	0.03742	1.223	0.03839
TCM SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TCM_GSE16522_MEMORY_VS_NAIVE_CD8_TCELL_UP	196	1.220	0.11200	1.512	0.00837	1.391	0.02469
TAG+TCM_GSE23321_CENTRAL_VS_EFFECTOR_MEMORY_CD8_TCELL_UP	198	1.309	0.09658	1.581	0.00821	1.340	0.05578
TAG+TCM_GSE16522_ANTI_CD3CD28_STIM_VS_UNSTIM_MEMORY_CD8_TCELL_DN	198	1.322	0.05159	1.746	0.00000	1.275	0.05979
TEM SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TEM_GSE10239_NAIVE_VS_KLRG1INT_EFF_CD8_TCELL_DN	198	1.626	0.00000	1.948	0.00000	1.726	0.00000
TAG+TEM_GSE10239_KLRG1INT_VS_KLRG1HIGH_EFF_CD8_TCELL_UP	197	-1.305	0.07085	1.165	0.17547	1.518	0.00602
TAG+TEM_GSE19825_CD24LOW_VS_IL2RA_HIGH_DAY3_EFF_CD8_TCELL_UP	199	1.292	0.03448	1.574	0.00000	1.413	0.00998
TAG+TEM_GSE16522_MEMORY_VS_NAIVE_CD8_TCELL_UP	196	1.220	0.11200	1.512	0.00837	1.391	0.02469
TAG+TEM_GSE10239_NAIVE_VS_MEMORY_CD8_TCELL_DN	189	1.557	0.00000	1.821	0.00000	1.370	0.03462
TAG+TEM_GOLDRATH_NAIVE_VS_MEMORY_CD8_TCELL_DN	200	1.825	0.00000	1.973	0.00000	1.290	0.04858
TAG+TEM_GSE16522_ANTI_CD3CD28_STIM_VS_UNSTIM_MEMORY_CD8_TCELL_DN	198	1.322	0.05159	1.746	0.00000	1.275	0.05979
TAG+TEM_GSE41978_KLRG1_HIGH_VS_LOW_EFFECTOR_CD8_TCELL_DN	156	1.490	0.00387	1.736	0.00000	1.245	0.10693
TRM SIGNATURE SETS	SIZE	NES (N vs B)	NOM p-val	NES (T vs B)	NOM p-val	NES (T vs N)	NOM p-val
TAG+TRM_GSE39152_BRAIN_VS_SPLEEN_CD103_NEG_MEMORY_CD8_TCELL_UP	199	1.231	0.11811	1.559	0.01016	1.076	0.30140
TAG+TRM_GSE39152_CD103_NEG_VS_POS_MEMORY_CD8_TCELL_DN	199	1.479	0.00594	1.496	0.00609	1.018	0.40365
TAG+TRM_GSE39152_SPLEEN_CD103_NEG_VS_BRAIN_CD103_POS_MEMORY_CD8_TCELL_DN	195	0.967	0.56238	1.073	0.28947	-0.974	0.52333

Supplementary Figure 2 | Gene signatures tested for CD8⁺ TILs.

Canonical T cell signatures (T_{EFF}, T_{EM}, T_{CM}, and T_{RM}) tested for enrichment in CD8⁺ T cells isolated from normal appearing brain (N) vs blood (B), tumor (T) vs blood (B), and tumor (T) vs normal appearing brain (N). Gene set enrichment analysis (1).
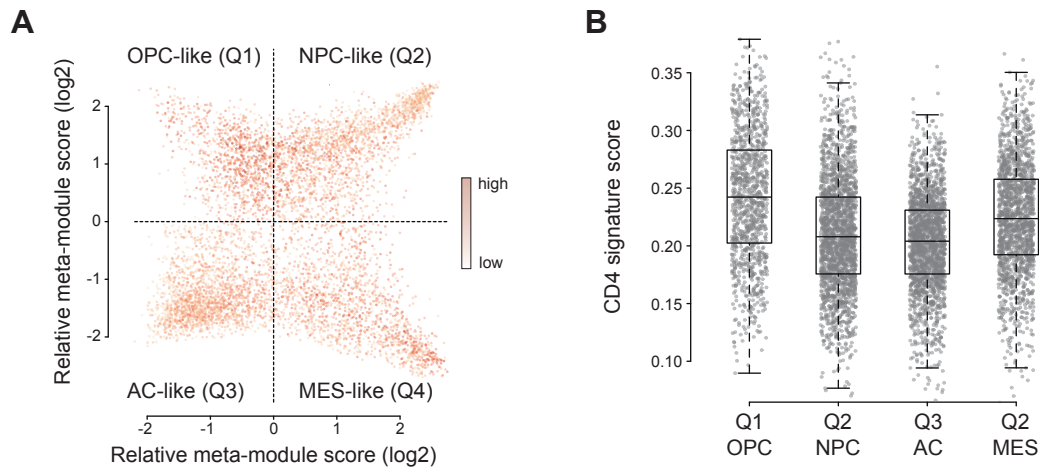
Supplementary Figure 3 | Representation of the tumor site specific CD4+ T cell signature in GBM cellular states (2).

(A) The presence of our GBM specific CD4+ T cell signature as defined by the DEGs of CD4+ T cells in GBM vs normal appearing brain was assessed in the compiled single cell transcriptomes of 28 GBM cases arranged in a meta-module score matrix according to (2). (B) Numerical scores of our GBM specific CD4+ T cell signature in each quadrant of the meta-module score matrix representing oligo-dendrocytic precursor (OPC)-like, neural progenitor cell (NPC)-like, astrocyte (AC)-like, and mesenchy-mal (MES)-like GBM states, respectively. For details see Materials and Methods.

Supplementary Table 1. Clinical features of GBM cases

Case	Age (yrs)	Gender	Molecular pathology	Localization	First symptom
GBM 1	55	male	MGMT non-methylated	fronto-lateral	epileptic seizure
GBM 2	57	male	MGMT non-methylated	insular	hemiparesis
GBM 3	33	female	MGMT methylated	temporo-occipital	lightheadedness
GBM 4	62	male	MGMT methylated	occipital	hemianopia
GBM 5	47	male	MGMT methylated	frontal	headache
GBM 6	82	female	MGMT non-methylated	occipital	visual field deficits
GBM 7	52	male	MGMT methylated	temporal	paresis of leg
GBM 8	53	male	MGMT non-methylated	callosal (frontal)	personality change
GBM 9	62	female	MGMT non-methylated	fronto-temporal	epileptic seizure

All cases were IDH^{wt} and were confirmed as GBM by histology.

Supplementary Table 1 | Clinical features of GBM cases. Demographic characteristics of the nine GBM cases included in the study. All cases were IDH^{wt} and histology confirmed GBM patients. All patients were treatment naive and had not been irradiated at the time of sampling.

Supplementary Table 2. Clinical features of GBM validation cases

Case	Age (yrs)	Gender	Molecular pathology	Localization	First symptom
GBM 10	84	male	MGMT methylated	insular	aphasia and hemiparesis
GBM 11	48	male	MGMT non-methylated	parietal	epileptic seizure
GBM 12	50	male	MGMT non-methylated	temporal	epileptic seizure
GBM 13	72	female	N.D.	fronto-parietal	epileptic seizure

All cases were IDH^{wt} and were confirmed as GBM by histology. N.D., not determined.

Supplementary Table 2 | Clinical features of GBM validation cases. Demographic characteristics of four GBM cases included in the study to validate marker expression of CD4$^+$ T cells in blood, normal appearing brain and at the GBM site by flow cytometry. All cases were IDH^{wt} and histology confirmed GBM patients. All patients were treatment naive and had not been irradiated at the time of sampling.

Legends to Datasets S1 and S2

Dataset S1 | List of DEGs overlapping in our data set as compared to the BrainTIME data set (3) - Core signatures. The DEG lists are given both for CD4$^+$ T cells as well as for CD8$^+$ T cells. DEGs refer to differential expression of genes in T cells isolated from the tumor bed as compared to the peripheral blood.

Dataset S2 | List of core CD4$^+$ and CD8$^+$ TIL genes that were at the same time also differentially expressed between T cells isolated from the tumor bed as compared to T cells isolated from normal appearing brain tissue. Intersection of the CD4$^+$ and CD8$^+$ core TIL signatures (see Dataset S1) and the DEGs in tumor vs normal appearing brain tissue from our data set (TUM).

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