

Supplementary Table 1. Summary of clinical and tumor sample c

Patient ID	Age at ICB initiation	Gender	Stage at ICB initiation
CGLU111	71	M	IV
CGLU113	63	M	IV
CGLU115	63	F	IV
CGLU116	56	M	IV
CGLU117	56	M	IV
CGLU120	58	F	IV
CGLU121	47	F	IV
CGLU124	50	F	IV
CGLU125	76	F	IV
CGLU126	73	F	IV
CGLU127	59	F	IV
CGLU128	65	F	IV
CGLU129	62	M	IV
CGLU130	74	F	IV
CGLU131	57	M	IV
CGLU132	63	M	IV
CGLU133	61	M	IV
CGLU134	72	F	IV
CGLU135	59	M	IV
CGLU159	63	F	IV
CGLU160	87	M	IV
CGLU162	78	F	IV
CGLU163	72	M	IV
CGLU168	88	M	IV
CGLU169	62	F	IV
CGLU172	58	F	IV
CGLU178	68	M	IV
CGLU180	76	M	IV
CGLU181	55	M	IV
CGLU185	56	F	IV
CGLU187	59	F	IV
CGLU189	46	F	IV
CGLU193	65	M	IV
CGLU197	68	M	IV
CGLU198	60	F	IV
CGLU199	61	M	IV
CGLU200	54	M	IV
CGLU201	51	M	IV
CGLU203	65	F	IV
CGLU208	67	F	IV
CGLU211	71	F	IV
CGLU212	57	M	IV
CGLU213	84	F	IV

CGLU227	68	M	IV
CGLU229	69	M	IV
CGLU230	62	F	IV
CGLU231	50	M	IV
CGLU232	73	M	IV
CGLU233	80	M	IV
CGLU240	60	M	IV
CGLU243	73	F	IV
CGLU244	63	M	IV
CGLU246	77	M	IV
CGLU247	82	M	IV
CGLU248	67	M	IV
CGLU252	67	F	IV
CGLU257	74	M	IV
CGLU260	79	M	IV
CGLU262	72	M	IV
CGLU266	71	F	IV
CGLU268	51	F	IV
CGLU270	61	M	IV
CGLU274	74	F	IV
CGLU286	48	M	IV
CGLU287	73	F	IV
CGLU288	54	F	IV
CGLU289	64	F	IV
CGLU295	77	M	IV
CGLU299	58	F	IV
CGLU304	81	M	IV
CGLU305	55	F	IV
CGLU307	66	F	IV
CGLU309	85	M	IV
CGLU310	56	F	IV
CGLU311	69	F	IV
CGLU327	75	M	IV
CGLU329	68	F	IV
CGLU334	72	M	IV
CGLU337	58	M	IV
CGLU341	64	F	IV
CGLU348	63	F	IV
CGLU389	61	M	IV
CGLU436	52	M	IV
CGLU510	61	F	IV
CGLU512	66	F	IV
CGLU514	73	F	IV
CGLU515	74	M	IV
CGLU519	54	M	IV
CGLU521	46	F	IV

Progression-free and overall survival values have been rounded to the closest integer. ICB; immu

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Smoking Status	Histology	Anatomic Location
Former Smoker	Squamous Cell Carcinoma	liver
Current Smoker	Squamous Cell Carcinoma	R4 lymph node
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Squamous Cell Carcinoma	lung
Current Smoker	Adenocarcinoma	adrenal
Former Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	lymph node
Former Smoker	Adenocarcinoma	lung
Never Smoker	LCNEC	lung
Former Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	adrenal
Former Smoker	Adenocarcinoma	soft tissue
Former Smoker	Adenocarcinoma	N/A
Never Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	lung
Former Smoker	Squamous Cell Carcinoma	pleural nodule
Former Smoker	Adenocarcinoma	lung
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Squamous Cell Carcinoma	pleura
Former Smoker	Adenocarcinoma	lung
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	lymph node
Former Smoker	Adenocarcinoma	lung
Never Smoker	Other	lung
Former Smoker	Other	lung
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Adenocarcinoma	lymph node
Former Smoker	Adenocarcinoma	N/A
Never Smoker	Adenocarcinoma	lymph node
Former Smoker	LCNEC	lung
Never Smoker	Squamous Cell Carcinoma	lung
Never Smoker	Adenocarcinoma	lung
Never Smoker	Squamous Cell Carcinoma	chest wall
Never Smoker	Adenocarcinoma	lymph node
Current Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	iliac wing
Former Smoker	Adenocarcinoma	lymph node
Current Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	lung

Former Smoker	Adenocarcinoma	N/A
Never Smoker	Adenocarcinoma	N/A
Never Smoker	Adenocarcinoma	N/A
Former Smoker	Squamous Cell Carcinoma	N/A
Never Smoker	Adenocarcinoma	N/A
Former Smoker	Squamous Cell Carcinoma	N/A
Former Smoker	Squamous Cell Carcinoma	N/A
Never Smoker	Adenocarcinoma	N/A
Former Smoker	Squamous Cell Carcinoma	brain
Former Smoker	Squamous Cell Carcinoma	bone
Former Smoker	Adenocarcinoma	lung
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	liver
Former Smoker	Adenocarcinoma	brain
Never Smoker	Adenocarcinoma	lung
Former Smoker	LCNEC	lung
Former Smoker	Adenocarcinoma	brain
Current Smoker	Squamous Cell Carcinoma	lymph node
Never Smoker	Adenocarcinoma	mediastinal mass
Former Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	brain
Current Smoker	Adenocarcinoma	brain
Former Smoker	Squamous Cell Carcinoma	lymph node
Former Smoker	Squamous Cell Carcinoma	lymph node
Former Smoker	Adenocarcinoma	pleural fluid
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	bone
Former Smoker	Adenocarcinoma	lymph node
Current Smoker	Adenocarcinoma	lymph node
Current Smoker	Adenocarcinoma	lymph node
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	bone
Current Smoker	Adenocarcinoma	pleura
Former Smoker	Squamous Cell Carcinoma	lung
Former Smoker	Adenocarcinoma	lung
Never Smoker	Adenocarcinoma	bone
Former Smoker	Adenocarcinoma	liver
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	adnexa
Former Smoker	Adenocarcinoma	soft tissue
Former Smoker	Adenocarcinoma	lung
Former Smoker	Adenocarcinoma	adrenal

line checkpoint blockade, M; male, F; female, LCNEC; large cell neuroendocrine carcinoma, D

Timepoint at which sample was obtained	Pathologic Tumor Purity (%)	Treatment	Prior Lines of Systemic Therapy
prior to ICB	30%	Anti-PD1 (nivolumab)	1
prior to ICB	40-60%	Anti-PD1 (nivolumab)	3
prior to ICB	70%	Anti-PD1 (nivolumab)	2
prior to ICB	NA	Dual ICB (anti-PD1+anti-CTLA4)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	1
prior to ICB	60-70%	Anti-PD1 (nivolumab)	2
prior to ICB	NA	Anti-PD1 (nivolumab)	3
prior to ICB	20-30%	Anti-PD1 (nivolumab)	1
prior to ICB	20-30%	Anti-PD1 (nivolumab)	1
prior to ICB	90%	Anti-PD1 (nivolumab)	1
prior to ICB	70%	Anti-PD1 (nivolumab)	2
prior to ICB	20-30%	Anti-PD1 (nivolumab)	3
prior to ICB	30-40%	Anti-PD1 (nivolumab)	1
prior to ICB	40%	Anti-PD1 (nivolumab)	1
prior to ICB	50%	Anti-PD1 (nivolumab)	1
prior to ICB	20%	Anti-PD1 (nivolumab)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	4
prior to ICB	NA	Anti-PD1 (nivolumab)	1
prior to ICB	NA	Anti-PD1 (nivolumab)	2
prior to ICB	20%	Anti-PD1 (nivolumab)	1
prior to ICB	50%	Anti-PD1 (nivolumab)	0
prior to ICB	40%	Anti-PD1 (nivolumab)	1
prior to ICB	50%	Anti-PD1 (nivolumab)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	1
prior to ICB	20%	Anti-PD1 (nivolumab)	0
prior to ICB	90%	Anti-PD1 (nivolumab)	3
prior to ICB	20%	Anti-PD1 (nivolumab)	1
prior to ICB	20%	Anti-PD1 (nivolumab)	1
prior to ICB	30-50%	Anti-PD1 (nivolumab)	3
prior to ICB	NA	Anti-PD1 (nivolumab)	2
prior to ICB	30%	Anti-PD1 (nivolumab)	2
prior to ICB	80%	Anti-PD1 (nivolumab)	2
prior to ICB	50%	Anti-PD1 (nivolumab)	2
prior to ICB	30%	Anti-PD1 (nivolumab)	1
prior to ICB	NA	Anti-PD1 (nivolumab)	2
prior to ICB	50%	Anti-PD1 (nivolumab)	2
prior to ICB	NA	Anti-PD1 (nivolumab)	2
prior to ICB	70%	Anti-PD1 (nivolumab)	2
prior to ICB	40%	Anti-PD1 (nivolumab)	1
prior to ICB	60%	Anti-PD1 (nivolumab)	1
prior to ICB	40%	Anti-PD1 (nivolumab)	1
prior to ICB	40%	Anti-PD1 (nivolumab)	2
prior to ICB	60%	Anti-PD1 (nivolumab)	0

prior to ICB	NA	Anti-PD1 (nivolumab)	3
prior to ICB	80%	Anti-PD1 (nivolumab)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	2
prior to ICB	20%	Anti-PD1 (nivolumab)	2
prior to ICB	30%	Anti-PD1 (nivolumab)	1
prior to ICB	35%	Anti-PD1 (nivolumab)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	2
prior to ICB	10%	Anti-PD1 (nivolumab)	1
prior to ICB	70%	Anti-PD1 (pembrolizumab)	0
prior to ICB	60%	Dual ICB (anti-PD1+anti-CTLA4)	0
prior to ICB	80%	Anti-PD1 (nivolumab)	1
prior to ICB	50%	Dual ICB (anti-PD1+anti-CTLA4)	1
prior to ICB	40%	Dual ICB (anti-PD1+anti-CTLA4)	1
prior to ICB	40%	Dual ICB (anti-PD1+anti-CTLA4)	0
prior to ICB	70%	Anti-PD1 (nivolumab)	1
prior to ICB	90%	Anti-PD1 (nivolumab)	1
prior to ICB	70%	Anti-PD1 (nivolumab)	3
prior to ICB	60%	Dual ICB (anti-PD1+anti-CTLA4)	0
prior to ICB	90%	Anti-PD1 (nivolumab)	1
prior to ICB	60%	Anti-PD1 (pembrolizumab)	0
prior to ICB	50-60%	Dual ICB (anti-PD1+anti-CTLA4)	0
prior to ICB	60-70%	Anti-PD1 (nivolumab)	1
prior to ICB	50%	Anti-PD1 (pembrolizumab)	2
prior to ICB	90%	Anti-PD1 (pembrolizumab)	0
prior to ICB	50%	Anti-PD1 (nivolumab)	1
prior to ICB	50%	Anti-PD1 (nivolumab)	1
prior to ICB	45%	Anti-PD1 (nivolumab)	1
prior to ICB	7%	Anti-PD1 (pembrolizumab)	0
resistant tumor	20%	Anti-PD1 (nivolumab)	1
prior to ICB	70%	Anti-PD1 (pembrolizumab)	0
prior to ICB	80%	Anti-PD1 (pembrolizumab)	0
prior to ICB	65%	Anti-PD1 (pembrolizumab)	0
prior to ICB	35%	Anti-PD1 (pembrolizumab)	0
prior to ICB	20%	Anti-PD1 (pembrolizumab)	1
prior to ICB	40%	Anti-PD1 (nivolumab)	1
prior to ICB	25%	Anti-PD1 + Chemotherapy	1
prior to ICB	65%	Anti-PD1 + Chemotherapy	1
prior to ICB	45%	Anti-PD1 (pembrolizumab)	1
prior to ICB	45%	Anti-PD1 (pembrolizumab)	0
prior to ICB	50%	Anti-PD1 (pembrolizumab)	1
resistant tumor	70%	Anti-PD1 (nivolumab)	2
prior to ICB	70%	Anti-PD1 (nivolumab)	1
resistant tumor	90%	Anti-PD1 (nivolumab)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	2
prior to ICB	50%	Anti-PD1 (nivolumab)	1
prior to ICB	80%	Anti-PD1 (nivolumab)	1

CB; durable clinical benefit, NDB; non durable clinical benefit, PFS; progression-free survival, OS; overall survival

Clinical Benefit	PFS	PFS censor (0=censored, 1=progressed)	OS
DCB	40	0	40
NDB	1	1	2
NDB	2	1	3
DCB	13	1	17
DCB	8	1	14
NDB	6	1	17
NDB	1	1	9
NDB	2	1	6
DCB	23	1	51
NDB	5	1	15
DCB	10	1	25
NDB	5	1	38
NDB	2	1	16
NDB	4	1	5
DCB	7	1	13
NDB	2	1	6
DCB	93	0	93
DCB	57	0	57
DCB	23	1	46
NDB	3	1	5
DCB	13	0	13
DCB	7	1	7
NDB	3	1	39
DCB	7	1	13
NDB	1	0	1
NDB	4	1	9
N/A	1	0	1
DCB	11	0	11
DCB	7	1	16
DCB	12	1	38
NDB	2	1	2
NDB	2	1	26
NDB	1	1	2
DCB	8	1	38
NDB	3	0	3
NDB	2	1	9
NDB	1	0	1
NDB	2	1	3
NDB	2	1	4
DCB	20	1	25
DCB	11	1	28
DCB	12	0	12
NDB	1	1	8

DCB	10	1	22
NDB	2	1	3
NDB	6	1	13
NDB	4	1	18
NDB	2	1	3
DCB	14	1	17
DCB	13	1	13
NDB	2	1	5
NDB	5	1	8
DCB	20	0	20
NDB	3	0	3
NDB	2	1	6
DCB	10	0	10
NDB	1	1	15
NDB	1	1	1
NDB	2	1	19
DCB	23	1	43
DCB	21	0	21
DCB	29	0	29
DCB	7	0	7
NDB	6	1	14
NDB	3	1	3
NDB	1	1	5
DCB	15	0	15
NDB	4	0	4
NDB	3	1	7
NDB	2	1	8
NDB	4	1	16
NDB	2	1	19
NDB	1	1	3
DCB	14	0	14
DCB	16	0	16
DCB	14	0	14
DCB	14	0	14
DCB	29	0	29
DCB	14	0	14
DCB	13	0	13
N/A	3	1	3
NDB	3	1	9
NDB	3	1	3
DCB	11	1	16
DCB	9	1	27
DCB	10	1	28
DCB	19	1	31
NDB	2	1	3
DCB	10	0	10

il, NE; non evaluable for PD-L1/CD8 staining due to insufficient tissue, N/A; not available

OS censor (0=censored, 1=DOD)	PD-L1 staining (%, tumor)	CD8+ T cell Density
0	60	NE
1	NE	NE
0	NE	NE
1	70	10
1	5	NE
1	0	20
1	5	20
1	0	5
0	10	10
1	0	0
1	10	10
1	70	10
1	80	5
0	20	5
1	20	NE
1	NE	NE
0	70	10
0	NE	NE
0	NE	NE
1	NE	NE
1	NE	NE
0	NE	NE
0	100	30
0	30	20
1	100	5
1	30	10
0	0	NE
0	1	0
0	0	NE
0	0	20
1	0	NE
1	0	NE
1	5	NE
0	0	15
1	0	5
1	0	0
1	0	NE
0	0	5
0	NE	NE
1	10	5
0	40	20
0	50	NE
0	50	5

0	50	NE
1	70	NE
0	5	NE
1	80	NE
1	100	NE
0	NE	NE
0	NE	NE
1	100	0
1	70	0
0	5	15
1	10	20
1	60	NE
1	NE	NE
1	NE	NE
0	NE	NE
0	5	5
0	100	0
0	10	5
0	90	70
0	NE	NE
1	NE	NE
1	0	5
1	0	0
1	90	20
1	60	NE
0	90	15
1	20	5
0	0	5
0	NE	NE
1	100	30
0	100	5
0	80	5
0	0	100
0	80	40
0	70	5
0	5	1
0	0	1
1	0	5
0	0	5
0	0	1
0	50	30
0	80	20
0	0	5
0	5	10
1	0	10
0	1	20
