

Supplementary data: Detailed features of cases and samples analyzed.

Case	Age at time of primary tumor diagnosis /Gender	Primitive lesion type, site and thickness (mm)/ metastatic site	Percentage of tumor cells in samples	Melanin pigmentation	BRAFV600 genotype (pyrosequencing)	IHC BRAFV600E (VE1) proportion of cells/intensity	NRASQ61 genotype (pyrosequencing)	IHC NRASQ61R (SP174) proportion of cells/intensity	
1	59/male	NM, face, 3,25	80	3+	NC	0	WT	0	
		Lymph node	60	3+	WT	0	WT	0	
2	41/male	Lymph node	80	0	V600E	4+, strong	WT	0	
3	51/male	SSM, back, 2,2	80	1+	NC	0	NC	0	
		Lymph node	95	0	WT	0	WT	0	
		Skin	90	1+	WT	0	WT	0	
4	75/male	SSM, back,2,9	70	1+	V600E	4+, strong	WT	0	
		Lymph node	20	0	NC	4+, strong	WT	0	
		Lymph node	40	0	0	V600E	4+, strong	WT	0
		Lymph node	10	0	0	WT	3+, weak	WT	0
5	90/female	SSM, heel, 9	95	1+	NC	0	NC	0	

		Skin	90	0	NC	0	NC	0
6	72/male	Lymph node	90	0	WT	0	Q61R	1+, strong
7	68/male	SSM, ear, 1,95	70	0	WT	0	WT	0
		Lung	90	0	NC	0	NC	0
8	88/female	SSM, calf, 13	90	1+	V600E	4+, strong	WT	0
		Lymph node	80	2+	V600E	4+, strong	WT	0
9	75/female	NM, calf, 2,5	80	0	NC	0	NC	0
		In-transit	5	0	NC	0	NC	0
		In-transit	90	0	WT	0	Q61L	0
10	81/female	MLM, nasal	70	0	WT	0	Q61K	0
		In transit	90	0	WT	0	Q61K	0
11	72/female	MLM, nasal	90	0	NC	0	NC	0
		Stomach	90	0	NC	0	WT	0
12	77/male	SSM, back, 1,2	20	3+	WT	0	WT	0
		Lymph node	80	4+	WT	0	WT	0
		Mesentery	70	1+	WT	0	WT	0
13	59/male	Parotid gland	50	1+	WT	0	WT	0
14	54/male	Liver	25	2+	WT	0	WT	0
15	43/male	NM, knee, 1,8	90	0	NC	0	Q61R	3+, strong

		Local recurrency	70	0	WT	0	Q61R	4+, strong
		Lymph node	95	0	NC	0	NC	4+, strong
		Lymph node	90	0	WT	0	Q61R	4+, strong
16	86/male	Lymph node	90	0	V600E	4+, strong	WT	0
17	67/female	Lymph node	90	0	WT	0	Q61R	4+, strong
18	70/male	SSM, arm,1,2	50	0	WT	4+, strong	WT	0
19	79/male	SSM, flank, 5,6	80	1+	WT	0	Q61R	4+, strong
		Lymph node	90	0	WT	0	Q61R	4+, weak
20	71/female	Skin	60	0	WT	0	WT	0
21	42/male	SSM, leg, 10	90	0	WT	0	Q61R	2+, weak
22	87/male	NM, face, 10,5	80	2+	WT	0	WT	0
23	74/male	Lymph node	80	0	WT	0	WT	0
24	65/male	SSM, ear,7	95	0	WT	0	WT	0
		In-transit	80	0	NC	0	WT	0
25	75/female	SSM, trunk, 4	30	0	V600R	0	WT	0
		Lymph node	90	1+	V600R	0	WT	0
		Lymph node	90	0	V600R	0	WT	0
		Lymph node	80	0	V600R	0	WT	0
26	52/male	NM, trunk, 7,1	70	0	WT	0	WT	0

27	55/female	Brain	95	0	WT	0	WT	0
		Brain	70	0	WT	0	WT	0
28	37/male	Brain	50	4+	V600E	4+, strong	WT	0
29	59/male	Lymph node	50	0	WT	0	Q61R	4+, weak
30	50/female	Brain	90	0	WT	0	Q61K	0
		Lung	90	0	WT	0	Q61K	0
31	68/female	NM, face, 2,4	80	1+	WT	0	WT	0
32	17/female	SSM, scalp, 2,5	30	0	WT	0	WT	0
		Lymph node	80	1+	WT	0	WT	0
33	61/male	SSM,foot, 6	70	1+	WT	0	WT	0
		Lymph node	95	2+	WT	0	WT	0
34	39/female	NM, back, 3,9	50	0	V600E	4+, weak	WT	0
35	40/female	Liver	100	1+	WT	0	WT	0
36	52/male	Lymph node	90	0	WT	0	Q61K	0
37	67/male	NM, back,12	75	1+	NC	0	WT	0
		Local recurrence	80	0	WT	0	WT	0
		Lymph node	80	2+	WT	0	WT	0
38	44/female	Skin	90	0	WT	0	WT	0
39	73/female	SSM, leg, 2,5	20	1+	NC	0	Q61R	3+, strong

		Mesentery	50*	4+	WT	0	WT	0
40	64/male	SSM, heel, 2,5	15	3+	WT	0	WT	0
		Lymph node	20	4+	WT	0	WT	0
41	82/male	Lymph node	95	2+	V600E	4+, weak	WT	0
		Lymph node	35	0	V600E	4+, strong	WT	0
42	61/male	Lung	70	1+	WT	0	Q61R	3+, strong
		Brain	40	0	WT	0	Q61R	2+, strong
43	49/female	NM, face, 5,5	90	0	V600E	3+, strong	WT	0
44	68/female	NM, face, 2,5	80	1+	V600E	4+, weak	WT	0
45	63/male	NM, face, 11	90	0	WT	0	WT	0
46	71/male	Skin	90	0	WT	0	Q61R	4+, weak
47	61/male	NM, back, 11	90	1+	WT	0	WT	0
		Skin	30	1+	WT	0	WT	0
		Brain	90	4+	WT	0	WT	0
48	56/male	DM, temple, 3,5	10	0	WT	0	WT	0
		Lymph node	95	0	WT	1+, weak	WT	0
		Lymph node	40	0	WT	0	WT	0
		Skin	80	0	NC	0	WT	0
49	64/male	Liver	60	3+	WT	0	WT	0

50	51/female	Skin	60	0	WT	0	WT	0
51	63/female	NM, face, 3	60	0	V600E	4+, strong	WT	0
		Parotid gland	20	1+	V600E	1+, weak	WT	0
52	86/female	Local recurrence	60	0	WT	0	Q61L	0
53	75/male	SSM, back, 2,7	40	0	V600K	0	WT	0
		Lymph node	70	0	V600K	0	WT	0
54	55/male	Primitive biopsy	50	0	V600K	0	WT	0
		Lymph node	80	1+	V600K	0	WT	0
55	55/male	Skin	80	0	V600E	4+, strong	WT	0
56	89/female	Primitive biopsy	80	0	V600R	0	WT	0
57	80/male	Primitive biopsy	80	0	WT	0	Q61L	0
58	53/male	Primitive biopsy	90	0	V600R	0	WT	0
59	49/male	NM, back, 9	90	2+	WT	0	Q61R	4+, strong
60	68/female	NM, leg, 27	90	0	WT	0	Q61L	0
		In-transit	90	1+	WT	0	Q61L	0
		Skin	80	0	WT	0	Q61L	0
		Skin	70	0	WT	0	Q61L	0
61	31/male	SSM, arm, 5	90	2+	WT	4+, weak**	Q61K	0**
		Local recurrence	10	3+	WT	4+, weak**	WT	0**

		Lymph node	90	3+	WT	0	Q61K	0
62	81/female	Lymph node	60	0	WT	0	Q61R	4+, strong
63	40/male	Lymph node	90	0	V600E	4+, weak	WT	0
64	24/male	SSM, leg, 1,3	20	0	NC	3+, weak	NC	0
		Lymph node	70	1+	V600E	3+, strong	WT	0
65	64/male	Lymph node	70	0	V600K	0	WT	0
		Lymph node	90	0	V600K	0	WT	0
66	81/female	SSM, foot, 2	2	0	NC	0	WT	2+, weak
		In-transit	70	1+	NC	0	NC	0
		Lymph node	90	2+	WT	0	Q61R	3+, strong
		Skin	80	0	WT	0	Q61R	4+, strong
67	70/female	SSM arm 2,2	50	1+	WT	0	Q61R	2+, strong
	74/female	In-transit	70	0	WT	0	Q61R	3+, weak
	75/female	Skin	80	0	WT	0	Q61R	4+, strong
		Skin	20	0	WT	0	Q61R	4+, strong
		Skin	80	0	WT	0	Q61R	4+, strong
68	60/female	Lymph node	60	0	V600E	4+, strong	WT	0
69	50/female	NM, nail, 10	90	1+	NC	0	NC	0
		Skin	95	0	WT	0	NC	0

		In-transit	90	0	WT	0	WT	0
		Lymph node	90	0	WT	0	WT	0
70	56/male	NM, neck, 2,6	70	1+	NC	2+, strong	WT	0
		Lymph node	90	3+	NC	0	NC	0
		Brain	90	2+	V600E	1+, weak	WT	0
71	35/female	Lymph node	100	0	WT	0	Q61K	0
72	61/male	SSM, back, 12,4	80	1+	V600E	4+, strong	WT	0
		Lymph node	80	3+	V600E	3+, weak	WT	0
73	88/female	Lymph node	90	0	WT	0	WT	0
74	76: male	MLM, anus	60	1+	WT	0	WT	0
		Lymph node	80	0	WT	0	WT	0
		Lymph node	95	0	WT	0	WT	0
75	77/male	Skin	70	0	V600K	0	WT	0
76	63/male	Lymph node	90	0	V600E	4+, strong	WT	0
77	83/male	Skin	80	1+	WT	0	Q61R	1+, weak
78	64/male	Lung	70	1+	V600E	3+, strong	WT	0
79	60/female	NM, trunk,3	80	0	V600K	0	WT	0

* This metastatic sample has been read back because of discrepancies between the two samples of a single patient. In fact, this metastatic sample only consisted in strong pigmented macrophages without obvious viable tumor cells.

** These samples have been read back because of discrepancies between weak positive IHC with BRAF^{V600E} antibody and NRAS^{Q61K} mutation status.

Finally, a very weak staining with NRAS^{Q61R} antibody was also noted, considered initially as non significant. The weak to very weak intensity of both of BRAF^{V600E} and NRAS^{Q61R} IHC as finally been considered as non specific.

DM: Desmoplastic Melanoma; MLM: Mucosal Lentiginous Melanoma; NM: Nodular Melanoma; SSM: Superficial Spreading Melanoma; WT : wild-type; NC: Non Conclusive.

Scoring system: 0: no staining ; 1+: staining of less than 25% of tumor cells; 2+: staining of 26% to 50% of tumor cells; 3+: staining of 51% to 75% of tumor cells; 4+: staining of more than 75% of tumor cells.