

Table S3. Demographic information of the four patient cohorts, related to Figure 6.

Variables		Cohort#1	Cohort#2	Cohort#3	Cohort#4
		Yale University n=278 n (%)	UNAV University n=18 n (%)	Fujian Medical University n=56 n (%)	Yale University n=21 n (%)
Age	≥60	205 (73.7)	9 (50)	32 (57.1)	14 (66.7)
	<60	73 (26.3)	9 (50)	24 (42.9)	7 (33.3)
Sex	Male	123 (44.2)	14 (77.8)	39 (69.6)	13 (61.9)
	Female	155 (55.8)	4 (22.2)	17 (30.4)	8 (38.1)
Smoking	Yes	214 (77.0)	15 (83.3)	41 (73.2)	N/A
	No	43 (15.5)	2 (11.1)	15 (26.8)	N/A
	Unknown	21 (7.5)	1 (5.6)	0 (0)	N/A
Stage	I-IIIa	247 (88.8)	0 (0)	8 (14.3)	0 (0)
	IIIb-IV	31 (11.2)	18 (100)	34 (60.7)	21 (100)
Histology	ADC	147 (52.9)	14 (77.8)	22 (39.3)	NA
	SCC	71 (25.5)	4 (22.2)	11 (19.6)	NA
	Others	60 (21.6)	0 (0)	23 (41.1)	NA
	Melanoma	NA	NA	NA	21 (100)
Previous systemic therapies	0	238 (85.6)	0 (0)	29 (51.8)	1 (4.8)
	1	21 (7.5)	16 (88.9)	24 (42.9)	15 (71.4)
	≥2	19 (6.8)	4 (22.2)	3 (5.4)	5 (23.8)

Table S4. Summary of clinical response of the cohort#2 and #4 patients to anti-PD therapy, related to Figure 6.

Variables	Cohort#2 UNAV University n=18	Cohort#4 Yale University n=21
Median Follow-up, months	8	15
Treatment-n (%)		
Nivolumab	20 (69)	15 (71.4)
Pembrolizumab	9 (31)	6 (28.6)
Best overall response		
Complete Response	0	3 (14.3)
Partial Response	11 (57.9)	5 (23.8)
Stable Disease	1 (5.3)	1 (4.8)
Progressive Disease	7 (36.8)	12 (57.1)
Progression-free survival		
Median	10	5
Range	0-39	2.4-7.6