

Supplementary Table 1: Demographic characteristics of patients

Patients (n=43)	
Age (years)	58.9 (34-76)
Sex	
Men	27 (62.8%)
Women	16 (37.2%)
Types of tumor	
Melanoma	11 (25.6%)
Rhinopharyngeal neoplasm	2 (4.7%)
Esophageal neoplasm	3 (7.0%)
lung neoplasm	4 (9.3%)
Thymic carcinoma	1 (2.3%)
Cardiac cancer	1 (2.3%)
Cholangiocarcinoma	11 (25.6%)
Gallbladder cancer	7 (16.2%)
Colon neoplasm	2 (4.7%)
Metastatic adenocarcinoma	1 (2.3%)
ECOG performance status	
0	29 (67.4%)
1	14 (32.6%)
Previous chemotherapy	
Platinum	20 (46.5%)
Paclitaxel	11 (25.6%)
Dacarbazine	5 (11.6%)
Temozolomide	1 (2.3%)
Fluorouracil	4 (9.3%)
Gemcitabine	3 (7.0%)
Raltitrexed	2 (4.7%)
Tegafur	6 (14.0%)
Vindesine	1 (2.3%)
Pemetrexed	3 (7.0%)
Irinotecan	3 (7.0%)
Tumor resection	
Yes	27 (62.8%)
No	16 (37.2%)
Metastasis	43 (100%)

Supplementary Table 2: Mass cytometry antibody panel information.

Metal	Target	Clone
151Eu	CD2	TS1/8
143Nd	CD5	UCHT2
147Sm	CD7	CD7-6B7
171Yb	CD9	SN4 C3-3A2
160Gd	CD28	CD28.2
141Pr	CD49d	9F10
164Dy	CD161	HP-3G10
158Gd	CCR4	205410
144Nd	CCR5	NP-6G4
156Gd	CXCR3	G025H7
142Nd	CD11a	HI111
145Nd	CD4	RPA-T4
146Nd	CD8a	RPA-T8
148Nd	CD16	3G8
149Sm	CD25	2A3
154Sm	CD45	HI30
159Tb	CCR7	G043H7
162Dy	CD69	FN50
165Ho	CD45RO	CD45RO
166Er	CD44	BJ18
167Er	CD27	O323
169Tm	CD45RA	HI100
170Er	CD3	UCHT1
172Yb	CD57	HCD57
174Yb	HLA-DR	L243
176Yb	CD127	A019D5
150Nd	CD134 (OX40)	ACT35
152Sm	CD95 (Fas)	DX2
153Eu	CD366 (Tim-3)	F38-2E2
155Gd	CD279 (PD-1)	EH12.2H7
161Dy	CD152 (CTLA-4)	14D3
168Er	CD278 (ICOS)	C398.4A
173Yb	CD137 (4-1BB)	4B4-1
175Lu	CD223 (LAG3)	11C3C65
	Live/dead marker	
194/195Pt	Cisplatin	

Supplementary Figures Legends:

Supplementary Figure 1. Dynamic changes of the percentages of other sixteen cell populations in two melanoma patients are presented by a line diagram before and after anti-PD-1 therapy.

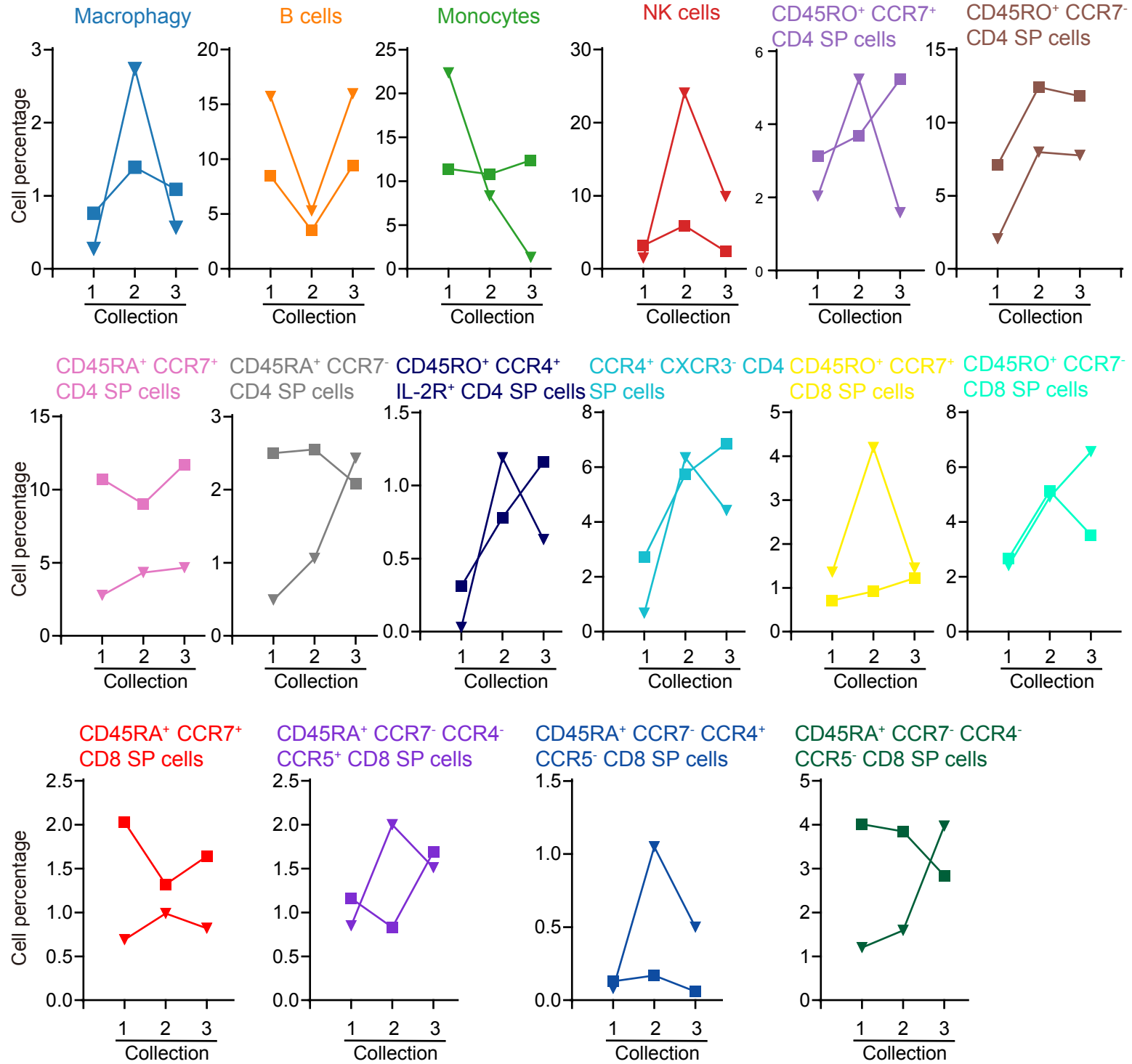
Supplementary Figure 2. The experimental information of patient samples, including patient ID, tumor type, response to anti-PD-1 treatment and collection points.

Supplementary Figure 3. (a) The expression of serum CXCL9 in response patients and non-response patients was tested by ELISA. (b) The expression of serum CXCL10 in response patients and non-response patients was tested by ELISA. (mean \pm s.e.m.), * $P < 0.05$ by Student's t-tests.

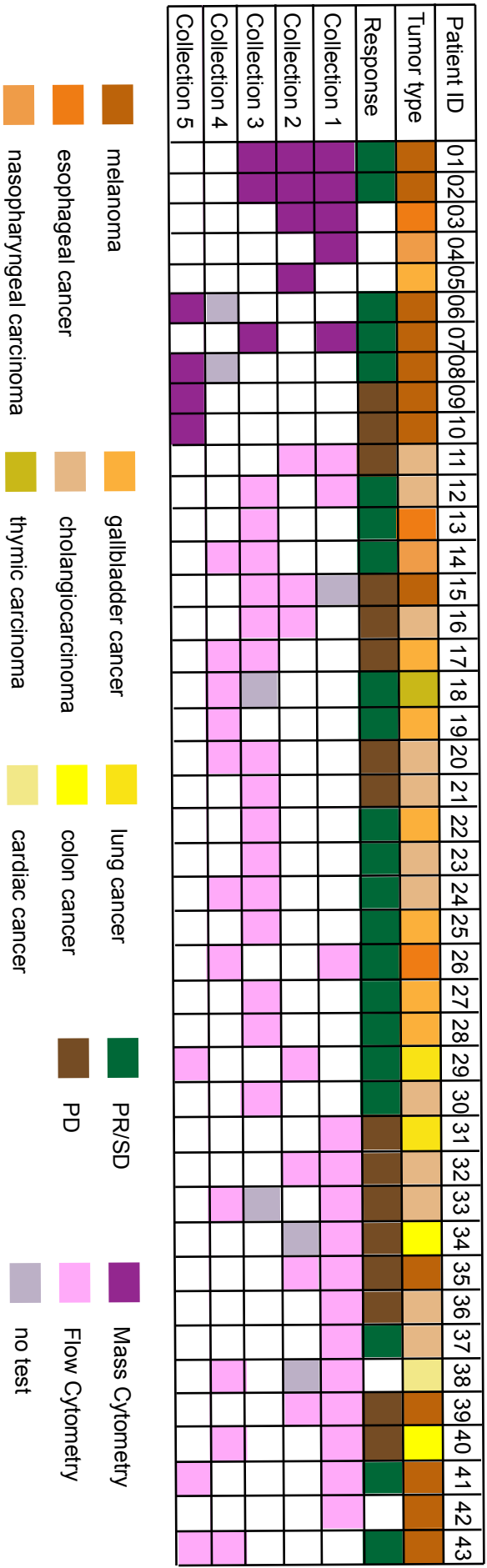
Supplementary Figure 4. The mRNA expressions of CXCL9/10 in the tumor tissues of mice model were detected by QPCR. (mean \pm s.e.m.; $n = 4$). *** $P < 0.001$ and **** $P < 0.0001$ by Student's t-tests.

Supplementary Figure 5. Tumor volumes in the treatment and control groups (6 mice in each group) were observed for 21 days and presented in a line chart. (mean \pm s.e.m.), * $P < 0.05$, NS non-significant by Student's t-tests, comparisons between indicated groups on day 21.

Supplementary Figure 1

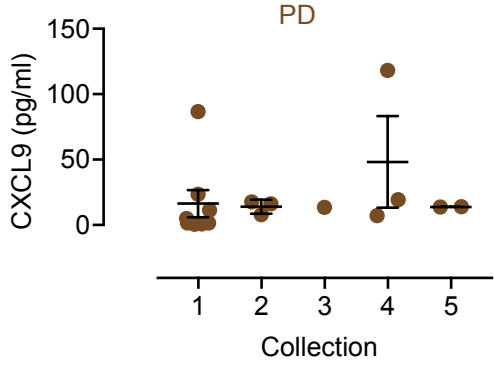
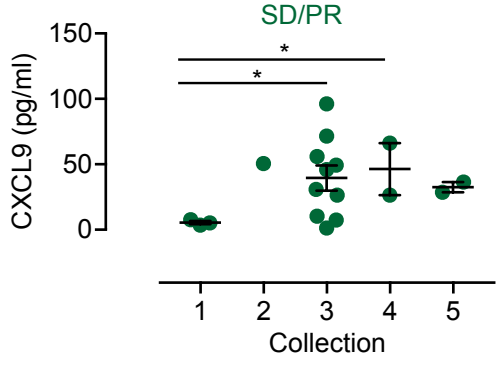
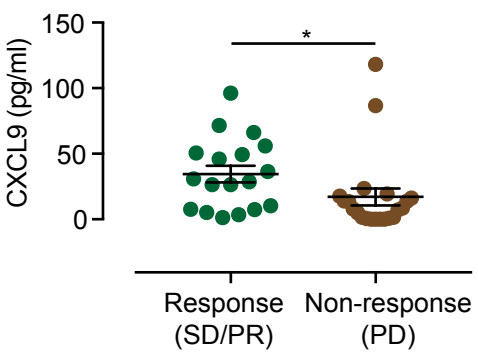


Supplementary Figure 2

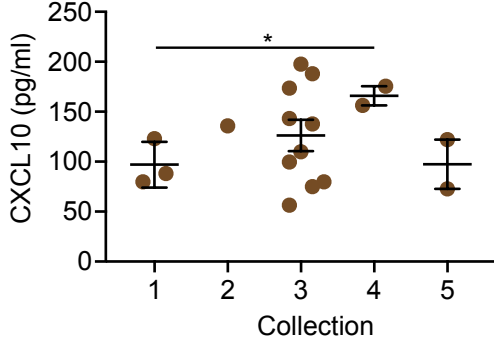
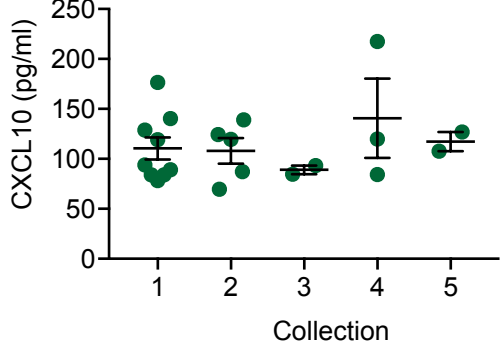
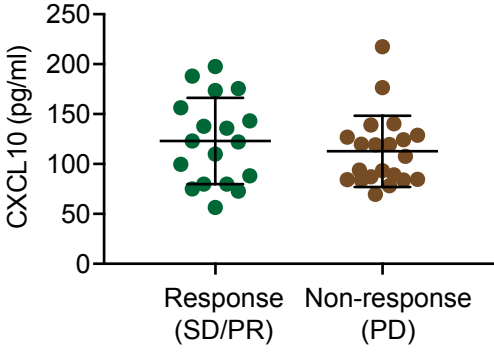


Supplementary Figure 3

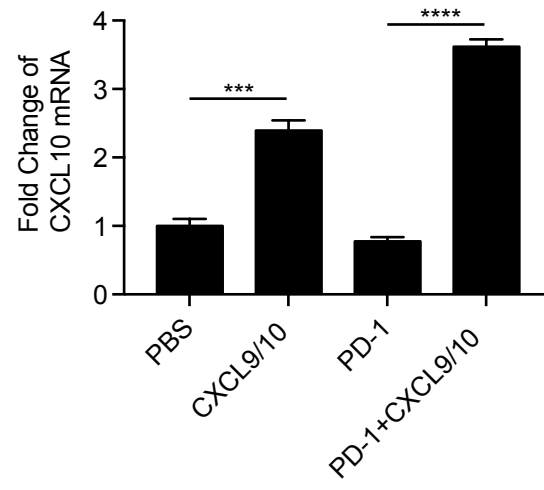
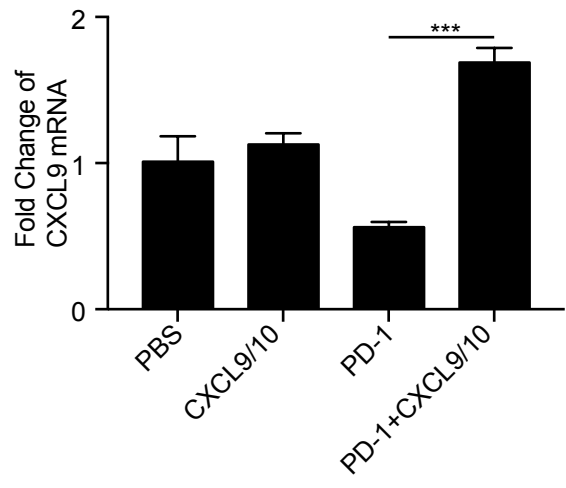
a



b



Supplementary Figure 4



Supplementary Figure 5

