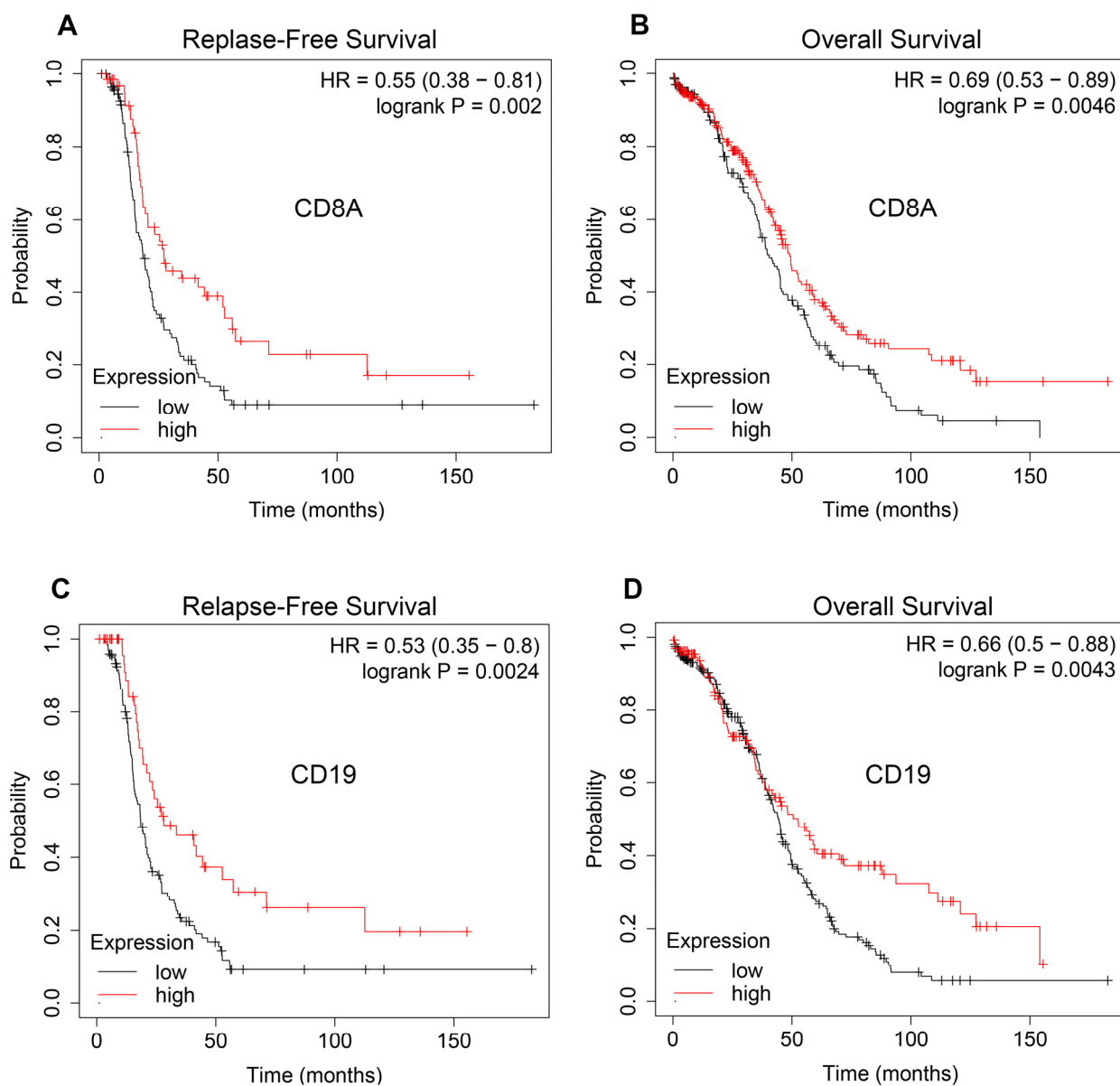**Supplementary Figure 1. B cell depletion led to impaired activation and function of both CD8+T cells and CD4+T cells.**
(A) The expression of CD69, IFN-γ and CD107a in the CD8+ T cell population and **(B)** CD4+ T cell populations was analyzed by flow cytometry on day 15 after treatment initiation, n=6 mice.

Supplementary Figure 2. Prognostic value of CD8A and CD19 expression in human ovarian cancer. Patient samples were classified as high expression (red) or low expression (black) to assess relapse-free survival (**A&C**) and overall survival (**B&D**). Data was analyzed using Kaplan Meier Plotter (www.kmplot.com).
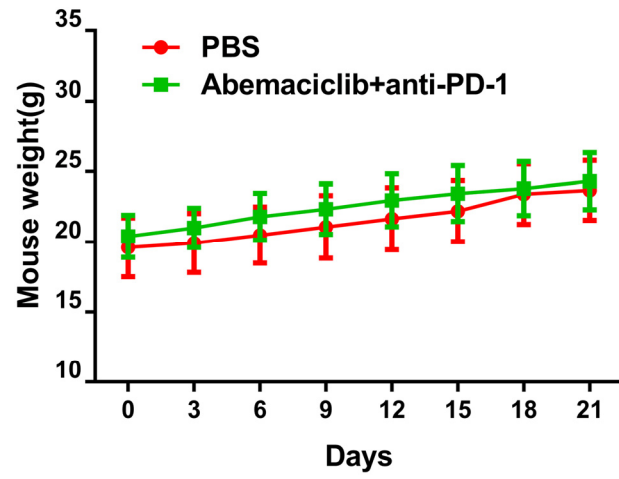
Supplementary Figure 3. Measurements of mouse weight over time. C57 mouse were administered with PBS or abemaciclib plus anti-PD-1 antibody for a totally period of 21 days, mouse weight were recorded every 3 days.

Supplementary Table1. Analysis of variance for fixed effects

	Df	Mean sq	F value	Pr > F
Abma	1	6180067	98.160	5.87e-15
α-PD-1	1	30168	0.479	0.49109
Time	1	17811251	282.901	< 2e-16
Abema: α-PD-1	1	1429253	22.701	9.93e-06
Abma: Time	1	3292515	52.296	4.72e-10
α-PD-1: Time	1	691313	10.980	0.00146
Abema: α-PD-1: Time	1	524828	8.336	0.00517

Bioluminescence quantification data were analyzed in a 2×2 arrangement for factorial analysis.

Supplementary Table 2. Measurement of serological parameters after treatment

Treatment	RBC (×10^6/μL)	WBC (×10^3/μL)	ALT (u/L)	AST (u/L)	LDH (u/L)	BUN (mg/L)	Cr (mg/L)
PBS	5.9±0.2	11±1.8	24±6.7	91±13.5	683±187.2	8.1±2.6	42±0.6
Abemaciclib +anti-PD-1	5.4±0.3	13±3.2	25±11.2	86±16.4	659±154.1	8.7±3.2	43±0.9

Serological parameters of C57 mice were analyzed 21 days after PBS or abemaciclib +anti-PD-1 treatment. RBC: red blood cell; WBC: white blood cell; ALT: alanine aminotransferase; AST: aspartate aminotransferase; LDH: lactate dehydrogenase; BUN: blood urea nitrogen; CR: creatinine.