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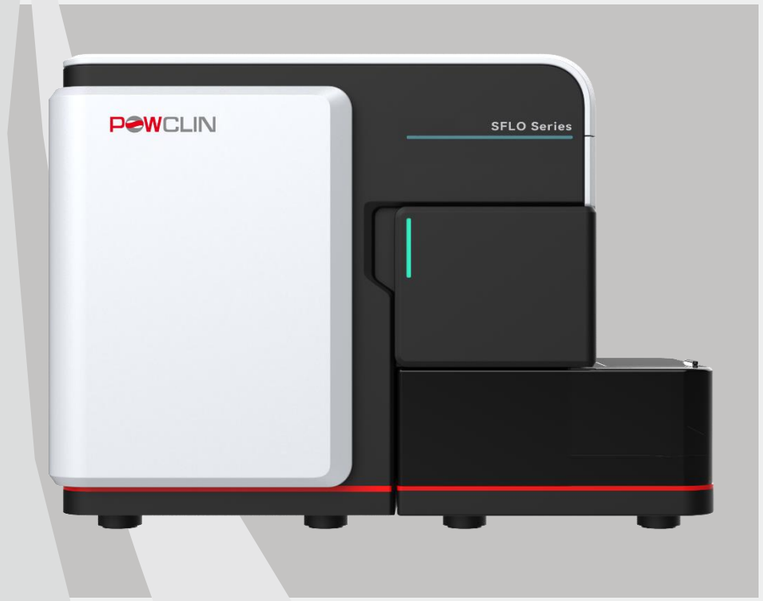
SFLO Series

Full Spectral Flow Cytometer



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SFLO Series

Full Spectral Flow Cytometers

SFLO Series full spectral flow cytometers are equipped with advanced technologies such as achromatic shaping optical path, simultaneous acquisition of full spectrum, high-speed acquisition of array sensors and a powerful flow analysis workstation.

Up to 5 lasers can be configured to SFLO, providing researchers with 64 fluorescence channels and 40 colors for multi-parameter analysis.

High-precision syringe pump sampling and pulsation-free sheath flow system make the SFLO analysis more stable.

The full-spectrum acquisition system cooperating with efficient software algorithms, fundamentally avoid compensation problems caused by overlapping fluorescence spectra.

Spectral technology, easy-to-use software, and automation across the workflow make the SFLO a user-friendly, high-performance flow cytometer that will bring research to the next level.

More parameter options

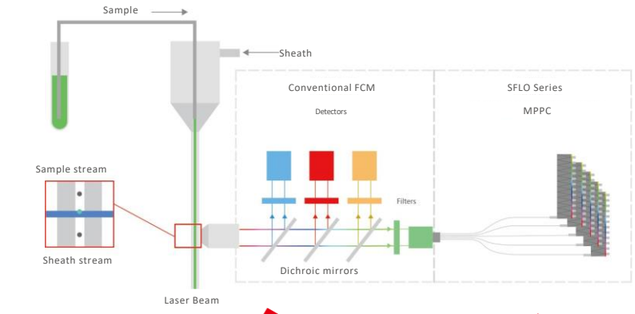
More accurate results

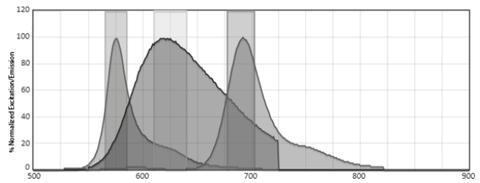
More convenient operation

SFLO Series Full Spectral Flow Cytometers

Technology

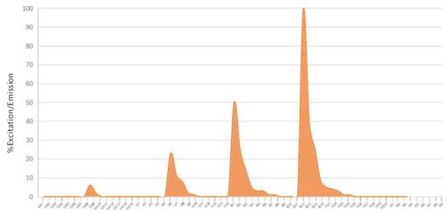
- Each fluorochrome will produce a characteristic emission spectrum under the excitation of the corresponding laser.
- Different from the conventional flow cytometer using dichroic mirrors and filters to split light, SFLO full spectral flow technology is based on advanced CWDM design, which divides all the signals of fluorochrome into several narrow wavelength ranges of light. Using MPPCs as detectors to obtain the complete characteristic emission spectrum of each fluorochrome, so as to distinguish different fluorochromes.





Receive spectral peak signal

Full Spectrum

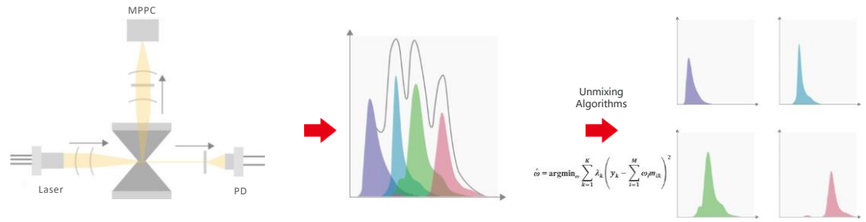


Receive full spectrum signal

- Complex compensation
- Limited channels
- Poor fluorochromes selection

- No compensation, software unmixing
- Unlimited channels, auto-fluorescence subtraction
- Flexible fluorochromes selection

- The collected optical signal is converted into an electronic signal. Then spectral analysis will be performed based on the reference spectrum in the spectral library, so as to obtain the corresponding fluorescence intensity of each fluorochrome.



Schematic diagram of SFLO full spectrum unmixing

Technical Parameters

Optical System	High reliable fixed achromatic optical path	
Laser Configuration	SFLO 2：488 nm、635 nm（24 channels）	
	SFLO 3：488 nm、635 nm、405 nm（39 channels）	
	SFLO 4：488 nm、635 nm、405 nm、561 nm （49 channels）	
	SFLO 5：488 nm、635 nm、405 nm、561 nm、355 nm（64 channels） (under development)	
Instrument Performance	Fluorescence Precision	CV < 3.0%
	Data Acquisition Rate	35,000 events/s
	Carryover	<0.1%
	Signal Processing	A fully digital system with 7-digit decimal data display
	Fluorescence sensitivity	FITC≤30MESF，PE≤10MESF

High stability automatic temperature control laser

Excellent full spectrum detection system

Innovative achromatic shaping optical path

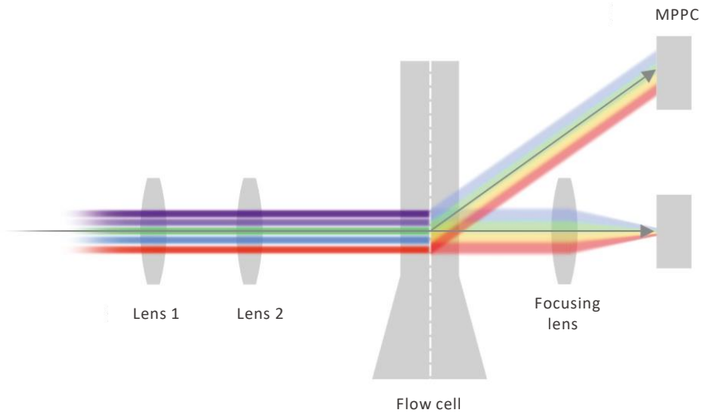
Efficient automatic sampling system

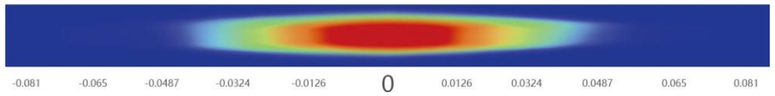
Sample Acquisition

- High-precision pump sample loading system
  Accurately calculates the sample volume
  Free microsphere absolute count
- Powerful backwashing function
  No residue, no dead volume, low carryover
- The detection speed can reach 35,000 events/s
  The whole process of sample loading-cleaning-detection can be completed within 30s
- Optional sample loader
  Suitable for sample analysis in tubes, 96-well and 384-well plates

Optics

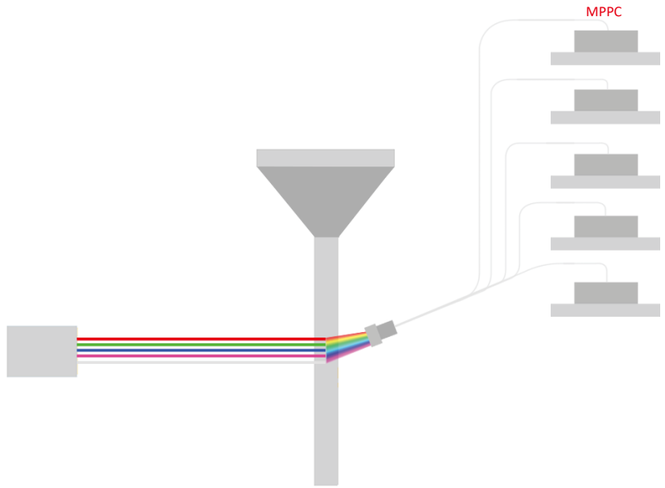
- By using 2 cylindrical lenses to achieve laser spot shaping, SFLO can reduce the laser energy loss and maximize excitation light efficiency, so as to improve the detection sensitivity.





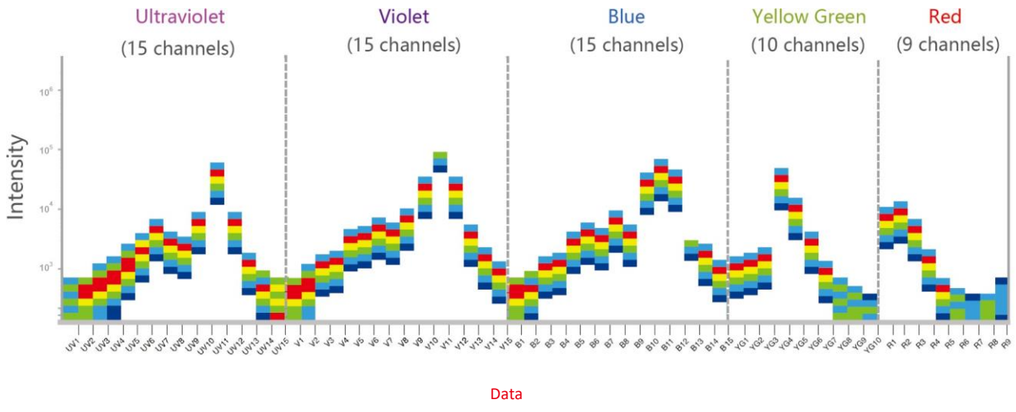
Full Spectrum Detection System

- SFLO technology is based on wide wavelength division multiplexing (CWDM) design for full-spectrum identification, no need to replace filters, which is widely compatible with various applications.
- SFLO innovatively uses the MPPC detector to replace the traditional photomultiplier tube detector (PMT) to improve the groupi ng effect of weakly expressed markers.



Schematic diagram of SFLO full spectrum collection

- Excellent single photon counting capability
- High sensitivity, fast response
- Anti-magnetic field interference, low crosstalk, low back noise
- Ultra-wide response range: from ultraviolet to infrared (375-840nm)



Features

Effective & Flexible

- High stability syringe pump sampling system, fast detection speed, strong focus stability, no dead volume, no residue.
- Suitable for sample analysis in tubes, 96-well and 384-well plates.

Robust & Well-Configured

- Highly stable lasers are configured with automatic temperature control TEC chip so as to obtain good directivity and strong coherence
- Up to 5 lasers and 64 fluorescent channels to meet various research and applications

Reliable & Great Performance

- Innovative achromatic optical path design, no optical adjustment
- MPPC has excellent single-photon counting ability, anti-magnetic field interference ability and low crosstalk as well as wide response range.

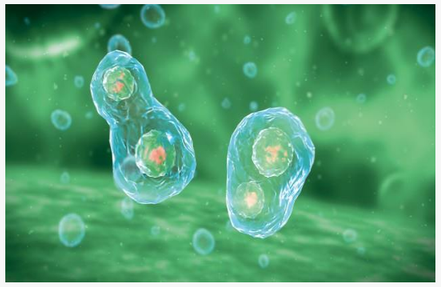
Easy to use and install

- Chinese and English bilingual operating software, built-in spectral library, no compensation, auto-fluorescence subtraction
- Smaller size, Simpler installation

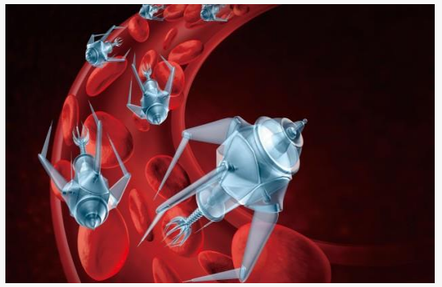
Application

Comprehensive and Scientific Analysis Solutions for Global Users

Cell & Biology



Drug

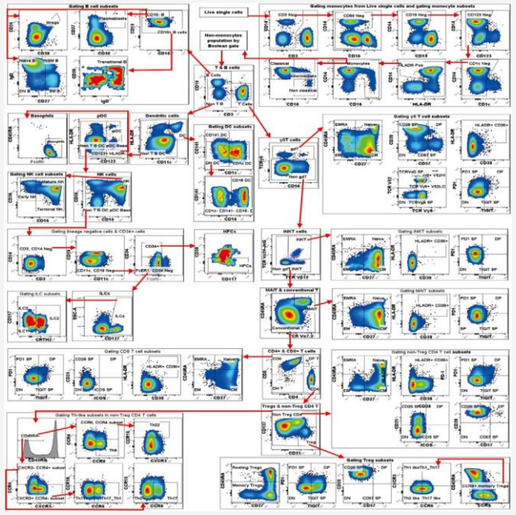


Medical

Tumor Immunology

Cell &Biology Example

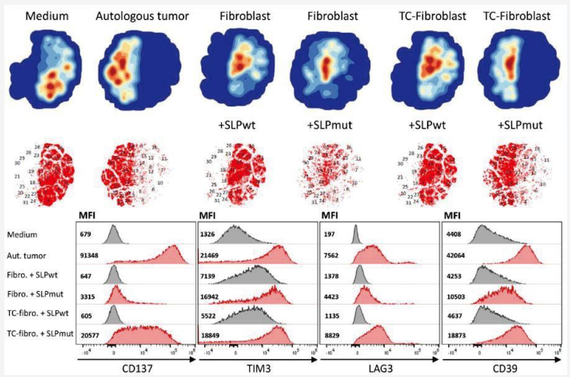
Develop a 43-color panel for the characterization of conventional and unconventional T cell subsets, B cells, NK cells, monocytes, dendritic cells, and innate lymphocytes using full spectral flow cytometry.



- The Panel covers most of the immune subpopulations of the peripheral immune system, which is helpful for a comprehensive understanding of the immune system, especially when the sample volume obtained from the patient is small.

Sahir F , Mateo J M , Steinhoff M , et al. Development of a 43 color panel for the characterization of conventional and unconventional T cell subsets, B cells, NK cells, monocytes, dendritic cells, and innate lymphoid cells using spectral flow cytometry[J]. Cytometry Part A.

Cancer-associated fibroblasts (CAFs) are the most prominent cell type in the TME of various malignancies, and their abundance is inversely proportional to patient survival. Whether CAFs in human cancers can directly affect CD8+ tumor-specific T cell function through tumor-exogenous antigen presentation on MHC-I remains unclear.

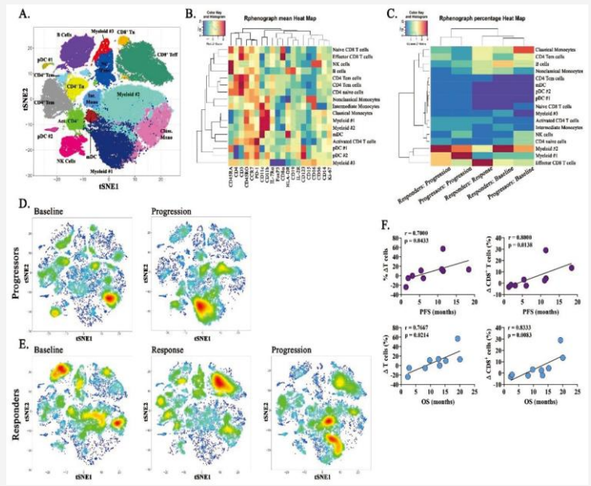


- Interactions between CD8+ T cells and cross-presented CAFs suppressed T cell function, as demonstrated by decreased cytotoxicity, decreased expression of activation markers (CD137), and increased expression of exhaustion markers (TIM3, LAG3, and CD39).

Tom J H, Marten V, Linda B et al. Enhanced antigen cross-presentation in human colorectal cancer-associated fibroblasts through upregulation of the lysosomal protease cathepsin S[J]. J Immunother Cancer. 2022 Mar;10(3):e003591.

Drug-associated Example

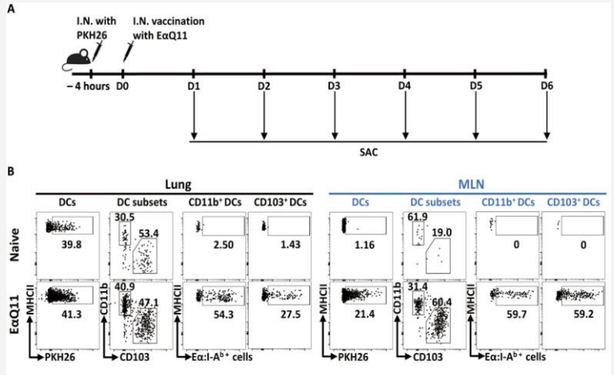
Combining Cetuximab and Ficlatuzumab to treat patients with refractory/relapsed head and neck squamous cell carcinoma (HNSCC), and evaluate the changes of immunophenotype before and after treatment.



- Increases in CD8+ T cell subsets in the peripheral blood are associated with treatment response, whereas expansion of a population of myeloid cells is associated with disease progression. The increase of peripheral CD8+ T cells in the treatment responders indicated that the combination regimen has potential immunomodulatory activity, which has important guiding significance for clinical medication.

Bauman J E, Ohr J, Gooding W E et al. Phase I Study of Ficlatuzumab and Cetuximab in Cetuximab-Resistant, Recurrent/Metastatic Head and Neck Cancer[J]. Cancers (Basel), 2020, 12: undefined.

Self-assembling peptide nanofiber vaccines may represent a novel, needle-free and adjuvant-free approach to elicit protective immunity against fungal and bacterial infections at skin and mucosal barrier surfaces, using full spectral flow cytometry to study nanoparticle vaccine immunity underlying mechanism of origin.

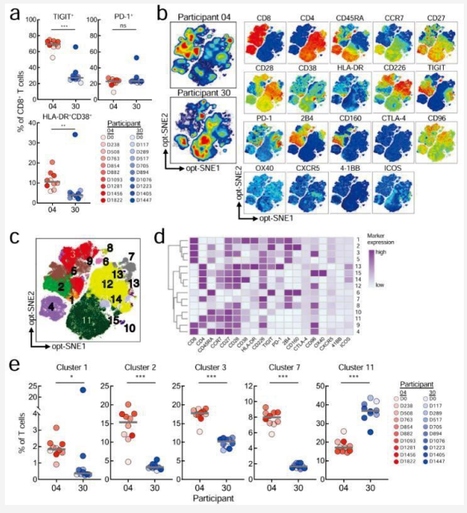


- Intranasal vaccination with EαQ11 triggered uptake and presentation of pEα on lung CD103+ and CD11b+ DCs, upregulation of CD80, and migration to draining lymph nodes.

Si Y, Tian Q, Zhao F et al. Adjuvant-free nanofiber vaccine induces in situ lung dendritic cell activationand T17 responses[J]. Sci Adv, 2020, 6: eaba0995.

Medical-associated Example

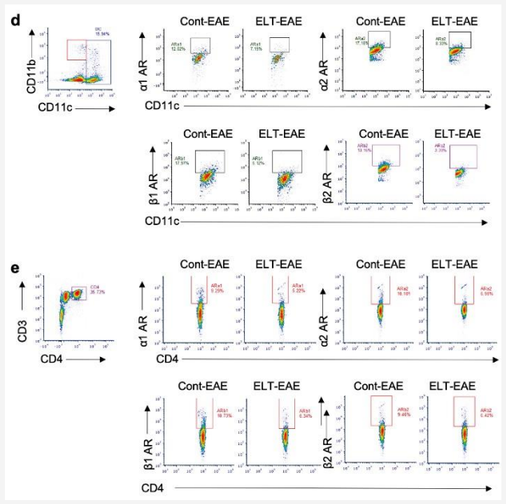
Using full-spectrum flow cytometry, the distinct mechanisms of long-term viral control in two subjects in the placebo arm of a randomized controlled therapeutic vaccine trial were investigated.



- Through opt-SNE and FlowSOM analysis, it was found that the T cell phenotype characteristics of the two subjects were significantly different, and the CD8+ T cells of the two subjects showed completely different surface receptors at different monitoring time points and intracellular factor expression patterns.

Jana B, Feng G, Manukumar H M et al. Distinct mechanisms of long-term virologic control in two HIV-infected individuals after treatment interruption of anti-retroviral therapy[J]. Nat Med. 2021 Nov;27(11):1893-1898.

Exposure to early life trauma (ELT) is associated with higher relapse rates in patients with multiple sclerosis, mechanistic studies using C57BL/6J mice and an experimental autoimmune encephalitis (EAE) model.

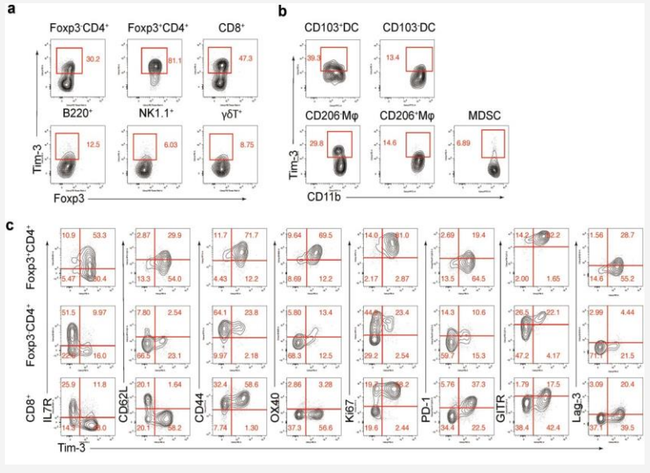


- ELT-mediated phenotypic changes in EAE may result from dysregulation of immunosuppressive β1-AR signaling in innate immune cells through chronic SNS overactivation, and MLT, LTβR, and CXCR2 are potential common biomarkers of IFN-β resistance in EAE and MS.

Yee M K, Danish M, Sungjong O et al. Early-life-trauma triggers interferon-β resistance and neurodegeneration in a multiple sclerosis model via downregulated β1-adrenergic signaling[J]. Nat Commun, 2021; 12: 105.

Tumor Immunology Example

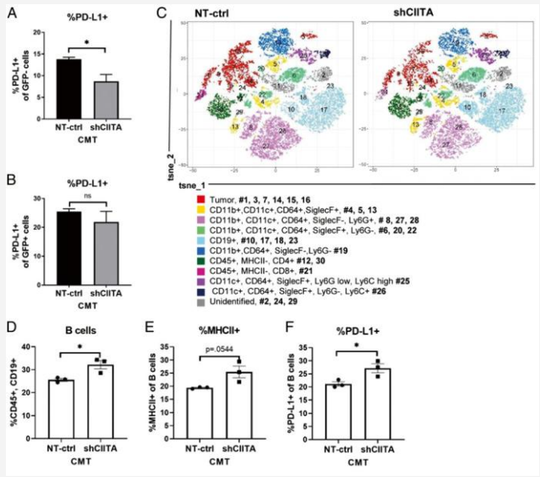
Immune checkpoint blockade (ICB) immunotherapy prolongs overall survival in cancer patients, but response rates are low. Resistance to ICB may be due to compensatory upregulation of additional immunosuppressive molecules.



- Tim-3 expression in the TME was upregulated in the majority of Treg, CD4, CD8 T cells, M1, DC1 and a small percentage of B cells, NK cells, γδ T cells, M2 and MDSC.

Yang M, Du W, Yi L et al. Checkpoint molecules coordinately restrain hyperactivated effector T cells in the tumor microenvironment[J]. Oncoimmunology, 2020, 9: 1708064.

The effect of lung cancer cell-specific MHCII (csMHCII) expression on tumor T cell recruitment and response to anti-PD-1 therapy was examined using two in situ immunocompetent mouse models of non-small cell lung cancer.



- Loss of CIITA in CMT167 decreased csMHCII and transformed tumors from anti-PD-1 sensitive to anti-PD-1 resistant, and overexpression of CIITA in LLC cells resulted in csMHCII expression in vitro and in vivo, increasing T cell infiltration.

Johnson A M, Bullock B L, Neuwelt A J et al. Cancer Cell-Intrinsic Expression of MHC Class II Regulates the Immune Microenvironment and Response to Anti-PD-1 Therapy in Lung Adenocarcinoma[J]. J Immunol, 2020, 204: 2295-2307.