# Medicilon Flow Cytometry Technology Platform

Flow Cytometry is a modern multi-parameter cell analysis technology that can detect single particles at high speed, accurately and objectively. At present, in the early stage of drug development, especially for anti-tumor drugs, complex cell analysis through flow multicolor detection technology can provide scientific researchers with maximum effective data.

Up to now, Medicilon has undertaken nearly **400** flow cytometry detection projects, including detection of cell surface antigen expression, analysis of cell proliferation/ differentiation/apoptosis, detection of animal PBMCs/ immune organs, analysis of xenograft model, etc. Medicilon flow cytometry detection team combines the characteristics of each case with years of practical experience and technical accumulation. They deliver high-quality experimental results to clients to help customers' R&D projects get approved.
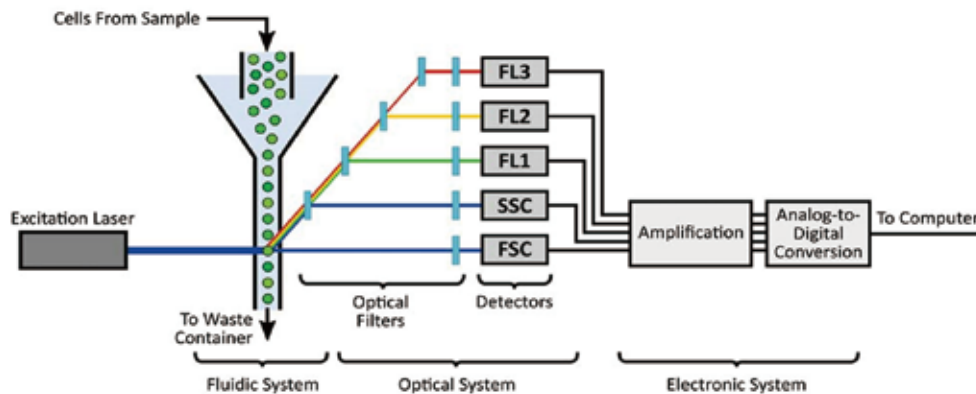
Flow Cytometry in Drug Discovery

Flow cytometry has been utilized at each stage of the drug discovery process, from target identification to lead development. Valid drug targets in cells encompass almost the entire plethora of biomolecular structures available: the cell membrane, any protein involved in mechanistic function or signaling, DNA down to the level of the gene, and other smaller molecules such as mRNA. Characterization of large and varied cell populations in a high throughput manner is useful in initial target identification, allowing dysfunctional cells to be separated for deeper analysis by other techniques. This process can be further optimized by tagging molecular features with the cell suspected to be involved in disease with fluorescent probes, and in this way, structural features of the cell such as the abundance of a particular protein or the integrity of the cell membrane can be quickly assessed. Following target identification and the generation of a drug lead the efficacy and toxicity of the drug can be investigated by flow cytometry.

Flow Cytometry in Immunology

Flow cytometry has been conventionally associated with the use of monoclonal antibodies to identify immuno-competent cells, to quantify changes in expression of surface determinants, and to separate cell population subsets before testing their functional characteristics. Multi-laser system, developments of multicolor fluorescence, and improvements of computing systems for multi-parametric analysis helps in the improvement of diagnosis, prognosis, and monitoring therapies given. Advances in flow cytometry now allow for automated, multiparametric analyses of hundreds of samples in a day. Along with improving computer speeds and storage capabilities, flow cytometry could facilitate the field of immunological research.

Advantages of Flow Cytometry Technology

In the innovative research of combination of therapeutic targets and drugs, it could help researchers to show the differences in biological effects between different individuals in the preliminary work of drug development, so as to further clarify the mechanism of effectiveness; To help researchers perform high-throughput and robust quantitative analysis of the tumor's "microenvironment", peripheral blood and the immune system in other host tissues, to achieve the goal of more clearly predicting the efficacy of immunotherapy, and to help the large-scale immunotherapy methods development.

Medicilon Flow Cytometry Technology Platform

Medicilon's streaming technology platform is committed to exploring and insight into the progress of tumor immune targeted therapy drugs, and providing accurate and reliable test prediction data in the early development stage. Our team has rich experience in experimental operation, streaming method development and data analysis, and every scientists could be independently responsible for the project. The platform is equipped with 4 powerful flow cytometers of BD brand. The newly introduced high-parameter BD FACSymphony A5 flow cytometer is equipped with five lasers and 31 parameters, which can enable up to 29 colors at the same time to meet clients' scientific research and analysis needs.

Service List

- Development Methodolgy and Sample Testing

  Has experience in the development and sample detection of flow cytometry methods for mouse, rat, dog, monkey and other species, as well as animal models of immunodeficiency, genetic modification, and humanization. Medicilon also has experience in processing various samples of peripheral blood, spleen, lymph node, bone marrow, tumor, liver, lung and others.

- Cellular Immunophenotype Analysis

  Established a basic analysis program (T, B, NK cells) to a complex detection analysis program (regulatory T cells, myeloid cell analysis, stem cell differentiation, etc.), involving cell surface proteins, intracellular/nuclear proteins detection (Transcription factors / Chemokines / Cytokines, etc.), which can meet the needs of clients for detection and analysis.

- Multi-Cytokine Detection

  Provides high-parameter cytokine detection services using ELISA, Luminex, MSD, EliSpot, FluoroSpot, flow CBA suspension chip technology. Only a small amount of sample is required for each test, with strong test specificity, good stability and high repeatability.

- Antibody Drug Receptor Occupancy Rate (RO) Project

  Since 2017, a number of clinical/preclinical RO tests have been completed, involving the detection of many different targets such as PD-1, CD20, CD47, TIGI, etc.

- Bioanalysis of Cell Therapy Drugs and Gene Modification Drugs

  Including stem cells, CAR-T cells, CAR-NK cells and other cell therapy products.

Assay	Cell	Medicilon capability (Human/Mouse/Rat/Monkey/Dog)
FACS	T cell / Treg	Yes (Human/Mouse/Rat/Monkey/Dog)
	B cell	Yes (Human/Mouse/Rat/Monkey/Dog)
	NK cell	Yes (Human/Mouse/Rat/Monkey)
	Macrophage / Monocyte / Neutrophil	Yes (Human/Mouse/Monkey)
	DC cell	Yes (Human/Mouse/Monkey)
	MDSC	Yes (Human/Mouse/Monkey)
	Checkpoint	Yes (Human/Mouse)
	Receptor Occupancy	Yes (Human/Mouse/Monkey)
	Phosphorylation	Yes (Human/Mouse)
Cytokine	Elisa	Yes (Human/Mouse/Rat/Monkey)
	CBA	Yes (Human/Mouse/Rat/Monkey)
	Luminex	Yes (Human/Mouse/Rat/Monkey)
	MSD	Yes (Human/Mouse/Rat/Monkey)
	ELISpot / FluoroSpot	Yes (Human/Mouse/Monkey)
Cell differentiation / polarization	T/M1/M2 macrophage	Yes (Human)
Cell cytotoxicity	ADCC, ADCP	Yes (Human)

To be continue

Medicilon FACS Assay Equipment

Different blood and tissue samples could be detected by BD Symphony A3/Fortessa/Celesta for 50+ Validated Panels (Up to 29 markers)

BD FACSCelesta (3 Lasers, 12 Channels)   BD Symphony A3 (5 Lasers, 29 Channels)   BD LSRFortessa (5 Lasers, 18 Channels)

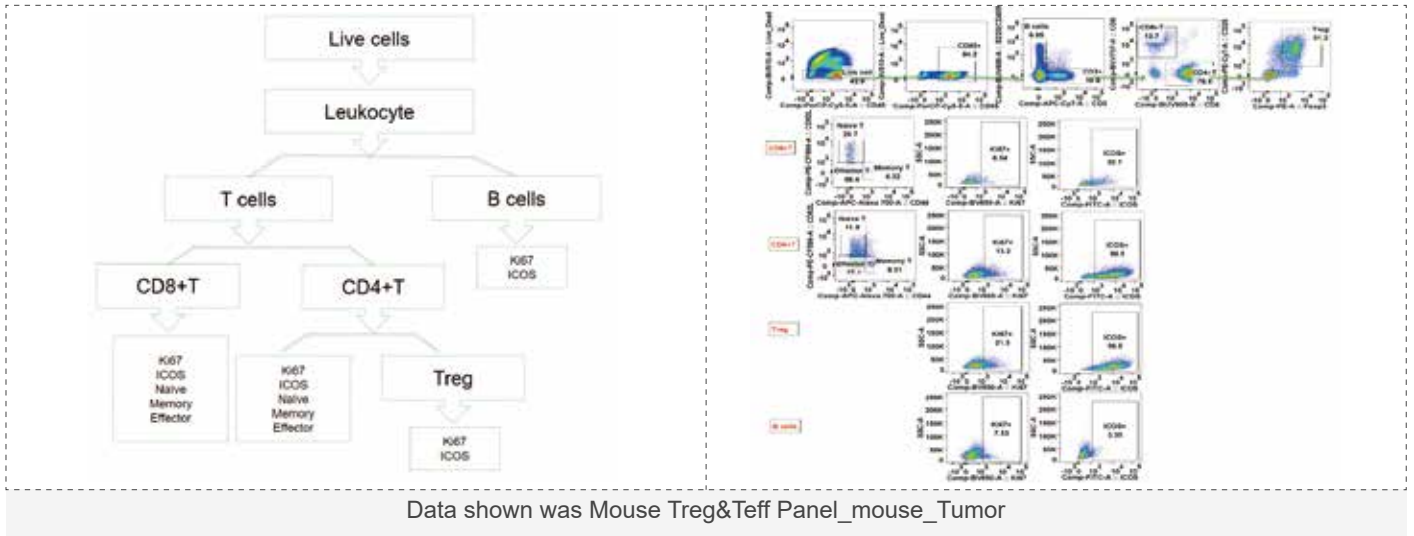1   With **5** lasers, **29** channels configuration

2   Utilize the total reflection optical path structure design to avoid the loss of optical signal in the transmission process, improve the sensitivity of analysis, and be able to identify and analyze rare cell types and conditions.

3   The most advanced revolutionary streaming product,which could acquire and analyze the big data of the immue system and provide a platform for exploring unknown immunoomics.

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Medicilon Case: FACS Assay

Blood/Lymph Node/Spleen/Bone Marrow/Tumor… samples could be analysed with FLOWJO for 50+ Validated Panels after FCM processed and detected.
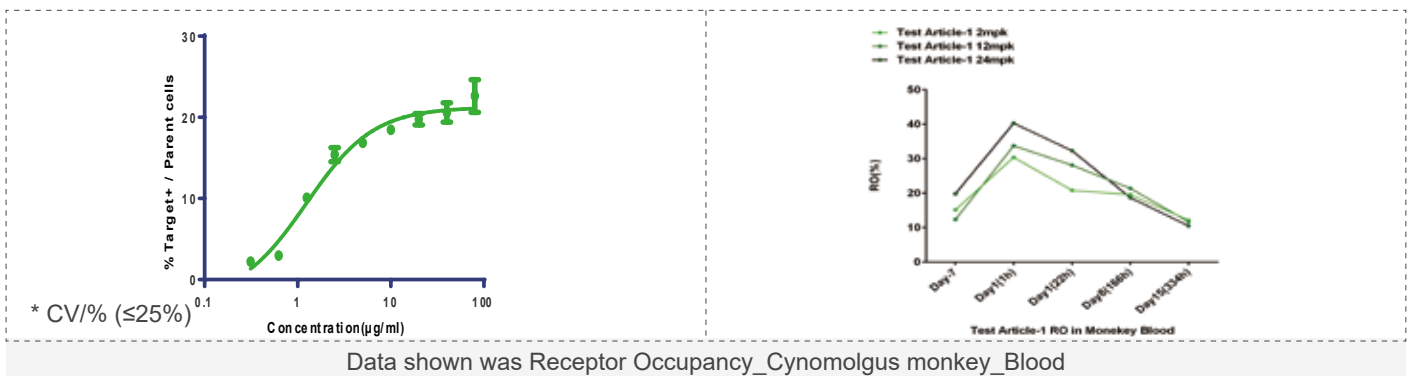

Data shown was Mouse Treg&Teff Panel_mouse_Tumor

Blood/Lymph Node/Spleen/Bone Marrow/Tumor… samples could be analysed with FLOWJO for 50+ Validated Panels after FCM processed and detected.

Data shown was Cyno T/B/NK Panel_monkey_Blood
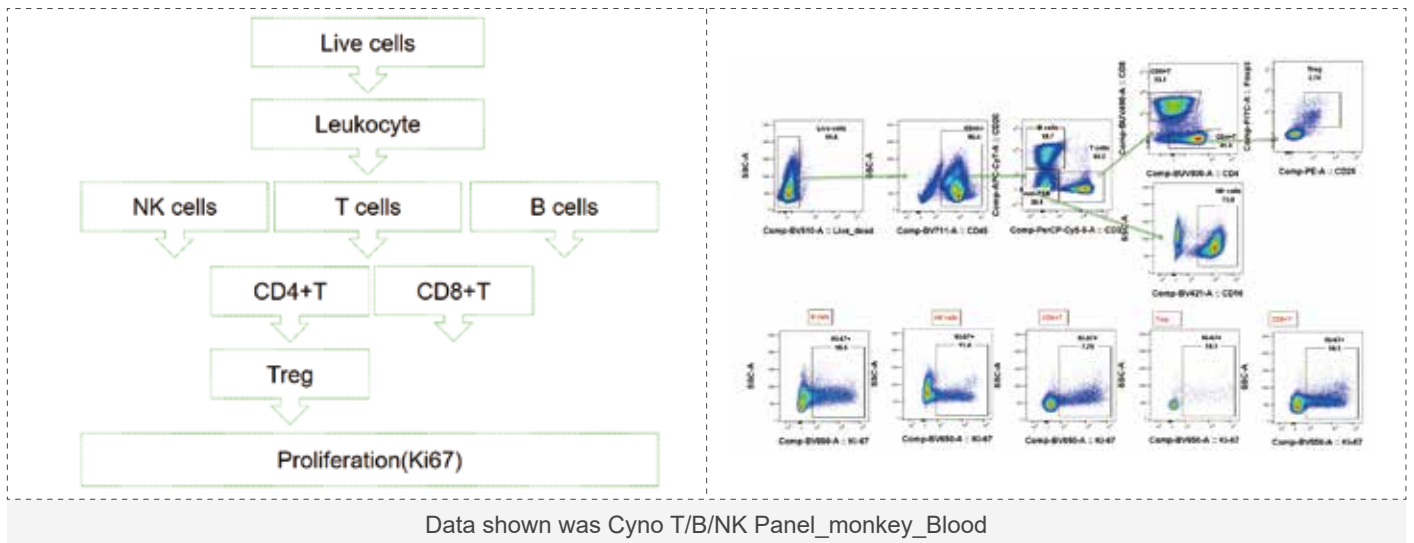
Blood samples could be analysed with FLOWJO after FCM processed and detected.

* CV/% (≤25%)

Data shown was Receptor Occupancy_Cynomolgus monkey_Blood

Medicilon Cytokine Analysis Equipment

Different serum/plasma and tissue samples could be analysed after cytokine processed and detected by Covaris E220R/BIO-RAD Bio-Plex 200/MD SPECTRAMAX M2/MSD for cytokine panels (up to 40+ factors)
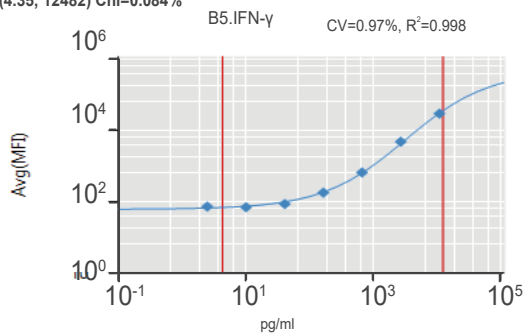

Covaris E220R

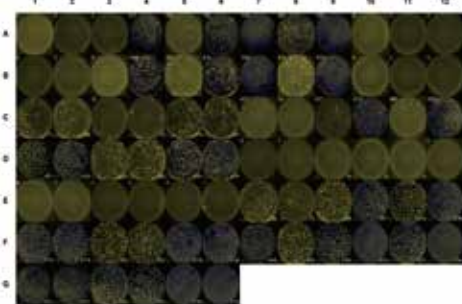BIO-RAD Bio-Plex 200

Medicilon Case: Cytokine Analysis

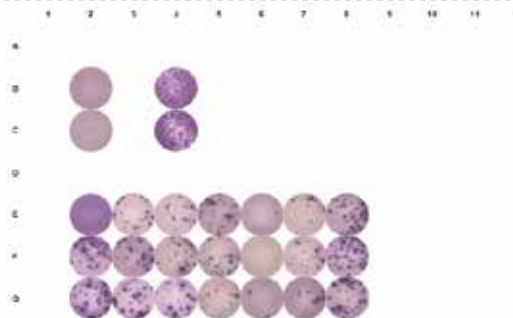Serum/Plasma/Liver/Lung/Tumor … samples could be analysed after processed and detected.
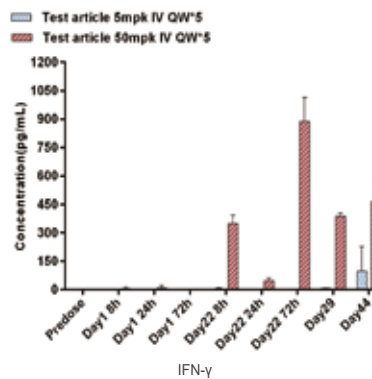
Data shown was CBA_Cynomolgus monkey_Plamsa

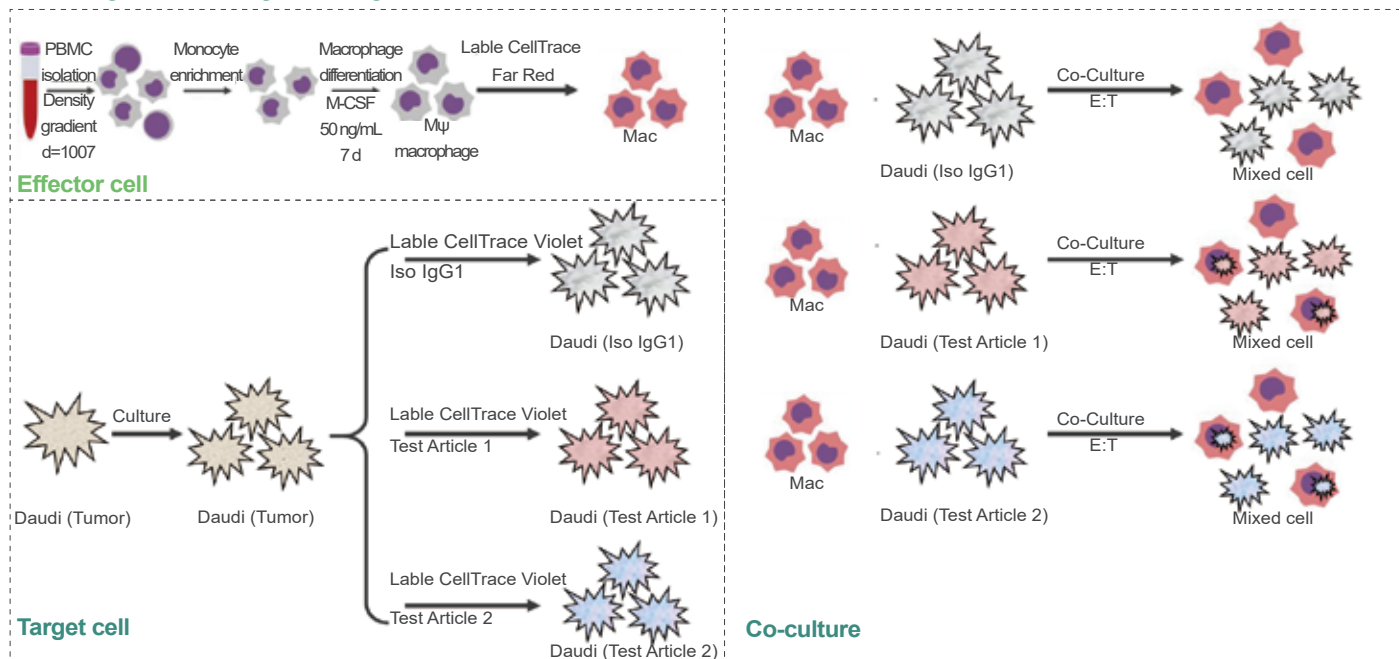PBMC/MNC samples could be analysed by CTL after processed and detected.

Data shown was EliSpot/FluoroSpot_PBMC

Cell Cytotoxicity Assay

- Works with a flow cytometer, microplate reader or fluorescence microscope
- Detects cell differentiation and cytolytic activity
- Works with multiple types of mammalian cell lines

Medicilon Case: Cell Cytotoxicity Assay

Cell line/Blood/Tissue samples could be analysed with FLOWJO for after processed and detected.

| FSC-A | FITC-A:Live_Dead | BV421-A::Daudi | BV421-A::Daudi | APC-A:Mac | APC-A::MAC |

Data shown was ADCP_PBMC
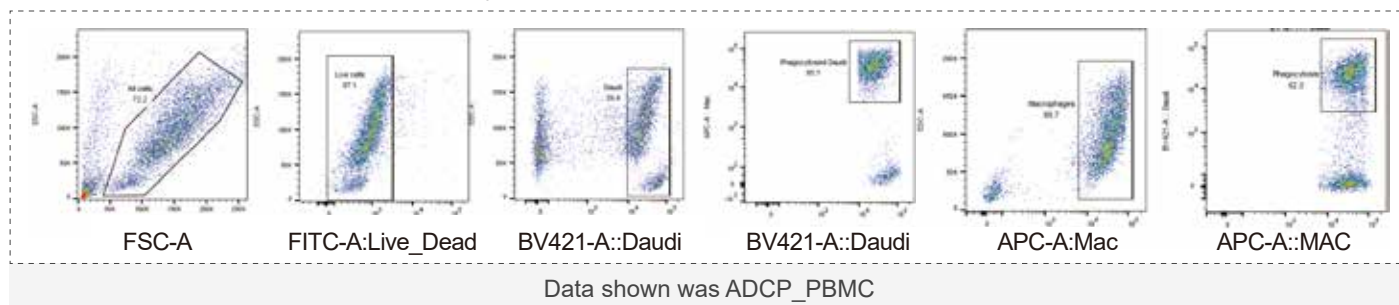
Future Applications

Flow cytometry can be used to study vaccine efficacy and safety in a number of capacities. Modern high-end flow cytometers utilized in the pharmaceutical industry are capable of processing tens of thousands of cells per second in an entirely automated manner, though when undertaking higher degrees of characterization analysis is slower. Continuously running bioreactors generate cells for testing that can then be exposed to a variety of conditions and later categorized by flow cytometry. Increased automation, cell processing speed, and a variety of characterization techniques incorporated directly into flow cytometry equipment will likely be observed going forward.