Παρουσίαση της BDBiosciences για το Διαδικτυακό Σεμινάριο 16/05/2020

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Biosciences > Applications > Research Applications > Solutions to Enable Your COVID-1

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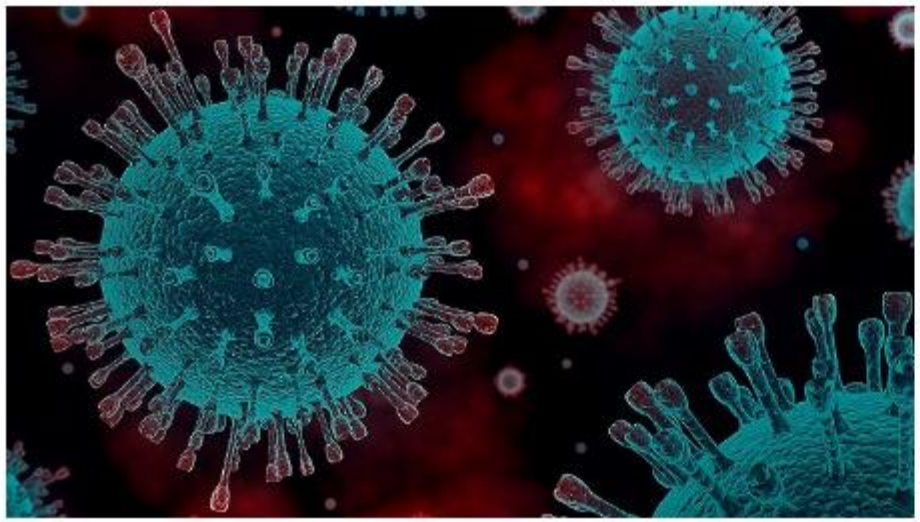

COVID-19 Research

While the COVID-19 global pandemic continues to evolve, we at BD Biosciences believe that scientific research is critical to better understanding and ultimately battling this disease. Now more than ever, BD Biosciences is committed to being your partner and providing you with the tools and support required to enable your COVID-19 research.

We provide a comprehensive portfolio of research tools to facilitate discovery in the following areas of COVID-19 research:

- Viral immune response
- Cytokine analysis
- Vaccine research
- Biomarkers and therapeutics

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Scientific Resources

BD Biosciences enables COVID-19 research by providing solutions for a comprehensive immunophenotypic, transcriptional and functional analysis of immune cells.

Flow Cytometry

- Assessment of immunophenotypic and functional changes in cells of the innate (e.g., monocytes, NK and dendritic cells) and adaptive (e.g., T and B cells) immune system
- Measurement of cytokines responsible for or associated with cytokine release syndrome
- Functional assays to assess antigen-specific T cell responses to viral epitopes

Fluorescence-Activated Cell Sorting

- Purification of antigen-specific T or B cells for vaccine efficacy testing or generation of neutralizing monoclonal antibodies
- Purification of immune cells of interest for downstream single-cell multiomic analysis

Flow cytometry	Immunophenotyping	Dried antibody cocktail for immunophenotypic characterization of human naïve, memory and effector T cells	See Product Description
		Dried antibody cocktail for immunophenotypic characterization of human regulatory T cells	See Product Description
		Dried antibody cocktail for immunophenotypic characterization of human monocytes	See Product Description
		Assessment of markers associated with T cell exhaustion	Download Data Sheet
		Immunophenotypic characterization of human NK cells	View Webinar
			Download Data Sheet
		Immunophenotypic characterization of human B cells	Download Data Sheet
		Immunophenotypic characterization of murine dendritic cells	Download Data Sheet
		Broad immunophenotypic characterization of major human immune cell lineages	Download Data Sheet
		Broad immunophenotypic characterization of major murine immune cell lineages	Download Data Sheet

	Functional assays	Proliferation, degranulation and intracellular cytokine analysis to assess CD8+ T cell activation	Download Data Sheet
		Apoptosis, degranulation and intracellular cytokine analysis to assess NK cell cytotoxicity	Download Data Sheet
		Intracellular cytokine analysis to assess the response of human dendritic cells to Toll-like Receptor agonists	Download Data Sheet
		Quantitation of Th1/Th2/Th17 cytokines produced by activated T cells using BD® Cytometric Bead Array (CBA)	Download Data Sheet
Cell sorting and single-cell multiomics	Deep cell characterization and cell signature discovery	Identification of immunophenotypic and molecular signatures of chronically stimulated human T cells	Download Scientific Poster View Webinar
		Workflow for discovery and confirmation of cell signatures defining human innate lymphoid cell subsets	Download Data Sheet View Webinar
		Deep characterization of human regulatory T cells	Download Data Sheet

Reagent Solutions

During this challenging time, researchers at the forefront of COVID-19 research need tools to power deeper cellular analysis. BD Biosciences research reagents include innovative dyes and a broad portfolio of human-specific antibodies to deliver more resolution and flexibility for experimental design, saving valuable samples and accelerating the time to critical insights.

- **Optimized panels, kits and assays**
- **Immunophenotyping and cell sorting**
- **Cytokine response**
- **BD® AbSeq Antibodies**

Optimized Panels, Kits and Assays

Readily available optimized antibody cocktails, gene panels, kits and recommended multicolor flow cytometry (MFC) panels shown in the tables below can help expedite experiments relevant to COVID-19 research.

Research Area	Research Application	Product Solution(s)
Viral Immune Response	Identification of naïve and different memory T cell subsets in human whole blood by MFC	**BD Horizon™ Dri Memory T Cell ***
	Identification of naïve and different effector regulatory T cell (Treg) subsets in human whole blood by MFC	**BD Horizon™ Dri Treg Cell***
	Identification of classical (M1), intermediate (M2) and non-classical (M3) monocyte subsets in human whole blood by MFC	**BD Horizon™ Dri MonoSet Panel***
	Targeted human immune gene panel (399 genes) relevant to phenotyping human immune cells	**BD Rhapsody™ Human Immune Response Panel**
	Targeted mouse immune gene panel (397 genes) relevant to phenotyping mouse immune cells	**BD Rhapsody™ Mouse Immune Response Panel**
	Targeted human T cell gene panel (259 genes) relevant to T cell biology	**BD Rhapsody™ Human T-Cell Expression Panel**
	Whole Transcriptome Analysis (WTA) enables identification of the most differentially expressed genes in your samples. The WTA data can be used for cell type identification and to construct a targeted panel tailored for your samples of interest	**BD Rhapsody™ WTA Reagent Kit 4 Pack**
Cytokine Analysis	Cytometry bead-based immunoassay to measure human cytokine(s) in serum, plasma and cell culture supernatant samples	**BD® CBA Human Inflammatory Cytokine Kit** **BD® CBA Human Th1/Th2 Cytokine Kit**

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Research Area	Research Application	Recommended Research Panel			
		T Cell Exhaustion Panel			
		Marker	Dye	Clone	Cat. No
Viral Immune Response	Assess the expression of multiple T cell inhibitory receptors (PD-1, TIM-3, LAG-3, CTLA-4, BTLA, TIGIT) on naïve and different memory T cell subsets	CD3	PerCP-Cy5.5	UCHT1	**560835**
		Live/Dead	7-AAD	N/A	**559925**
		CD4	APC-R700	RPA-T4	**564975**
		CD8	APC-H7	SK1	**560179**
		CD45RA	BV650	HI100	**563963**
		CD197 (CCR7)	FITC	150503	**561271**
		CD95	BV480	DX2	**746675**
		TIGIT	BV421	741182	**747844**
		CD152 (CTLA-4)	PE	BNI3	**555853**
		CD223 (LAG-3)	Alexa Fluor® 647	T47-530	**565716**
		CD272 (BTLA)	BV605	J168-540	**743986**
		CD279 (PD-1)	PE-Cy7	EH12.1	**561272**
		CD366 (TIM-3)	BV786	7D3	**742857**

Immunophenotyping and Cell Sorting

The immune response to a virus such as SARS-CoV-2 can be tracked in the blood. Multicolor flow cytometry is one of the most powerful tools with which to identify, for example, alterations in the immune cell landscape in response to viral infection. BD Biosciences has a broad catalog of flow cytometry reagents to aid in the analysis and isolation of cells of the innate and adaptive immune system.

colors that enable a comprehensive study of T cell biology.

Type of Cell	$CD8^+$ Cytotoxic T Lymphocytes (CTLs)	$CD8^+$ Exhausted CTLs	$CD4^+$ Th1	$CD4^+$ Th17	$CD4^+$ Tfh	$CD4^+$ Tregs
Main Function	Kill virus-infected cells	Activated but have lost cytotoxic activity	Promote cell-mediated response	Enhance neutrophil and macrophage recruitment	Regulate development of antigen specific B cell development and antibody production	Immune regulation
Pathogens Targeted	Viruses and some intracellular pathogens		Intracellular pathogens	Extracellular pathogens		
Extracellular Markers	**CD8**	**CD279 (PD-1)** **CD152 (CTLA-4)** **CD223 (LAG-3)** **CD366 (TIM-3)** **TIGIT** **CD159a (NKG2A)**	**CD4** **CD183 (CXCR3)**	**CD4** **CD196 (CCR6)**	**CD4** **CD185 (CXCR5)**	**CD4** **CD25**
Differentiation Cytokines			**IFN-γ** **IL-2** **IL-12**	**TGF-β** **IL-6** **IL-1** **IL-21** **IL-23**	**IL-12** **IL-6**	**TGF-β** **IL-12**
Hallmark Cytokines	**IFN-γ** **TNF** **IL-2**		**IFN-γ** **TNF** **IL-2**	**IL-17A** **IL-17F** **IL-21** **TNF**	**IL-21**	**TGF-β** **IL-10**
Transcription Factors	**T-bet** **Eomes**	**IRF4**	**T-bet** **Stat1** **Stat6**	**RORγt**	**Bcl-6** **MAF**	**FoxP3** **Smad3** **Stat5**

Cytometry PART A
Journal of the International Society for Advancement of Cytometry

International Society for the Advancement of Cytometry Cell Sorter Biosafety Standards

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Abstract

Flow cytometric cell sorting of biological specimens has become prevalent in basic and clinical research laboratories. These specimens may contain known or unknown infectious agents, necessitating precautions to protect instrument operators and the environment from biohazards arising from the use of sorters. To this end the International Society of Analytical Cytology (ISAC) was proactive in establishing biosafety guidelines in 1997 (Schmid et al., Cytometry 1997;28:99–117) and subsequently published revised biosafety standards for cell sorting of unfixed samples in 2007 (Schmid et al., Cytometry Part A J Int Soc Anal Cytol 2007;71A:414–437). Since their publication, these documents have become recognized worldwide as the standard of practice and safety precautions for laboratories performing cell sorting experiments. However, the field of cytometry has progressed since 2007, and the document requires an update. The new Standards provides guidance: (1) for laboratory design for cell sorter laboratories; (2) for the creation of laboratory or instrument specific Standard Operating Procedures (SOP); and (3) on procedures for the safe operation of cell sorters, including personal protective equipment (PPE) and validation of aerosol containment. Published © 2013 Wiley Periodicals Inc.†

Key terms

flow cytometry; occupational health; biohazards; cell sorting; biosafety; aerosol containment

Table 1. Biosafety level determination for cell sorting

	BSL2	BSL-2 WITH ENHANCED PRECAUTIONS (DURING SORTING OPERATIONS)	BSL3	BSL4
Risk Assessment Condition	Uninfected non-primate cells	Non-infectious Human/NHP cells; Infectious but with low risk assessment	Infectious samples with high risk assessment; All samples containing known aerosol pathogens	Extremely Dangerous Pathogens
Example sample type or agents[a]	Normal murine cells third-generation Lentivirus (non-human cells)	Normal human blood; Human cell lines[a]; An example agent is: Influenza A[a]; second-generation Lentivirus or third-generation in human cells	Example agents include[a]: Mycobacterium Tuberculosis, Monkeypox	Example agents include[a]: Ebola, Marburg
Containment System Validated	Periodically (monthly or with filter change)[b]	Periodically (monthly or with filter change)[b]	Weekly or before Every Sort[b]	Weekly or before Every Sort[b]
Aerosol Containment Operational	Required	Required	Required	Required
Respirator	Optional	N-95, FFP2 or better[c]	PAPR	Special Suit
Eye protection	Safety Glasses	Face shield or safety goggles	N/A	N/A
Lab Coat	Front Closure lab coat	Wrap around, solid-front	Coveralls	Special suit
Separate Room and Environmental controls	Optional	Required or limited access to room[d]	Required[e]	Required[e]

Cytometry PART A
ISAC Journal of Quantitative Cell Science

MIFlowCyt

Novel Impactor and Microsphere-Based Assay Used to Measure Containment of Aerosols Generated in a Flow Cytometer Cell Sorter

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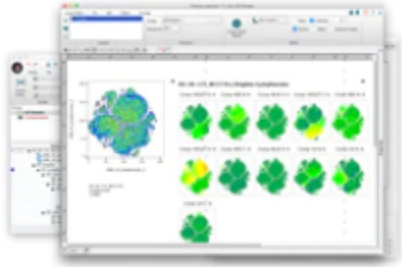
Abstract

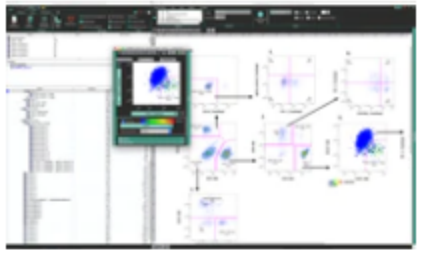
Today's state-of-the-art cell sorting flow cytometers are equipped with aerosol containment systems designed to evacuate aerosols from the sort chamber during a sort. This biosafety device is especially important when the sort operator is sorting infectious or potentially infections samples. Hence, it is critical to evaluate the performance for this system in normal operation and in "failure" mode to determine the efficacy of containment. In the past decade, the most popular published method for evaluating containment has been the Glo-Germ bead procedure. These highly fluorescent and multisize particles can easily be detected on a microscope slide and enumerated using a fluorescent microscope. Collecting particles on this slide is accomplished using an Aerotech impactor. This sampler collects potentially escaping aerosols from the sort chamber before enumerating any particles. Although the Glo-Germ procedure has been adopted by many labs, there are several drawbacks with the procedure that have limited its adoption by cell sorter laboratories: The Aerotech impactor is a reusable device that requires rigorous cleaning between measurements. The surface area of the collection slide is large and difficult to scan on a fluorescence microscope. These beads produce a wide variation in sizes resulting in inconsistency in flow rates. Here, we describe a novel and replacement method utilizing a Cyclex-d impactor and Dragon Green beads. This method was compared for sensitivity of detection of escaped aerosols with a published method for aerosol detection which utilizes a UV-APS aerodynamic particle sizer and a UV-excitable dye. One of the advantages of the



Flow Cytometry Analysis

FlowJo™ Software is the leading platform for single-cell flow cytometry analysis that helps your research stand out with accessible features for immunophenotyping, cell cycle, proliferation, kinetics studies, quantitative population comparison, plate screening assays and more.

Learn More



RNA-Seq Analysis

SeqGeq™ Software v1.6 analyzes data from RNA-Seq and single-cell RNA-Seq experiments, providing tools to extract genes and cells of interest and putting transcriptome analyses back in the hands of bench scientists. Explore, visualize and shape your next-gen sequencing data with interactive graphing tools that are designed to help you focus on the insights that matter most.

Learn More

We offer a variety of support and training for when you need it most:

- **On demand training on FlowJo University**
- **Monthly live webinars**
- **Technical and research support**

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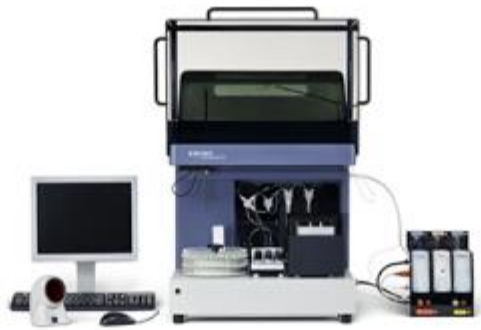
Clinical sample prep

Devices designed to automate laboratory workflow by preparing cells and standardizing processing steps for subsequent analysis by flow cytometry.

FACS™ Lyse Wash Assistant

The BD FACS™ Lyse Wash Assistant automates and standardizes sample processing steps.



FACS™ Sample Prep Assistant (SPA) III

BD FACS™ Sample Prep Assistant automates processing and speeds workflow for clinical labs.

BD FACSDuet™

The BD FACSDuet™ sample preparation system provides a powerful new level of performance to move the pace of your lab forward.

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