

Human Flow Cytometry Panels

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Overview

The CIIA provides comprehensive, full-service flow cytometry support from experimental design through to panel development, sample preparation, data acquisition, analysis, and interpretation. Our team uses spectral flow cytometry to measure >20 surface and intracellular markers simultaneously within a single sample, allowing for the evaluation of multiple immune cell types and their activation states (**Page 2, Table 1**).

Explore our established panels (**Pages 3-5**) or connect with us at ciiia@uhn.ca to design a custom panel that supports your discovery, translational and clinical research needs.

Sample Requirements

Please refer to our [Sample Requirements and Submission Guidelines](#).

Panel Selection and Costs

A subset of markers can be chosen from any panel to reduce costs and focus the analysis on the most relevant targets. Pricing is determined by the selected markers/panel(s), batch size, and level of analysis support required.

Instrument(s)

The panels listed in this document are compatible with the [Sony ID7000 Spectral Cell Analyzer](#).

Data Analysis Software

The CIIA uses Sony ID7000™ Analysis Software for spectral unmixing and [FlowJo](#) Software for gating and routine data analysis. High-dimensional analysis, including cell clustering and visualization, is performed using [Omiq](#) and custom workflows in R.

Data Delivery and File Formats

Data can be delivered in a range of formats including summary reports, publication-ready figures, gated population statistics, and FCS files compatible with downstream analysis platforms, supporting both routine and advanced computational workflows.

Table 1. Immune Cell Types

Immune Cell Type ^(a)	Flow Cytometry Markers	Main Functions
Conventional T cells	CD3, CD4, CD8	Provide adaptive, antigen-specific immunity including direct killing of infected and/or malignant cells (CD8+ cytotoxic T cells) and helper functions through cytokine secretion (CD4+ helper T cells).
Regulatory T cells (Tregs)	CD3, CD4, CD25, CD127 ^{-low} , FOXP3	Suppress immune responses through cytokine secretion to maintain self-tolerance and prevent autoimmunity.
$\gamma\delta$ T cells	CD3, TCR- $\gamma\delta$, TCR V δ 1, TCR V δ 2, TCR V δ 3, TCR V γ 9	Innate-like T cells that respond to stress, infection, and malignant cells without classical MHC restriction.
B cells	CD19, CD20	Produce antibodies in response to antigen and differentiate into memory B cells or plasma cells.
Plasma cells	CD19 ^{-low} , CD38, CD138	Produce large quantities of antigen-specific antibodies.
NK cells	CD16, CD56, NKp30, NKp44, NKp46, NKG2A, NKG2C, NKG2D	Innate-like cells of lymphoid origin that kill infected and/or malignant cells that lack expression of MHC-I.
Monocytes	CD14, CD16, HLA-DR	Phagocytose pathogens, dead cells and debris, and produce inflammatory cytokines. Monocytes can differentiate into dendritic cells (DCs) and macrophages.
Macrophages	CD14, CD16, CD11b, CD68	Tissue-resident or monocyte-derived myeloid cells that phagocytose pathogens, dead cells and debris, produce immunomodulatory cytokines and support tissue repair.
DCs	CD1c, CD11c, CD123, HLA-DR	Bridge innate and adaptive immune responses by efficiently priming CD4 and CD8 T cell responses through antigen presentation, co-stimulation and cytokine production. Uniquely specialized antigen presenting cells that can cross-present antigen to CD8 T cells.
Neutrophils ^(b)	CD15, CD16	Rapid innate effector response; phagocytosis and acute inflammation.
Basophils ^(b)	CD123, CD193, CD294	Mediate allergic and type 2 immune responses through histamine release and IgE-dependent activation.
Eosinophils ^(b)	CD11b, CD15, CD16 ⁻ , CD125, CD193, Siglec-8	Provide innate immune response to parasites and allergens through inflammation via histamine and mediator release.

^(a) Please contact us at cija@uhn.ca regarding detection of immune cells (e.g., ILC subsets, MAIT cells, iNKT cells) and non-immune cells (epithelial cells, fibroblasts) which are not listed in this table.

^(b) Fresh whole blood is required to accurately evaluate the proportions of circulating neutrophils, basophils and eosinophils.

General Immune Panel

Our general immune panel (29 markers) enables high-dimensional profiling of innate and adaptive immune populations as well as characterization of T cell subsets and their expression of activation and immune checkpoint markers.

This panel has been optimized for PBMCs and single-cell suspensions from tissues and fluids, and is suitable for a range of applications including:

- Immune profiling of longitudinal patient samples across all disease settings.
- Assessment of peripheral immune populations in PBMC samples.
- Assessment of the immune microenvironment in tissue samples including resections and biopsies.
- Assessment of T cell activation states and immune checkpoint expression.
- Assessment of human immune cells in humanized mice (with addition of anti-mouse CD45).

General Immune Panel			
Immune Lineage	T Cell Subsets	T Cell Phenotyping	Immune Checkpoint
CD45 CD3 CD19 CD14 CD33 CD56 NKp46 CD15 CD16 HLA-DR	TCR- $\gamma\delta$ TCR-V δ 1 CD4 CD8 FOXP3	CD25 CD28 CD39 CD69 CD103 CD127 4-1BB Helios ICOS Ki67	CTLA-4 PD-1 PD-L1 TIGIT

T Cell Phenotyping Panel

Our T cell phenotyping panel (25 markers) enables high-dimensional evaluation of T cell subsets and their expression of activation, exhaustion and immune checkpoint markers.

This panel has been optimized for PBMCs and single-cell suspensions from tissues and fluids, and is suitable for a range of applications including:

- T cell immune profiling of longitudinal patient samples across all disease settings.
- Assessment of peripheral T cells in PBMC samples.
- Assessment of T cells in the immune microenvironment in tissue samples including resections and biopsies.
- Detailed assessment of T cell activation states and immune checkpoint expression.
- Assessment of human T cells in humanized mice (with addition of anti-mouse CD45).

T Cell Phenotyping Panel			
Immune Lineage	T Cell Subsets	T Cell Phenotyping	Immune Checkpoint
CD45 CD3	TCR- $\gamma\delta$ CD4 CD8 FOXP3	CD45RA CD27 CD28 CD39 CD57 CD69 CD103 CD244 4-1BB Granzyme B HLA-DR Ki-67 TCF-1 TOX	CTLA-4 LAG3 PD-1 TIGIT TIM3

Myeloid Panel

Our general immune panel (32 markers) enables high-dimensional profiling of innate and adaptive immune populations with additional markers for characterization of myeloid populations.

This panel has been optimized for PBMCs and single-cell suspensions from tissues and fluids, and is suitable for a range of applications including:

- Immune profiling of longitudinal patient samples across all disease settings, with emphasis on myeloid populations.
- Assessment of peripheral immune populations in PBMC samples, with emphasis on myeloid populations.
- Assessment of the immune microenvironment in tissue samples including resections and biopsies, with emphasis on myeloid populations.

Myeloid Panel			
Immune Cell Lineage	Myeloid Subsets	T Cell Subsets	Immune Checkpoint
CD45 CD3 CD19 CD56 NKp46	HLA-DR CD1c CD11b CD14 CD15 CD16 CD33 CD123 CD141 CD163 CX3CR1	TCR- $\gamma\delta$ CD4 CD8 FOXP3	PD-1 PD-L1 CTLA-4 TIGIT
		T Cell Phenotyping	
		CD25 CD28 CD39 CD69 CD103 CD127 4-1BB Ki67	