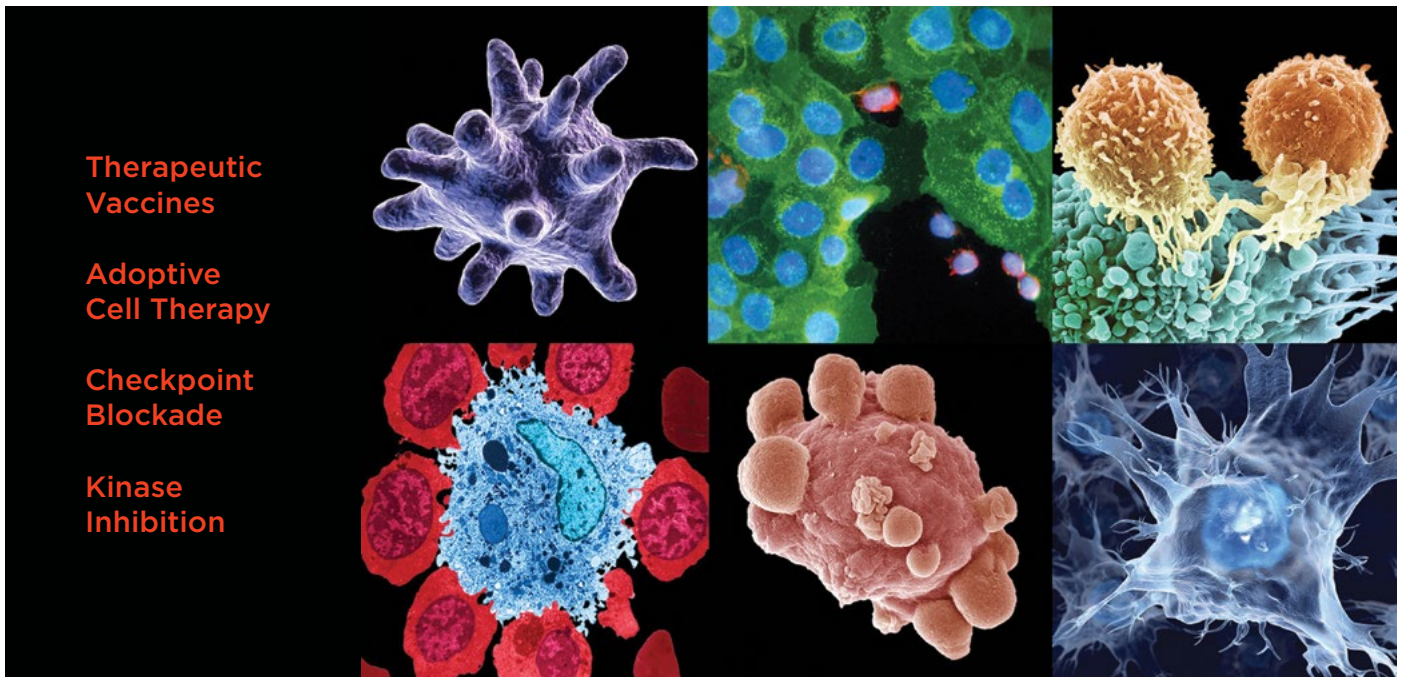




*A PROVEN DEPTH OF EXPERTISE*  
**COMPREHENSIVE IMMUNE MONITORING FOR ONCOLOGY**



For a comprehensive list of GCP/  
GLP/GCLP services, see inside

Your trusted immune monitoring partner for therapeutic and vaccine development

caprion.com

# IMMUNECARTA SERVICES: PROVEN EXPERTISE. COMPREHENSIVE

ASSAY	TARGET OF INTEREST	CELL TYPE(S)
<b>CELLULAR IMMUNITY</b>		
<b>CELLULAR ENUMERATION</b>	Hematopoietic Stem Cells	Circulating CD34+
	Immune Cells	T, B and Innate cells
<b>CELLULAR PHENOTYPING</b>	Cell Lineage	T cells B cells NK cells NKT cells Dendritic cells Basophils Monocytes
	Cell Subset Differentiation	T cell: Memory Subsets B cell: IgD+, Germinal Center, Memory Subsets NK cell: Development and Activation Subsets Dendritic cell: Basophils Monocytes Tregs
	Antigenic Specificity	Antigen-specific CD8+/CD4+ T cells
	Activation/Inhibition/Exhaustion/ Immune Senescence	T, B and Innate cells
	Homing Receptors/Co-Receptors	T cells, B and Innate cells
	TCR V $\beta$ Repertoire Analysis	CD8+/CD4+ T cells
	<b>FUNCTIONAL PROFILING</b>	Intracellular Cytokine (ICS)/ Chemokine Staining
Apoptosis/Necrosis		T, B and Innate cells
Phosphorylation (Phosflow)		T, B, Innate and Tumor cells
Proliferative Response/Cell Cycling		T cells and subsets
Cytotoxicity/Degranulation/Basophil Activation Test (BAT)		Basophil, T, NK and NKT cells
<b>SEROLOGY AND SOLUBLE MARKERS</b>		
<b>CBA* (CYTOKINE BEAD ARRAY)</b>		
<b>MSD* (MESO SCALE DISCOVERY)</b>		
<b>ELISA*</b>		
<b>ELISPOT FOR COMPREHENSIVE EPITOPE MAPPING*</b>		
<b>MOLECULAR BIOLOGY</b>		
<b>GENE EXPRESSION AND DNA ANALYSIS</b>	mRNA Expression (Real-Time PCR)	Cells, Tissue
	T Cell Receptor Excision Circles (TREC)	Cells, Tissue

# additional markers available upon request

\*Panels and assays are custom-designed to fit client needs

# COMPREHENSIVE IMMUNE MONITORING FOR ONCOLOGY.

## POTENTIAL MARKERS

CD34, CD45, others
CD3, CD4, CD8, CD16/56, CD19, CD14, CD11c, CD45, CD123, others
CD3, CD4, CD8 CD19, HLA-DR CD16, CD56, Lin- V $\alpha$ 24, $\alpha$ GalCer:CD1d tetramer, CD3 CD11c, CD123, Lin- CD123, Lin- CD14
CD45RA/RO, CD27, CCR7, CD28, CD62L CD27, IgD/M, CD20, CD38, CD10, IgA/G/E, CD23, CD44, Bcl-2, CD77, Ki67 CD94/NKG2A, CD7, KIR2DL/DS, CD57, KIR CD11c, CD123, BDCA-2/3/4, Fc $\gamma$ Rs, IgE, CCR3 CD16, CD64, Fc $\gamma$ Rs CD25, FoxP3, CD127, CD95, CTLA <sub>4</sub>
HLA-restricted TCR (using Tetramer/Pentamer/Dexamer)
HLA-DR, CD38, ICOS, OX40, 4-1BB, Ki67, CD40, CD95, PD-1, CD57, CD83, CD80, CD86, CD160, LAG-3, 2B4, CTLA-4, TIM-3
CCR4, CCR5, CCR6, CCR7, CCR9, CXCR3, $\alpha$ 4 $\beta$ 7 integrins, others
V $\beta$ 1, V $\beta$ 2, V $\beta$ 3, V $\beta$ 4, V $\beta$ 5.1, V $\beta$ 5.2, V $\beta$ 5.3, V $\beta$ 7.1, V $\beta$ 7.2, V $\beta$ 8, V $\beta$ 9, V $\beta$ 11, V $\beta$ 12, V $\beta$ 13.1, V $\beta$ 13.2, V $\beta$ 13.6, V $\beta$ 14, V $\beta$ 16, V $\beta$ 17, V $\beta$ 18, V $\beta$ 20, V $\beta$ 21.3, V $\beta$ 22, and V $\beta$ 23
IFN- $\gamma$ , TNF- $\alpha$ , IL-2, IL-4, IL-17, IL-22, IL-10, TGF $\beta$ , IL-9, IL-21, MIP-1 $\beta$ , others
Annexin, Caspase 3, CD95, PARP, TUNEL, Live/Dead, 7-AAD
Akt, Btk, Elk, EGF-R, Lck, LAT, Zap70, Syk, MEK1, NFKB, PKC, PLC- $\gamma$ 1, PLC- $\gamma$ 2, p38 MAPK, ERKK1/2, Src, STAT-1 to STAT-6
CFSE, Ki67, BrdU, CD3, CD8, CD4, CD45RA, CCR7, CD27, CD28, CD127, CD57, others
CD107a (LAMP-1), CD107b (LAMP-2), CD63 (LAMP-3), Granzyme, Perforin, others
TH1/TH2/TH17 subsets, chemokines, cytokines
Cytokines, chemokines, adhesion molecules, growth factors, phosphoproteins, antibodies
Cytokines, chemokines, adhesion molecules, growth factors, antibodies
IFN $\gamma$ and/or IL-2, TNF $\alpha$ , IgG, IgM
Specific mRNA quantification
sjTREC

# ROBUST PROCESS FROM START TO FINISH

## IMMUNE MONITORING OF TUMOR INFILTRATING LYMPHOCYTES

### YOUR CHALLENGE

- Limited administrative resources for IRB management

### IMMUNECARTA SOLUTION

- Network of clinical and academic collaborators
- Drafting protocol and consent forms for submission to the Research Ethics Board



- Limited access to sufficient clinical samples

- Clinical Sample Procurement
- Clinical data and pathology report available



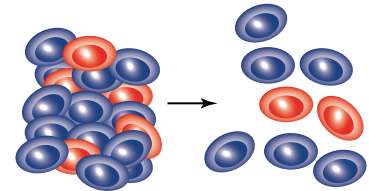
- Limited infrastructure for **GLP-compliant** transportation

- Clinical sample shipment



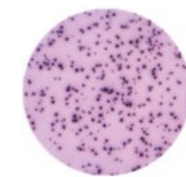
- Limited internal resources for **GLP-compliant** sample preparation

- Mechanical disruption +/- enzymatic digestion into a single cell suspension

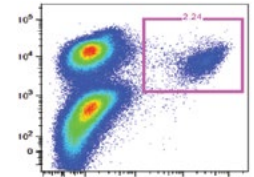


- Limited internal expertise and infrastructure for immune monitoring and/or proteomic analysis

- Phenotypic and functional single cell profiling



Function Validation  
ELISpot/ICS/CFSE



Phenotypic Validation  
HLA-I restricted multimers

# DEFINING THE RESPONSE™

ImmuneCarta® provides our clients with a comprehensive immune oncology offering. We are committed to providing the highest quality services in an GCP, GLP, and GCLP compliant laboratory.

## OVERVIEW OF IMMUNE MONITORING SERVICES FOR IMMUNOTHERAPY DEVELOPMENT

### Multiparametric Flow Cytometry

Single-cell multidimensional assays for identification of immunological signatures of protection, disease progression and/or therapeutic efficacy

### Cellular Enumeration

Quantify cell subsets such as CD34+ hematopoietic stem cells and T, B, and NK cell subsets

### Phenotypic Characterization Assays

Characterize immune cell subpopulations and relationship between phenotypic and functional attributes

### Functional Profiling

Measure distinct immune cell subsets using the following assays:

- ICS (Intracellular Cytokine Staining)—cytokine production and degranulation
- CFSE (Carboxyfluorescein succinimidyl ester)—cellular proliferation
- Phenotypic signatures of immune exhaustion
- Phospho Flow Cytometry—changes in phosphorylation state of intracellular kinases in response to different activation/suppression signals
- Cell Cycling—determination of cells in active phase of cell cycle, using Ki-67 as a nuclear marker
- BAT (Basophil Activation Test)—activation and degranulation of basophils in whole blood

### ELISpot

Assess breadth, magnitude and specificity of the immune response

### T Cell Epitope Mapping

Rapidly identify immunogenic regions using overlapping peptide pool matrices

### Serological Profiling

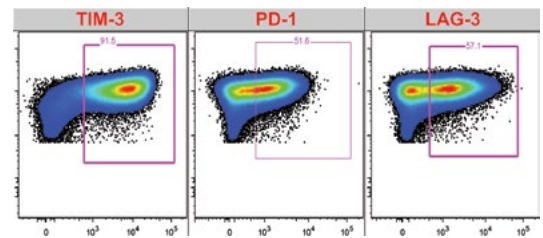
- Customized ELISA—measure the concentration of analytes and antibody titers
- Customized CBA (Cytokine Bead Array)—quantify multiple soluble and intracellular proteins simultaneously
- Customized MSD (Meso Scale Discovery)—multiplexed immunoassay to quantify biomarkers

### Customizable Assays

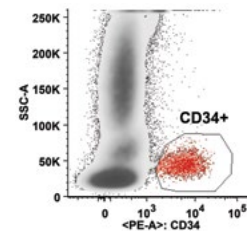
ImmuneCarta provides customizable assays within our immune monitoring services

### Bioinformatics

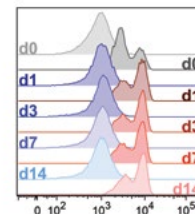
- Process large and complex data sets
- Obtain statistical analysis, study design, pathways analysis, biological interpretation, and reporting



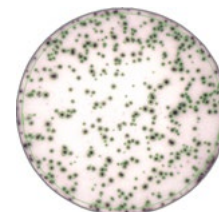
18-color Multiparametric Flow Cytometry



Enumeration of stem and immune cells



Tracking phosphorylation status and stability in whole blood



Measure the breadth, magnitude and specificity of the immune response

# IMMUNE MONITORING SERVICES

Caprion is proud to offer an expanded range of solutions for clinical and translational research with the addition of ImmuneCarta® Services to complement its established proteomic biomarker services business. The pairing of Caprion's traditional strengths in biomarker and target discovery with ImmuneCarta's immune monitoring expertise, provides a powerful combination of solutions for all phases of drug and vaccine development.

## Immune Monitoring Expertise for Immunotherapy

**Highlights of ImmuneCarta Services**

- 18-Color Multiparametric Flow Cytometry
- Cellular Enumeration
- Phenotypic Characterization Assays
- Functional Profiling
- ELISpot
- T Cell Epitope Mapping
- Serological Profiling
- Customizable Assays

ImmuneCarta operates in accordance with applicable GLP/GCLP regulations and guidelines, under which studies are planned, conducted, monitored, reported and archived.

	SERVICES PROVIDED THROUGH ALL STAGES OF CLINICAL DEVELOPMENT			
	DISCOVERY	RESEARCH	PRE-CLINICAL	CLINICAL
Consulting (Immune monitoring study design, review of protocols, etc)	•	•	•	•
On-demand assay customization and qualification/validation	•	•	•	•
Sample management, tracking and storage in a real-time monitored and controlled environment	•	•	•	•
Blood processing, cryopreservation and storage	•	•	•	•
On-site blood processing training and lab manual (for harmonisation of multi-centric studies)			•	•
High-throughput analysis of complex immunological data sets and interpretation (FlowJo, Pestle, Spice)	•	•	•	•
Manuscript preparation support (for peer-reviewed publications)	•	•	•	•

### GLP-COMPLIANT SERVICES

	DISCOVERY	RESEARCH	PRE-CLINICAL	CLINICAL
Consulting (Immune monitoring study design, review of protocols, etc)	•	•	•	•
On-demand assay customization and qualification/validation	•	•	•	•
Sample management, tracking and storage in a real-time monitored and controlled environment	•	•	•	•
Blood processing, cryopreservation and storage	•	•	•	•
On-site blood processing training and lab manual (for harmonisation of multi-centric studies)			•	•
High-throughput analysis of complex immunological data sets and interpretation (FlowJo, Pestle, Spice)	•	•	•	•
Manuscript preparation support (for peer-reviewed publications)	•	•	•	•

Accelerating precision medicine through proteomics and immune monitoring



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