

Product quick guide

The broadest portfolio for your T cell research

Sample preparation

Cell separation

Cell culture

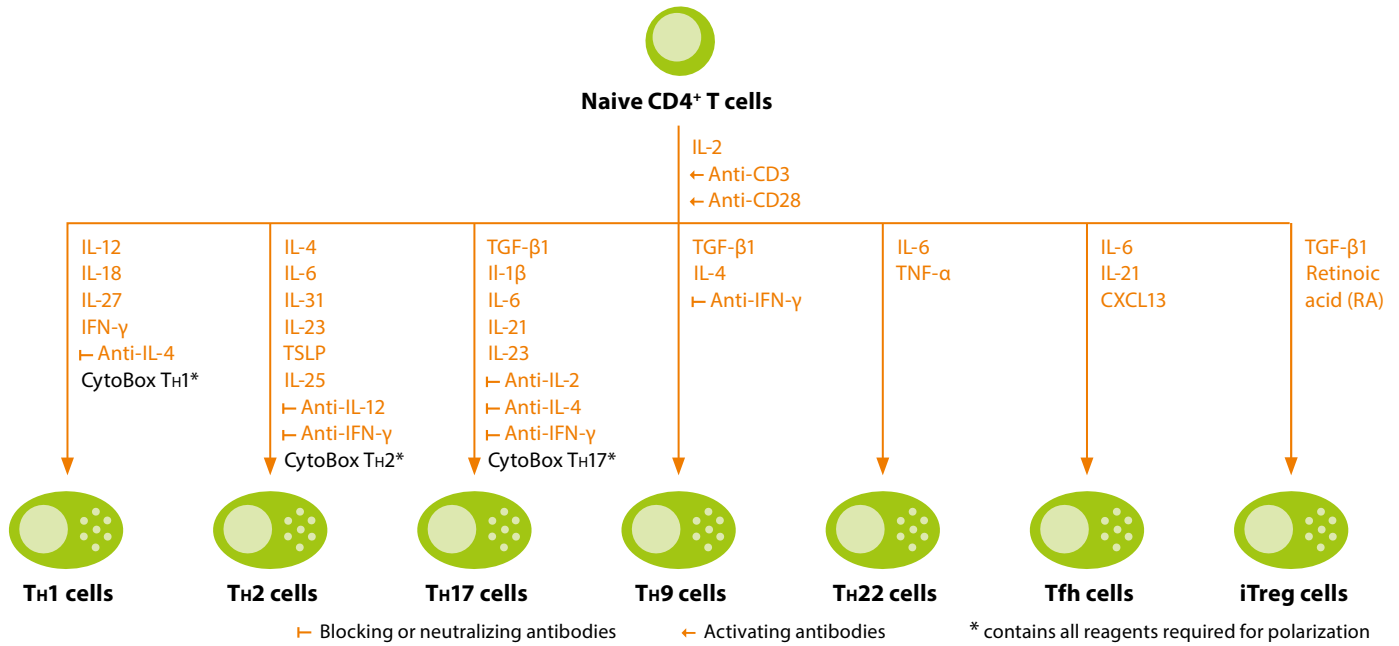
Flow cytometry

Mouse T cells

Overview

CD4⁺ T cell subsets

Polarization reagents



Flow cytometry markers

Surface markers						
CD3, CD4, CD44, CD94, CD183 (CXCR3), CD195 (CCR5),	CD3, CD4, CD44, CD193 (CCR3), CD194 (CCR4), CD184 (CXCR4)	CD3, CD4, CD44, CD161, CD194 (CCR4), CD196 (CCR6)	CD3, CD4, CD44, TCR α / β , CD196 (CCR6)	CD3, CD4, CD44, CD194 (CCR4), CD196 (CCR6), CCR10, AhR	CD3, CD4, CD44, TCR α / β , CD69, CD185 (CXCR5), CD197 (CCR7)	CD3, CD4, CD44, CD25, CD127
Transcription factors						
T-bet, STAT1, STAT4	GATA3, STAT6	ROR γ t, STAT3	IRF4, GATA3, STAT6, PU.1	BNC2, FOXO4, STAT3	STAT3, Bcl6	FoxP3, STAT5, Smad2
Secreted cytokines						
IL-2, IFN- γ , TNF- α	IL-4, IL-5, IL-6, IL-13	IL-17A, IL-17F, IL-21, IL-22, IL-26	IL-9, IL-10	IL-13, IL-22, TNF- α	IL-6, IL-10, IL-12, IL-21	IL-10, IL-35, TGF- β 1

Other T cell lineages

Flow cytometry markers



NKT cells

CD3⁺
CD4^{+/-}
CD8^{+/-}
CD16⁺
CD56⁺
CD57⁺
CD161⁺ (NK1.1)
CD335^{+/-} (NKp46)
TCR Va14-Ja18 with
TCR V β 2, V β 7, or V β 8.2



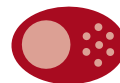
TCR γ / δ T cells

CD3⁺
CD4^{+/-}
CD8^{+/-}
IFN- γ ⁺
TCR γ / δ ⁺



Tumor-infiltrating leukocytes (TIL)

CD3⁺
CD4⁺/CD8⁺
CD39⁺
CD44⁺
CD45⁺
CD137⁺ (4-1BB)
CD152⁺ (CTLA-4)
CD183⁺ (CXCR3)
CD223⁺ (LAG-3)
CD279⁺ (PD1)
CD366⁺ (TIM-3)



CD8⁺ cytotoxic T cells

CD3⁺
CD8⁺
CD44⁺
CD107a⁺ (LAMP-1)
CD178⁺ (FasL)
Granzyme B⁺
IFN- γ ⁺
Perforin⁺



Treg cells

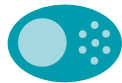
CD3⁺
CD4⁺
CD25⁺ (IL2RA)
CD152⁺ (CTLA-4)
CD304⁺ (Neuropilin-1)
FoxP3⁺
FR4⁺
GITR⁺
Helios⁺

Mouse T cells

Overview

T cell differentiation

Flow cytometry markers



Effector T cells

CD3⁺
CD4⁺/CD8⁺

Activation markers:

CD25⁺ (IL2RA)
CD44⁺
CD69⁺
CD95⁺ (FasR)
CD134⁺ (OX40)
CD137⁺ (4-1BB)
Ki-67⁺
KLRG1⁺



Naive T cells

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD44⁻
CD57⁻
CD62L⁺ (L-Selectin)
CD69⁻
CD127⁺
CD197⁺ (CCR7)



Exhausted T cells

CD3⁺
CD4⁺/CD8⁺

Exhaustion markers:

CD96⁺ (TACTILE)
CD152⁺ (CTLA-4)
CD160⁺ (NK1)
CD223⁺ (LAG-3)
CD244⁺ (2B4)
CD272⁺ (BTLA)
CD279⁺ (PD1)
CD366⁺ (TIM-3)
EOMES⁺
ICOS⁺
TIGIT⁺
VISTA⁺

Memory T cells



Tscm

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD44^{+/-}
CD57⁻
CD62L⁺ (L-Selectin)
CD69⁻
CD127⁺
CD197⁺ (CCR7)



Tcm

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD44⁺
CD57⁻
CD62L⁺ (L-Selectin)
CD69^{+/-}
CD127⁺
CD197⁺ (CCR7)



Tem

CD3⁺
CD4⁺/CD8⁺
CD27^{+/-}
CD28^{+/-}
CD44⁺
CD57⁺
CD62L⁻ (L-Selectin)
CD69^{+/-}
CD127^{+/-}
CD197⁻ (CCR7)



Trm

CD3⁺
CD4⁺/CD8⁺
CD27⁻
CD28^{+/-}
CD44⁺
CD57⁺
CD62L⁻ (L-Selectin)
CD69⁺
CD95⁺ (FAS)
CD103⁺
CD127^{+/-}
CD197⁻ (CCR7)

Legend

Th T helper cell
Tfh T follicular helper cell
iTreg Induced regulatory T cell
NKT Natural killer T cell

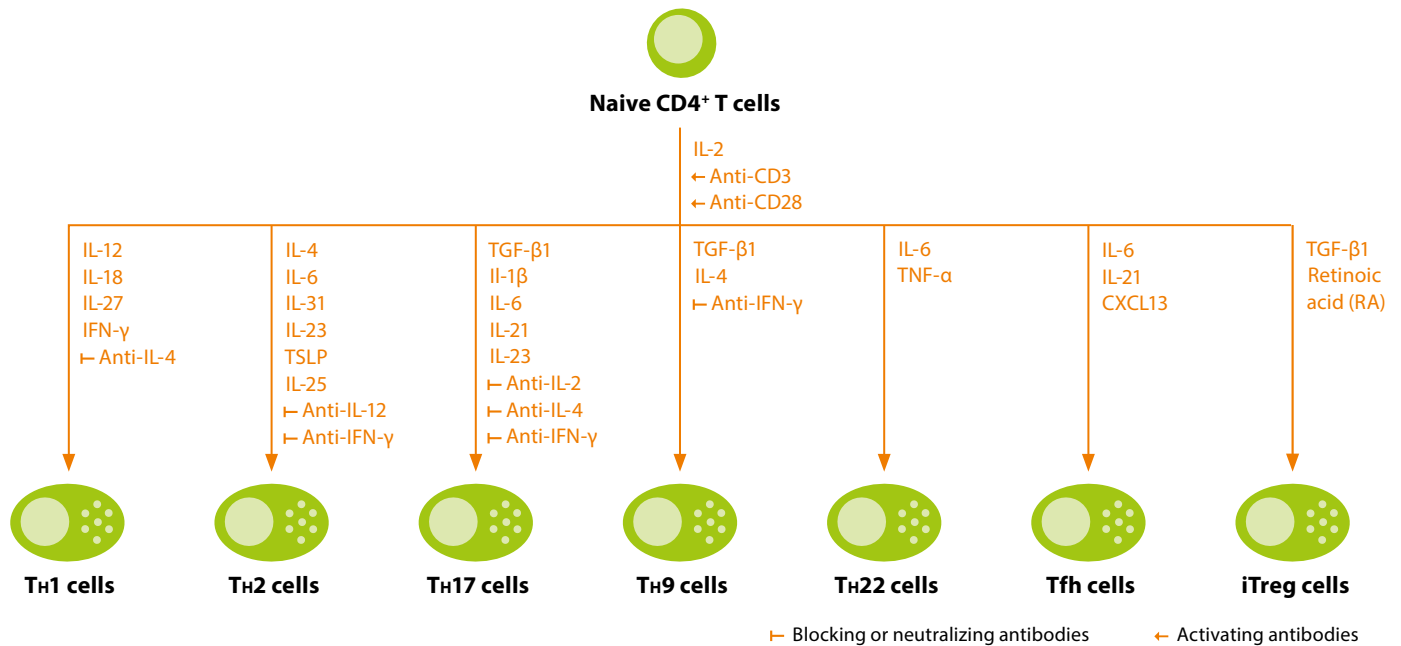
Treg Regulatory T cell
Tscm Stem memory T cells
Tcm Central memory T cells
Tem Effector memory T cells
Trm Tissue-resident memory T cells

Human T cells

Overview

CD4⁺ T cell subsets

Polarization reagents



Flow cytometry markers

Surface marker						
CD3, CD4, CD94, CD183 (CXCR3), CD195 (CCR5)	CD3, CD4, CD193 (CCR3), CD194 (CCR4), CD184(CXCR4)	CD3, CD4, CD161 (NK1.1), CD194 (CCR4), CD196 (CCR6)	CD3, CD4, CD196 (CCR6), TCRα/β	CD3, CD4, CD194 (CCR4), CD196 (CCR6), CCR10, AhR	CD3, CD4, CD69, CD185 (CXCR5), CD197 (CCR7), TCRα/β	CD3, CD4, CD25, CD127
Transcription factors						
T-bet, STAT1, STAT4	GATA3, STAT6	RORγt, STAT3	IRF4, GATA3, STAT6, PU.1	BNC2, FOXO4, STAT3	STAT3, Bcl6	FoxP3, STAT5, Smad2
Secreted cytokines						
IL-2, IFN-γ, TNF-α	IL-4, IL-5, IL-6, IL-13	IL-17A, IL-17F, IL-21, IL-22, IL-26	IL-9, IL-10	IL-13, IL-22, TNF-α	IL-6, IL-10, IL-12, IL-21	IL-10, IL-35, TGF-β1

Other T cell lineages

Flow cytometry markers



NKT cells

CD3⁺
CD4^{+/-}
CD8^{+/-}
CD16⁺
CD56⁺ (NCAM)
CD57⁺
CD161⁺ (NK1.1)
TCR Va24-Ja18
with TCR Vβ11 (iNKT)



TCRγ/δ⁺ T cells

CD3⁺
CD4^{+/-}
CD8^{+/-}
IFN-γ⁺
TCRγ/δ⁺



CD8⁺ cytotoxic T cells

CD3⁺
CD8⁺
CD107a⁺ (LAMP-1)
CD178⁺ (FasL)
Granzyme B⁺
IFN-γ⁺
Perforin⁺



Treg cells

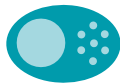
CD3⁺
CD4⁺
CD25⁺ (IL2RA)
CD127^{low}
CD152⁺ (CTLA-4)
FoxP3⁺
GITR⁺
Helios⁺

Human T cells

Overview

T cell differentiation

Flow cytometry markers



Effector T cells

CD3⁺
CD4⁺/CD8⁺

Activation markers:

CD25⁺ (IL2RA)
CD69⁺
CD95⁺ (FasR)
CD134⁺ (OX40)
CD137⁺ (4-1BB)
CD154⁺ (CD40L)
Ki-67⁺
KLRG1⁺



Naive T cells

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD45RA⁺
CD45RO⁻
CD57⁻
CD62L⁺ (L-Selectin)
CD69⁻
CD95⁻ (FasR)
CD127⁺
CD197⁺ (CCR7)



Exhausted T cells

CD3⁺
CD4⁺/CD8⁺

Exhaustion markers:

CD96⁺ (TACTILE)
CD152⁺ (CTLA-4)
CD160⁺ (NK1)
CD223⁺ (LAG-3)
CD244⁺ (2B4)
CD272⁺ (BTLA)
CD279⁺ (PD1)
CD366⁺ (TIM-3)
EOMES⁺
ICOS⁺
TIGIT⁺
VISTA⁺

Memory T cells



Tscm

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD45RA⁺
CD45RO⁻
CD57⁻
CD62L⁺ (L-Selectin)
CD95⁺ (FasR)
CD127⁺
CD197⁺ (CCR7)



Tcm

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD45RA⁻
CD45RO⁺
CD57⁻
CD62L⁺ (L-Selectin)
CD95⁺ (FasR)
CD127⁺
CD197⁺ (CCR7)



Ttm

CD3⁺
CD4⁺/CD8⁺
CD27⁺
CD28⁺
CD45RA⁻
CD45RO⁺
CD57⁺
CD62L⁻ (L-Selectin)
CD95⁺ (FasR)
CD127⁺
CD197⁻ (CCR7)



Tem

CD3⁺
CD4⁺/CD8⁺
CD27^{+/-}
CD28⁻
CD45RA⁻
CD45RO⁺
CD57⁺
CD62L⁻ (L-Selectin)
CD95⁺ (FasR)
CD127^{+/-}
CD197⁻ (CCR7)



Temra

CD3⁺
CD4⁺/CD8⁺
CD27⁻
CD28⁻
CD45RA⁺
CD45RO⁻
CD57⁺
CD62L⁻ (L-Selectin)
CD95⁺ (FasR)
CD127⁻
CD197⁻ (CCR7)

Legend

T_H T helper cells
T_{fh} T follicular helper cells
iTreg Induced regulatory T cells
NKT Natural killer T cells
Treg Regulatory T cells

T_{scm} Stem memory T cells
T_{cm} Central memory T cells
T_{tm} Transitional memory T cells
T_{em} Effector memory T cells
T_{emra} Effector memory RA T cells

► miltenyibiotec.com/tcells

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Human T cells

Products

Separation reagents



T cells

CD3 MicroBeads # 130-050-101	CD2 MicroBeads # 130-091-114	CD6 MicroBeads # 130-091-264
REAl ease™ CD3 MicroBead Kit # 130-117-038	MACSxpress® Pan T Cell Isolation Kit # 130-098-193	CD28 MicroBead Kit # 130-093-247
StraightFrom® Whole Blood CD3 MicroBeads # 130-090-874	Pan T Cell Isolation Kit # 130-096-535	



DN T cells

Double-negative
T Cell Isolation Kit
130-092-614



Naive Pan T cells

Naive Pan T Cell
Isolation Kit
130-097-095



CD4⁺ T cells

CD4 MicroBeads
130-045-101

REAl ease CD4
MicroBead Kit
130-117-037

StraightFrom Whole
Blood CD4 MicroBeads
130-090-877

CD4⁺ T Cell Isolation Kit
130-096-533

MACSxpress CD4 T Cell
Isolation Kit
130-098-195

StraightFrom Buffy Coat
CD4 MicroBead Kit
130-114-980

StraightFrom LRSC
CD4 MicroBead Kit
130-117-028

StraightFrom Leukopak
CD4 MicroBead Kit
130-117-022



Treg cells

CD25 MicroBeads II
130-092-983

CD127 MicroBead Kit
130-094-945

CD4⁺CD25⁺ Regulatory
T Cell Isolation Kit
130-091-301

CD4⁺CD25⁺CD127^{dim/-}
Regulatory T Cell
Isolation Kit II
130-094-775

CD25⁺CD49d⁻ Regulatory
T Cell Isolation Kit
130-094-551

CD4⁺CD25⁺CD45RA⁺
Regulatory T Cell
Isolation Kit
130-093-631

MACSxpress Treg
Isolation Kit
130-109-557



TCRγ/δ⁺ T cells

Anti-TCRγ/δ
MicroBead Kit
130-050-701

TCRγ/δ⁺ T Cell
Isolation Kit
130-092-892



CD8⁺ T cells

CD8 MicroBeads
130-045-201

REAl ease CD8 MicroBead
Kit # 130-117-036

StraightFrom Whole Blood
CD8 MicroBeads
130-090-878

CD8⁺ T Cell Isolation Kit
130-096-495

MACSxpress CD8 T Cell
Isolation Kit
130-098-194

StraightFrom Buffy Coat
CD8 MicroBead Kit
130-114-978

StraightFrom LRSC
CD8 MicroBead Kit
130-117-027

StraightFrom Leukopak
CD8 MicroBead Kit
130-117-019



NKT cells

CD3⁺CD56⁺
NKT Cell
Isolation Kit
130-093-064

Anti-iNKT
MicroBeads
130-094-842



Activated T cells

CD25 MicroBeads II # 130-092-983	CD154 MicroBead Kit # 130-092-658
CD30 MicroBeads # 130-051-401	CD137 MicroBead Kit # 130-093-476
CD69 MicroBead Kit II # 130-092-355	



Tumor-infiltrating leukocytes (TIL)

CD45 (TIL) MicroBeads
130-118-780

Human T cells

Products

Separation reagents

CD4⁺ T cell subsets



CD4⁺ RTE

CD4⁺ Recent Thymic Emigrant Isolation Kit
130-094-299



Naive CD4⁺ T cells

Naive CD4⁺ T Cell Isolation Kit II
130-094-131

Pre-selection with:
CD4⁺ T Cell Isolation Kit
130-096-533

CD62L MicroBeads
130-091-758
CD45RA MicroBeads
130-045-901
CD45RO MicroBeads
130-046-001



Skin-homing T cells

CD4⁺CLA⁺ T Cell Isolation Kit
130-092-435

Anti-CLA MicroBead Kit
130-092-464



Memory CD4⁺ T cells

Memory CD4⁺ T Cell Isolation Kit
130-091-893

MACSxpress CD4 Memory T Cell Isolation Kit
130-106-770



TEM

CD4⁺ Effector Memory T Cell Isolation Kit
130-094-125



Tcm

CD4⁺ Central Memory T Cell Isolation Kit
130-094-302



TH1 cells

IFN-γ Secretion Assay – Cell Enrichment and Detection Kit (PE)
130-054-201



TH2 cells

CD294 (CRTH2) MicroBead Kit
130-091-274
IL-4 Secretion Assay – Cell Enrichment and Detection Kit (PE)
130-054-101



TH17 cells

IL-17 Secretion Assay – Cell Enrichment and Detection Kit (PE)
130-094-542



Naive CD8⁺ T cells

Naive CD8⁺ T Cell Isolation Kit
130-093-244

Pre-selection with:
CD8⁺ T Cell Isolation Kit
130-096-495

CD45RA MicroBeads
130-045-901
CD45RO MicroBeads
130-046-001



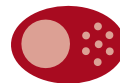
Memory CD8⁺ T cells

CD8⁺ Memory T Cell Isolation Kit
130-094-412



TEMRA

CD8⁺CD45RA⁺ Effector T Cell Isolation Kit
130-094-485



Cytotoxic T cells

CD8⁺CD57⁺ T Cell Isolation Kit
130-093-396



Effector T cells

Pre-selection of CD8⁺ T cells with:
CD8⁺ T Cell Isolation Kit
130-096-495
CD27 MicroBeads
130-051-601

Color code for the use of MACS[®] Cell Separation products

- Positive selection (labeling of target cells)
- Depletion (labeling for removal of an unwanted cell type)
- Isolation of untouched cells using a depletion cocktail
- Positive selection of cells directly from blood products
- Sequential separation (combination of depletion of non-target cells and positive selection)
- Isolation of untouched cells directly from whole blood

Legend

- DN T cell** Double-negative T cell
- iNKT** Invariant natural killer T cell
- NKT cell** Natural killer T cell
- RTE** Recent thymic emigrant
- Tcm** Central memory T cell
- TEM** Effector memory T cell
- TEMRA** Effector memory CD45RA⁺ T cell
- TH cell** T helper cell
- Treg cell** Regulatory T cell

Human T cells

Products

Tissue dissociation

Product	Order no.
Tumor Dissociation Kit, human	130-095-929
MACS Tissue Storage Solution	130-100-108

Medium

Product	Order no.
TexMACS™ Medium, research grade (500 mL)*	130-097-196

*also available in MACS® GMP grade

Cytokines and growth factors

Product	Research grade	Premium grade	MACS GMP
CCL19 (MIP-3β)	●		●
CD40-Ligand	●	●	
CD137 (4-1BB)-Ligand	●		
CXCL13	●		
CXCL16	●		
Galectin-1	●		
Galectin-3	●		
G-CSF	●	●	
GM-CSF	●	●	●
GRO-α	●		
GRO-β	●		
IFN-α2a	●		
IFN-β1a	●		
IFN-γ1b	●	●	
IL-1α	●		
IL-1β	●	●	●
IL-1ra	●		
IL-2 IS	●	●	●
IL-3	●	●	●
IL-4	●	●	●
IL-5	●		
IL-6	●	●	●
IL-7	●	●	●
IL-8	●		
IL-9	●		
IL-10	●		
IL-11	●		
IL-12	●		

Product	Research grade	Premium grade	MACS GMP
IL-13	●	●	
IL-15	●	●	●
IL-15Ra sushi	●	●	
IL-17	●		
IL-17F	●		
IL-19	●		
IL-21	●	●	
IL-22	●		
IL-23	●		
IL-24	●		
IL-27	●		
IL-31	●		
IL-33	●	●	
IL-34	●		
IL-35	●	●	
TGF-β1	●		
TGF-β2	●		
TGF-β3	●		
TNF-α		●	●
TRAIL Receptor-1	●		
TRAIL	●		
TSLP	●		

Activation reagents

Product	Order no.
Suppression assays	
Treg Suppression Inspector	130-096-207
Polyclonal stimulation	
CytoStim, human (200 μL)	130-092-172
CytoStim, human (1 mL)	130-092-173
T Cell Activation and Expansion Kit, human	130-091-441
Treg Expansion Kit, human (2 mL)	130-095-345
Treg Expansion Kit, human (2x2 mL)	130-095-353
T Cell TransAct, human*	130-111-160
Antigen-specific stimulation	
PepTivator® Peptide Pools**	

* also available in MACS GMP grade

**available in research, premium, and MACS GMP grade, and as PepTivator HT (96-well format for high-throughput T cell activation).

Human T cells

Products

Functional-grade antibodies

Product	Pure	Biotin
Anti-FcεR1a		
Anti-GM-CSF	●	
Anti-TNF-α	●	
Anti-HLA-G	●	
Anti-IFN-α	●	
Anti-IFN-γ	●	
Anti-IL-4	●	
Anti-IL-6	●	
Anti-IL-9	●	
Anti-IL-10	●	
Anti-IL-12 (p40/p70)	●	
Anti-IL-13	●	
Anti-iNKT	●	
CD2	●	●
CD3	●	●
CD28	●	●
CD40	●	
CD42b	●	
CD58 (LFA-3)	●	
CD279 (PD1)	●	
CD282 (TLR2)	●	
CD335 (NKp46)	●	●
CD337 (NKp30)	●	
CD357 (GITR)	●	

Flow cytometry antibody cocktails and kits

Product	Order no.
7-Color Immunophenotyping Kit, human	130-098-456
Rapid Cytokine Inspector (CD4 T Cell) Kit, human*	130-097-341
Rapid Cytokine Inspector (CD8 T Cell) Kit, human*	130-097-342
Rapid Cytokine Inspector (CD4/CD8 T cell) Kit, human*	130-097-343
MACSPlex Cytokine 12 Kit** (GM-CSF, IFN-α, IFN-γ, IL-2, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12p70, IL-17A, TNF-α)	130-099-169

* combine with RCI antibodies of your choice, e.g., Anti-IL-2, Anti-IL-17A, Anti-IFN-γ, Anti-TNF-α

**Individual combinations of cytokines are possible with MACSPlex Reagents Kits

Product	Order no.
Treg Detection Kit (CD4/CD25/CD127), human (25 tests)	130-096-076
Treg Detection Kit (CD4/CD25/CD127), human (100 tests)	130-096-082
Treg Detection Kit (CD4/CD25/FoxP3) (APC), human	130-094-158
Treg Detection Kit (CD4/CD25/FoxP3) (PE), human	130-094-163
Inside Stain Kit	130-090-477
FoxP3 Staining Buffer Set	130-093-142

Cytokine Secretion Assays

Product	Order no.
Cytokine Secretion Assay – Detection Kits*	
GM-CSF (PE)	130-105-755
IFN-α (PE)	130-094-161
IFN-γ (APC)	130-090-762
IFN-γ (FITC)	130-090-433
IFN-γ (PE)	130-054-202
IL-2 (APC)	130-090-763
IL-2 (PE)	130-090-487
IL-4 (PE)	130-054-102
IL-5 (APC)	130-091-624
IL-5 (PE)	130-091-623
IL-10 (APC)	130-090-761
IL-10 (PE)	130-090-434
IL-12 (PE)	130-092-124
IL-13 (PE)	130-093-479
IL-17 (APC)	130-094-536
IL-17 (PE)	130-094-537
IL-22 (PE)	130-108-278

*For Cytokine Secretion Assay – Cell Enrichment and Detection Kits, please see separation reagents on page 3.

Human T cells

Products

Flow cytometry antibodies

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	REAlity
T cell development – naive vs. memory (TscM/TcM/Tm/TEM/TEMRA)																
CD3	●	●	●				●	●	●	●	●	●		●	●	●
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8	●	●	●	●			●	●	●	●	●	●		●	●	●
CD27	●	●	●	●			●			●	●	●		●	●	●
CD28				●			●				●	●			●	●
CD45RA	●	●	●				●	●	●	●	●	●		●	●	●
CD45RO	●	●	●				●	●	●	●	●	●		●	●	●
CD57	●		●				●	●			●	●		●	●	
CD62L (L-Selectin)	●	●	●				●				●	●			●	●
CD69	●	●	●				●	●			●	●		●	●	●
CD95 (FasR)			●				●				●	●		●	●	
CD127			●	●			●	●			●	●		●	●	●
CD197 (CCR7)	●		●				●			●	●	●			●	●
CD4⁺ TH subsets (Th1/Th2/Th9/Th17/Th22/Tfh)																
CD3	●	●	●				●	●	●	●	●	●		●	●	●
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●
CD161 (NK1.1)			●	●			●				●	●			●	●
CD183 (CXCR3)				●			●	●			●	●			●	●
CD184 (CXCR4)				●			●	●			●	●			●	●
CD185 (CXCR5)			●					●			●	●			●	●
CD194 (CCR4)							●				●	●			●	●
CD196 (CCR6)							●	●			●	●			●	●
CD197 (CCR7)	●		●				●			●	●	●			●	●
CCR10							●					●				●
IL-2			●		●		●	●			●	●				●
IL-4							●	●								
IL-5					●		●					●	●			
IL-9							●					●				
IL-10					●		●					●				
IL-13							●						●			
IL-17A	●		●				●	●			●	●	●	●		
IL-21							●					●				
IL-22					●		●					●	●			
IL-26 (coming soon)																
IFN-γ	●		●				●				●	●	●	●		●
T-bet							●	●				●				●
RORγT					●		●					●				●
GATA3			●				●	●				●				●

Human T cells

Products

Flow cytometry antibodies

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	REAlity
Treg cells																
CD3	●	●	●				●	●	●	●	●	●		●	●	●
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●
CD25 (IL2RA)				●			●					●			●	●
CD45RA	●	●	●				●	●	●	●	●	●		●	●	●
CD45RO	●	●	●				●	●	●	●	●	●		●	●	●
CD49d	●		●				●				●	●			●	●
CD127			●	●			●	●			●	●		●	●	●
CD152 (CTLA-4)							●					●				
IL-10					●		●					●				
TGF-β		●					●					●			●	
FoxP3							●	●				●				
Helios		●					●	●				●				●
GITR							●					●			●	
Cytotoxic T cells																
CD3	●	●	●				●	●	●	●	●	●		●	●	●
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD107a (LAMP-1)	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●
CD178 (FasL)							●				●	●			●	
CD253 (TRAIL)							●					●			●	
Perforin	●		●				●					●			●	
Granzyme A							●					●				●
Granzyme B	●						●					●				●
IFN-γ	●		●				●				●	●	●	●	●	●
TNF-α	●						●				●	●		●		●
TCRγ/δ+ T cells																
CD3	●	●	●				●	●	●	●	●	●		●	●	●
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8	●	●	●	●			●	●	●	●	●	●		●	●	●
TCRγ/δ	●	●					●			●	●	●		●	●	●
IFN-γ	●		●				●				●	●	●	●	●	●
NKT cells																
CD3	●	●	●				●	●	●	●	●	●		●	●	●
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8	●	●	●	●			●	●	●	●	●	●		●	●	●
CD16	●	●	●			●	●	●		●	●	●		●	●	●

Human T cells

Products

Flow cytometry antibodies (continued)

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	REAFinity™	
NKT cells (continued)																	
CD56 (NCAM)	●	●	●	●		●	●	●		●	●	●		●	●	●	
CD57	●		●				●	●			●	●		●	●		
CD161 (NK1.1)			●	●			●				●	●			●	●	
TCR Vβ11	●						●				●	●		●		●	
Anti-iNKT (TCR Va24-Ja18 with TCR Vβ11)							●				●	●			●		
Activated T cells																	
CD3	●	●	●				●	●	●	●	●	●		●	●	●	
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●	
CD8	●	●	●	●			●	●	●	●	●	●		●	●	●	
CD25 (IL2RA)				●			●					●			●	●	
CD27	●	●	●	●			●			●	●	●		●	●	●	
CD28				●			●				●	●			●	●	
CD69	●	●	●				●	●			●	●		●	●	●	
CD95 (FasR)			●				●				●	●		●	●		
CD134 (OX40)			●	●			●				●	●		●	●	●	
CD137 (4-1BB)				●		●	●	●				●			●	●	
CD154 (CD40L)	●		●				●			●	●	●		●	●	●	
Ki-67			●		●		●	●		●	●	●	●			●	
KLRG1			●				●	●			●	●		●	●	●	
Exhausted T cells																	
CD3	●	●	●				●	●	●	●	●	●		●	●	●	
CD4	●	●	●	●			●	●	●	●	●	●		●	●	●	
CD8	●	●	●	●			●	●	●	●	●	●		●	●	●	
CD96 (TACTILE)							●				●	●		●	●	●	
CD152 (CTLA-4)							●					●					
CD160 (NK1) (coming soon)																	
CD223 (LAG-3)							●					●			●	●	
CD244 (2B4)			●				●				●	●		●	●	●	
CD278 (ICOS)	●	●	●				●	●		●	●	●		●	●	●	
CD279 (PD1)				●			●				●	●			●	●	
CD366 (TIM-3)				●			●				●	●			●	●	
TIGIT																●	
VISTA (coming soon)																	
EOMES (coming soon)																	
CD272 (BTLA) (coming soon)																	

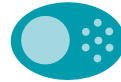
Our MACS® Antibody portfolio is continuously growing. To search all available antibodies and for more information about REAFinity™ Recombinant Antibodies visit www.miltenyibiotec.com/antibodies

For customized fillings or bulk requests of pure antibodies for mass cytometry please go to www.miltenyibiotec.com/CytoF

Mouse T cells

Products

Separation reagents



T cells

CD3ε MicroBead Kit
130-094-973

CD5 (Ly-1) MicroBeads
130-049-301

CD90.1 MicroBeads
130-094-523

Pan T Cell Isolation
Kit II # 130-095-130

CD90.2 MicroBeads
130-049-101



CD4⁺ T cells

CD4 (L3T4) MicroBeads
130-117-043

CD4⁺ T Cell Isolation Kit
130-104-454



Treg cells

CD4⁺CD25⁺Regulatory
T Cell Isolation Kit
130-091-041

CD25 MicroBead Kit
130-091-072

CD62L (L-selectin)
MicroBeads
130-049-701



CD8⁺ T cells

CD8a (Ly-2) MicroBeads
130-117-044

CD8a⁺ T Cell Isolation Kit
130-104-075



TCR γ/δ⁺ T cells

TCRγ/δ⁺ T Cell
Isolation Kit
130-092-125



Tumor-infiltrating leukocytes (TIL)

CD4 (TIL) MicroBeads
130-16-475

CD8 (TIL) MicroBeads
130-16-475

CD4/ CD8 (TIL) MicroBeads
130-16-482

CD45 (TIL) MicroBeads
130-110-618



Naive CD4⁺ T cells

Naive CD4⁺ T Cell
Isolation Kit
130-104-453

CD4⁺CD62L⁺
T Cell Isolation Kit
130-106-643



Memory T cells

Pre-selection with:
CD4⁺ or CD8⁺ T Cell Isolation Kit
130-104-454 (CD4)
130-104-075 (CD8)

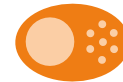
CD62L (L-selectin) MicroBeads
130-049-701

CD62L (L-selectin) MicroBeads
130-049-701



Naive CD8a⁺ T cells

Naive CD8a⁺ T Cell
Isolation Kit
130-096-543



iNKT cells

NK1.1⁺ iNKT Cell
Isolation Kit
130-096-513



Th1 cells

Mouse IFN-γ Secretion
Assay – Cell Enrichment
and Detection Kit (PE)
130-090-517



Th17 cells

Mouse IL-17 Secretion
Assay – Cell Enrichment
and Detection Kit (PE)
130-094-213



Th2 cells

Mouse IL-4 Secretion
Assay – Cell Enrichment
and Detection Kit (PE)
130-090-515



Activated T cells

CD25 MicroBead Kit
130-091-072

CD154 Enrichment
and Detection Kit (PE)
130-093-129

Color code for the use of MACS® Cell Separation products

- Positive selection (labeling of target cells)
- Isolation of untouched cells using a depletion cocktail
- Depletion (labeling for removal of an unwanted cell type)
- Sequential separation (combination of depletion of non-target cells and positive selection)

Legend

- Treg cell** Regulatory T cell
- iNKT** Invariant natural killer T cell
- Th cell** T helper cell

For rat and non-human primate cell isolation products, please visit www.miltenyibiotec.com/cellseparation

Mouse T cells

Products

Tissue dissociation

Product	Order no.
Lamina Propria Dissociation Kit, mouse	130-097-410
Tumor Dissociation Kit, mouse	130-096-730
Lung Dissociation Kit, mouse	130-095-927
Liver Dissociation Kit, mouse	130-105-807
Spleen Dissociation Kit, mouse	130-095-926
MACS Tissue Storage Solution	130-100-108

Medium

Product	Order no.
TexMACS™ Medium, research grade (500 mL)*	130-097-196

*also available in MACS® GMP grade

Cytokines and growth factors

Product	Research grade	Premium grade
G-CSF	●	●
GM-CSF	●	●
IFN-α	●	●
IFN-γ	●	●
IL-1α	●	
IL-1β	●	●
IL-2	●	
IL-3 IS	●	●
IL-4	●	●
IL-5	●	
IL-6	●	●
IL-7	●	
IL-10	●	
IL-12	●	
IL-13	●	
IL-15	●	
IL-17A	●	
IL-17F	●	
IL-21	●	
IL-22	●	
IL-33	●	
IP-10 (CXCL10)	●	
TNF-α	●	●

CytoBoxes

Product	Order no.
CytoBox TH1, mouse	130-107-761
CytoBox TH2, mouse	130-107-760
CytoBox TH17, mouse	130-107-758

Activation reagents

Product	Order no.
Polyclonal stimulation	
T Cell Activation/Expansion Kit, mouse	130-093-627
Treg Expansion Kit, mouse	130-095-925
Antigen-specific stimulation	
PepTivator® Peptide Pools*	

*available in research, premium, and MACS GMP grade, and as PepTivator HT (96-well format for high-throughput T cell activation).

Functional-grade antibodies

Product	Pure
Anti-FcεRIα	●
Anti-H-2Kb/SIINFEKL	●
Anti-Galectin-9	●
Anti-GM-CSF	●
Anti-TNF-α	●
Anti-HLA-G	●
Anti-IFN-α	●
Anti-IFN-γ	●
Anti-IL-4	●
Anti-IL-6	●
Anti-IL-9	●
Anti-IL-10	●
Anti-IL-12 (p40/p70)	●
Anti-IL-13	●
Anti-iNKT	●
CD2	●
CD3ε	●
CD18	●
CD28	●
CD40	●
CD48	●
CD126 (IL-6Ra)	●

Mouse T cells

Products

Functional-grade antibodies (continued)

Product	Pure
CD127	●
CD134 (OX40)	●
CD137	●
CD152	●
CD153	●
CD178	●
CD180	●
CD223	●
CD252 (OX40L)	●
CD275 (B7-H2)	●
CD279 (PD1)	●
CD282 (TLR2)	●
CD317 (PDCA-1)	●
CD357 (GITR)	●

Flow cytometry antibody cocktails and kits

Product	Order no.
MACSPlex Cytokine 10 Kit* (GM-CSF, IFN- γ , IL-2, IL-4, IL-5, IL-10, IL-12p70, IL-17A, IL-23, TNF- α)	130-101-740
Treg Detection Kit (CD4/CD25/FoxP3) (PE), mouse	130-094-165
Treg Detection Kit (CD4/CD25/FoxP3) (APC), mouse	130-094-164
Lineage Cell Detection Cocktail-Biotin, mouse	130-092-613

*Individual combination of cytokines is possible with MACSPlex Reagents Kits



For more information about our automated cell separation instruments visit www.miltenyibiotec.com/macs-automation

Cytokine Secretion Assays

Product	Order no.
Cytokine Secretion Assay – Detection Kits*	
IFN- γ (APC)	130-090-984
IFN- γ (PE)	130-090-516
IL-2 (APC)	130-090-987
IL-2 (PE)	130-090-491
IL-4 (PE)	130-090-479
IL-5 (APC)	130-091-174
IL-5 (PE)	130-091-166
IL-10 (APC)	130-090-939
IL-10 (PE)	130-090-489
IL-17 (APC)	130-094-207
IL-17 (PE)	130-094-205

*For Cytokine Secretion Assays – Cell Enrichment and Detection Kits, please see separation reagents on page 9.



For more information about our automated tissue dissociation instruments visit www.miltenyibiotec.com/gentlemacs

Mouse T cells

Products

Flow cytometry antibodies

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	REAlity
T cell development – naive vs. memory (TscM/TCM/TEM/TRM)																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD27	●		●				●				●	●		●	●	●
CD28							●					●			●	●
CD44	●		●	●			●				●	●		●	●	●
CD62L	●	●					●	●		●	●	●		●	●	●
CD69	●	●	●				●			●	●	●		●	●	●
CD103	●		●			●	●					●			●	●
CD127				●			●				●	●			●	●
CD197 (CCR7)							●					●			●	●
CD4⁺ TH subsets (TH1/TH2/TH9/TH17/TH22/Tfh)																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD44	●		●	●			●				●	●		●	●	●
CD161 (NK1.1)							●			●	●	●		●	●	●
CD183 (CXCR3)				●			●				●	●				●
CD184 (CXCR4)			●				●	●			●	●				●
CD185 (CXCR5)							●	●			●	●			●	●
CD194 (CCR4) (coming soon)																
CD196 (CCR6)							●	●			●	●				●
CD197 (CCR7)							●					●			●	●
CCR10 (coming soon)																
IL-2			●				●					●				●
IL-4					●		●					●				●
IL-5							●					●				●
IL-9							●					●				●
IL-10					●		●					●				●
IL-13 (coming soon)																
IL-17A			●				●					●				●
IL-17F			●				●					●				●
IL-21 (coming soon)																
IL-22							●									●
IL-26 (coming soon)																
IFN-γ			●				●					●				●
T-bet							●	●				●				●

Mouse T cells

Products

Flow cytometry antibodies

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	REAlity
CD4⁺ T_H subsets (continued)																
RORγT					●		●					●				●
GATA3			●				●	●				●				●
Treg cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD25 (IL2RA)				●			●				●	●			●	●
CD152 (CTLA-4)							●					●			●	
CD304 (Neuropilin-1)							●					●				●
FR4							●					●			●	
IL-10					●		●					●	●			
TGF-β																
FoxP3					●		●						●			●
Helios			●				●	●				●				●
GITR							●					●				
Cytotoxic T cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD44	●		●	●			●				●	●		●	●	●
CD107a (LAMP-1)					●		●					●			●	
CD178 (FasL)							●				●	●			●	
Perforin (coming soon)																
Granzyme B			●				●					●				●
CD253 (TRAIL)	●		●				●					●			●	
IFN-γ			●				●					●				●
TNF-α			●				●					●				●
TCRγ/δ⁺ T cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
TCRγ/δ	●	●	●				●			●	●	●	●		●	●
NKT cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●

Mouse T cells

Products

Flow cytometry antibodies

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	
NKT cells (continued)																
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD16/CD32				●			●				●	●			●	●
CD49b			●				●				●	●		●	●	●
CD56 (NCAM)							●					●				
CD57 (coming soon)																
CD161 (NK1.1) (coming soon)																
CD335 (Nkp46)	●		●				●	●		●	●	●		●	●	
TCR Vβ2							●				●	●		●	●	●
TCR Vβ8.1, 8.2			●				●				●	●		●	●	●
Activated T cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD25 (IL2RA)				●			●				●	●			●	●
CD27	●		●				●				●	●		●	●	●
CD28							●					●			●	●
CD44	●		●	●			●				●	●		●	●	●
CD69	●	●	●				●			●	●	●		●	●	●
CD95 (FasR)				●			●			●	●				●	●
CD134 (OX40)							●				●	●			●	●
CD137 (4-1BB)			●				●				●	●			●	●
CD154 (CD40L)						●	●					●			●	●
Ki-67			●		●		●	●		●	●	●	●			●
KLRG1							●				●	●			●	
Exhausted T cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD96 (TACTILE) (coming soon)																
CD152 (CTLA-4)							●					●			●	
CD160 (NK1)				●			●				●	●			●	●
CD223 (LAG-3)				●	●		●					●			●	●
CD244.1 (2B4)				●			●				●	●			●	●
CD244.2 (2B4)				●			●				●	●		●	●	●

Mouse T cells

Products

Flow cytometry antibodies

Antigen	VioBlue®	VioGreen™	FITC	VioBright™ FITC	Vio® 515	VioBright 515	PE	PE-Vio 615	PerCP	PerCP-Vio 700	PE-Vio 770	APC	Vio 667	APC-Vio 770	Biotin	REAFinity
Exhausted T cells (continued)																
CD272 (BTLA)							●				●	●				●
CD278 (ICOS)	●	●	●				●	●		●	●	●		●	●	●
CD279 (PD1)	●		●				●		●			●			●	●
CD366 (TIM-3)				●			●					●			●	●
TIGIT							●					●				●
VISTA (coming soon)																
EOMES							●					●				●
Tumor-infiltrating T cells																
CD3	●		●	●			●	●		●	●	●		●	●	●
CD4	●	●	●	●			●	●		●	●	●		●	●	●
CD8a	●	●	●	●			●	●	●	●	●	●		●	●	●
CD8b	●	●	●				●			●	●	●		●	●	●
CD39							●				●	●			●	●
CD44	●		●	●			●				●	●		●	●	●
CD45	●	●	●	●			●	●	●	●	●	●		●	●	●
CD137 (4-1BB)			●				●				●	●			●	
CD152 (CTLA-4)							●					●			●	
CD183 (CXCR3)				●			●				●	●				●
CD223 (LAG-3)				●	●		●					●			●	●
CD279 (PD1)	●		●				●		●			●			●	●
CD366 (TIM-3)				●			●					●			●	●

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