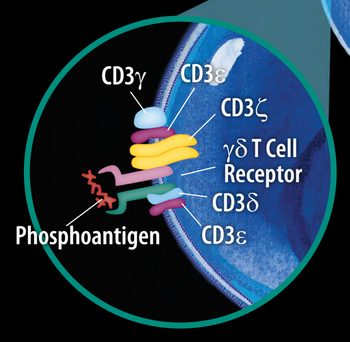
Naïve CD8+ T Cell

IL-2

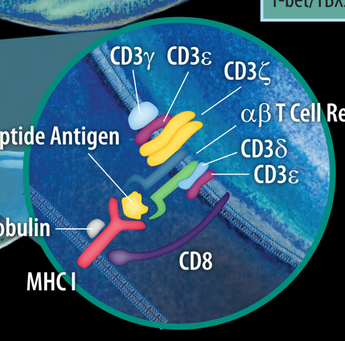
CD8+ Cytotoxic T Cell

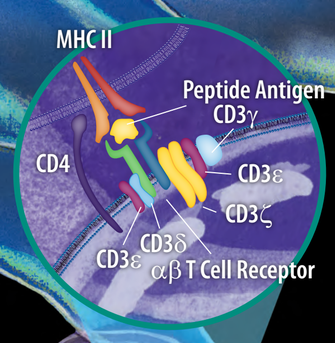
CELL SURFACE MARKERS	SECRETED FACTORS
CD3	Granulysin
CD8	Granzyme A
TCR α/β	Granzyme B
$\alpha_L\beta_2$ Integrin/LFA-1	Perforin
CXCR3	TNF-α
Fas Ligand	TNF-β
LAMP-1/CD107a	IFN-γ
TRANSCRIPTION FACTORS	
Eomes	
T-bet/TBX21	



γδ T Cell

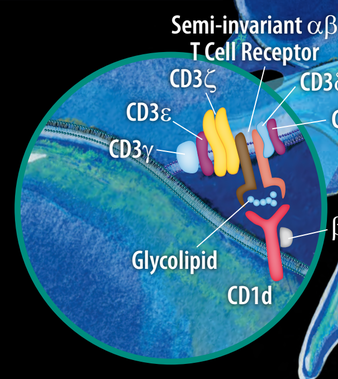
CELL SURFACE MARKERS	NKG2D
CD3	TCR γ/δ
CD4	**SECRETED FACTORS**
CD8α	Granzyme A
CD27 Ligand/TNFSF7	Granzyme B
CD161	IFN-γ
CXCR4	IL-10
EDG-1/S1P1	IL-17A
IL-18 Rα/IL-1 R5	IL-22
IL-23 R	Perforin





CELL SURFACE MARKERS	NKG2D
CD3	NKp30
CD4	NKp44
CD8α	NKp46/NCR1
CD44	NKp80/KLRF1
CD57	TCR α/β
CD94/NKG2	**SECRETED FACTORS**
CD160	GM-CSF
CD161/NK1.1	IFN-γ
Fcγ RIII/CD16	IL-10
Integrin α2/CD49b	IL-13
KIR Family	TNF-α
NCAM-1/CD56	

NKT Cell



Plasma Cell

Memory B Cell

Centrocyte

T Follicular Helper Cell

CELL SURFACE MARKERS	IL-6 Rα	STAT3
CD3	IL-21 R	**SECRETED FACTORS**
CD4	NTB-A/SLAMF6	IFN-γ
CD28	OX40/TNFRSF4/CD134	IL-2
CD40 Ligand/TNFSF5	PD-1	IL-4
CD84/SLAMF5	SLAM/CD150	IL-10
CD229/SLAMF3	**TRANSCRIPTION FACTORS**	IL-17A
CXCR4	Bcl-6	IL-17F
CXCR5	BATF	IL-21
ICOS	c-MAF	

B Cell

CELL SURFACE MARKERS	IL-4 Rα	SECRETED FACTORS
CCR3	IL-17B R/IL-17RB	IL-4
CCR4	ST2/IL-1 R4	IL-5
CCR8	TSLP R	IL-9
CD3	**TRANSCRIPTION FACTORS**	IL-10
CD4	GATA-3	IL-13
CXCR4	IRF4	IL-21
IFN-γ R1/CD119	STAT5	IL-31
IFN-γ R2	STAT6	

Th2 Cell

CELL SURFACE MARKERS
CD3
CD4
IL-4 Rα
IL-17B R/IL-17 RB
TGF-β RII
TRANSCRIPTION FACTORS
IRF4
PU.1
SECRETED FACTORS
IL-9
IL-10

IL-6
IL-21

Th9 Cell

Th1 Cell

CELL SURFACE MARKERS	IL-12 Rβ2	SECRETED FACTORS
CCR1	IL-18 Rα	IFN-γ
CCR5	IL-27 Rα/WSX-1/TCCR	IL-2
CD3	**TRANSCRIPTION FACTORS**	IL-10
CD4	STAT1	TNF-α
CXCR3	STAT4	TNF-β
IFN-γ R1/CD119	T-bet/TBX21	
IFN-γ R2		

IL-12
IL-18
IL-27
IFN-γ

IL-4
IL-25
IL-33
TSLP

IL-4
TGF-β

IL-6
TGF-β
TNF-α

Th22 Cell

CELL SURFACE MARKERS
CCR4
CCR6
CCR10
CD3
CD4
IL-6 Rα
IL-21 R
TGF-β RII
TRANSCRIPTION FACTORS
AHR
Batf
STAT3
SECRETED FACTORS
CCL7/MCP-3
CCL15/MIP-1α
FGFs
IL-10
IL-13
IL-21
IL-22
IL-26/AK155
TNF-α

TGF-β
IL-6
IL-21
IL-23
IL-1β

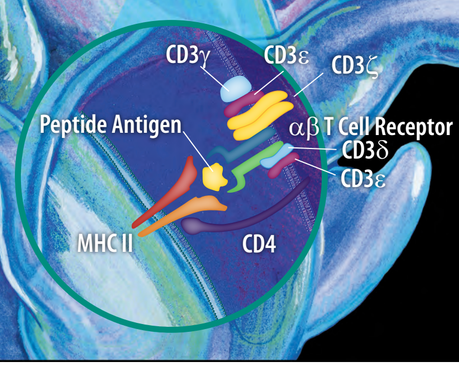
Th17 Cell

CELL SURFACE MARKERS
CCR4
CCR6
CD3
CD4
IL-1 RI
IL-6 Rα
IL-21 R
IL-23 R
TGF-β RII
TRANSCRIPTION FACTORS
Batf
IRF4
RORα
RORγt/RORC2
SECRETED FACTORS
CCL20/MIP-3α
IL-17A
IL-17F
IL-21
IL-22
IL-26/AK155

Naïve CD4+ T Cell

IL-2
TGF-β

Naïve CD4+ T Cell



Treg

CELL SURFACE MARKERS	CTLA-4	LAP	STAT5
5′ Nucleotidase/CD73	Folate Receptor 4	LRRC32/GARP	**SECRETED FACTORS**
CD3	GITR/TNFRSF18	OX40/TNFRSF4/CD134	Galectin-1
CD4	IL-2 Rα/CD25	L-Selectin/CD62L	IL-10
CD5	Integrin αE/CD103	**TRANSCRIPTION FACTORS**	IL-35
CD39/ENTPD1	LAG-3/CD223	FoxP3	TGF-β1

Dendritic Cell

T Cell Subsets

T helper 1 (Th1) Cells

Th1 cells promote cell-mediated immune responses and are required for host defense against microbial pathogens. Th1 cell cytokines promote macrophage activation, nitric oxide production, and cytotoxic T lymphocyte proliferation. When unregulated, Th1 responses may be involved in inflammatory disorders and autoimmunity.

Th2 Cells

Th2 cells are required for humoral immunity and play an important role in coordinating the immune response to large extracellular pathogens. Th2 cytokines also stimulate eosinophil activation and survival, mast cell activation, and have been implicated in the development of chronic allergic inflammation and asthma.

Th9 Cells

Th9 cells have a putative physiological role in host defense against parasitic helminth infections, but may also be involved in the development of chronic allergic inflammation, airway remodeling, and autoimmune diseases. They are closely related to Th2 cells, and there is considerable plasticity between the two cell types.

Th17 Cells

Th17 cells are involved in the immune response to specific fungi and extracellular bacteria. They stimulate chemokine secretion by resident cells, leading to the recruitment of neutrophils and macrophages to sites of inflammation. Recruited cells produce additional cytokines and proteases that can further promote the immune response.

Th22 Cells

Th22 cells express many of the same cell surface antigens as Th17 cells and primarily secrete IL-22. However, unlike Th17 cells, Th22 cells do not secrete IL-17, and they express the skin homing chemokine receptor CCR10. In the skin they may contribute to host defense against microbial pathogens and promote tissue repair or remodeling. Th22 cells may be involved in the pathogenesis of inflammatory skin disorders.

Follicular Helper T (Tfh) Cells

Tfh cells regulate the development of antigen-specific B cell immunity. Upon exposure to a foreign antigen, Tfh cells help centrocytes generate antibody-producing plasma cells and long-lived memory B cells. Tfh cells may be involved in the pathogenesis of immune cell-related cancers and autoimmunity.

Regulatory T (Treg) Cells

Treg cells play a crucial role in suppressing physiological immune responses and preventing sustained or exaggerated responses that can underlie inflammatory disorders and autoimmunity. They are best known for secreting cytokines that inhibit the activities of effector T cells and antigen-presenting cells.

CD8+ Cytotoxic T Lymphocytes (CTL)

CTLs are characterized by a TCR complex that includes an αβ TCR and the co-receptor CD8 that recognizes peptide antigens presented by MHC I. CTLs are classically known for their direct interaction with cellular targets and the release of cytolytic granules containing a range of factors that induce apoptosis.

γδ T Cells

γδ T cells are characterized by a TCR that consists of γ and δ subunits. Although traditional antigen presentation does not appear to be necessary for activation, phospho-antigens have been described as ligands for the γδ TCR. Evidence suggests there are a wide range of subtypes that differ in their cytokine expression patterns and localization. Consequently, γδ T cell activities are thought to be varied and context-dependent.

Natural Killer T (NKT) Cells

NKT cells express a semi-invariant αβ TCR and surface antigens typically associated with natural killer cells. The TCR recognizes glycolipid antigens presented by the MHC I-like molecule CD1d. NKT cells can have divergent effects on immune function due to their ability to produce cytokines that promote either inflammation or tolerance. NKT cells may also be cytotoxic, but this is generally not thought to be their primary function.

For more detailed information about the T cell subsets presented, please see our website at **www.RnDSystems.com/TCellPoster**

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