

T Helper Cell Polarization

T cell polarization is important in several immunological and biological processes. Each T cell subset can be polarized from a naïve Th0 precursor cell and has unique characteristics to provide specialized adaptive immunity against pathogens or self-antigens. Proteintech offers products for each step of this workflow, from cell isolation to polarized Th cell characterization.

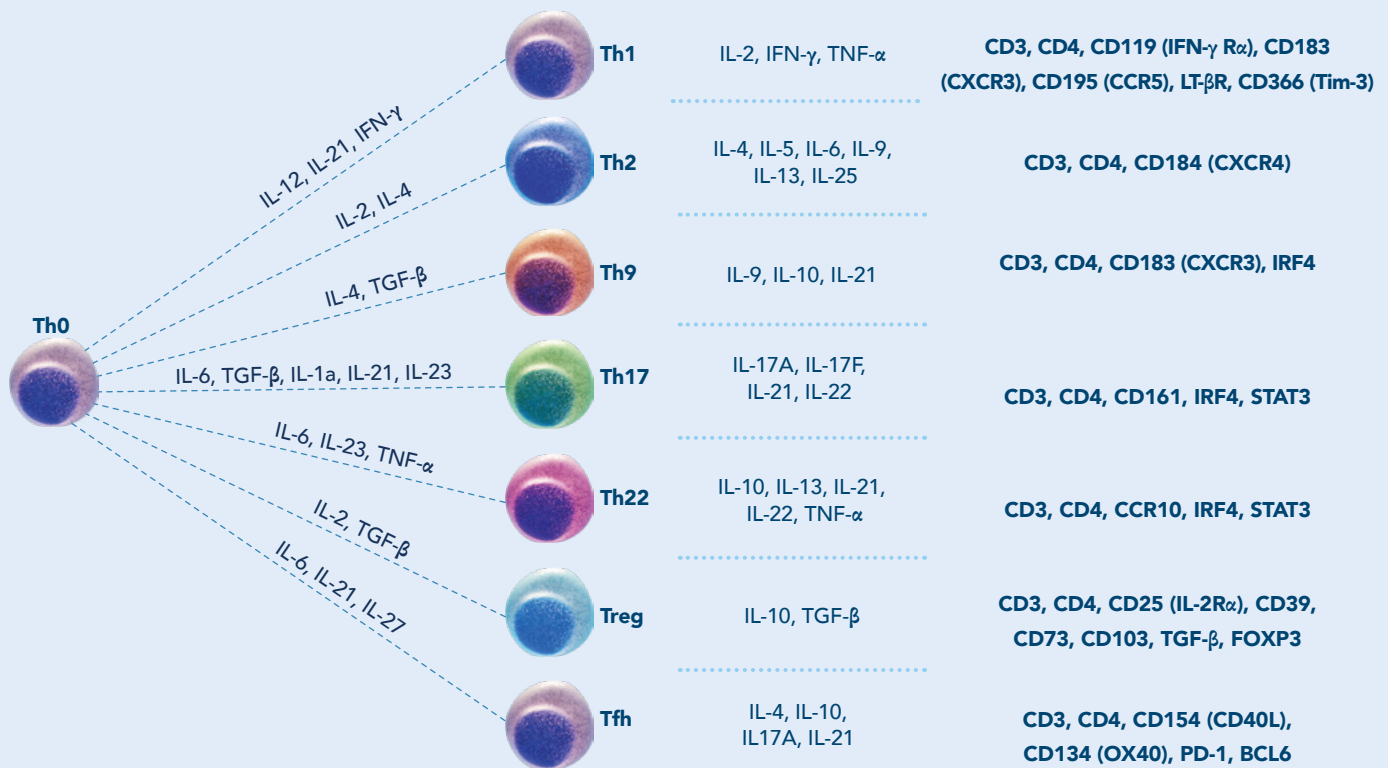
Cell Isolation
Magnetic Cell Separation Kits

Cell Polarization
Humankine®
NeutraKine™

T Cell Subset

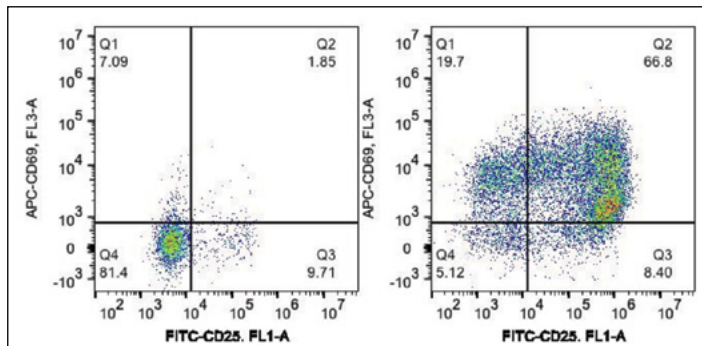
Secreted Cytokines
ELISA/AuthentiKine™

Cell Marker Expression
Flow Antibodies



Cell Separation Products to Isolate Naïve T cell Populations

Proteintech offers several different magnetic bead-based cell separation systems for both positive and negative selection of desired T cell populations. A T cell activation kit can also be used to rapidly activate and expand isolated cell populations in culture.



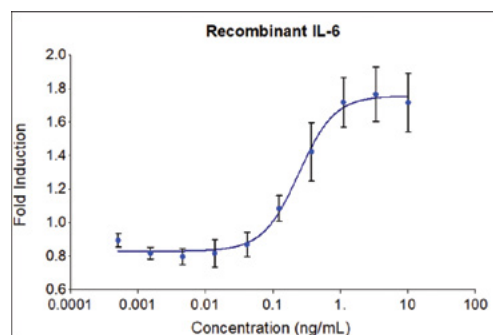
▲ **Human CD3/CD28 T Cell Activation Beads Kit (KMS310)**: PBMCs were activated by Human CD3/CD28 T cell Activation Beads Kit for 3 days at a 1:1 bead to cell ratio. Unstimulated cells (left panel) and stimulated cells (right panel) were stained with fluorescence flow antibodies APC-CD69 and FITC-CD25. Total viable lymphocytes were gated. The activation effect of the kit was tested on human PBMCs from three different donors.

Product Name	Catalog No.	Method
CD3 Magnetic Beads	MS002	Positive Selection
CD3 Magnetic Beads Kit	KMS001	Positive Selection
CD4 Magnetic Beads	MS003	Positive Selection
CD4 Magnetic Beads Kit	KMS002	Positive Selection
CD8 Magnetic Beads	MS004	Positive Selection
CD8 Magnetic Beads Kit	KMS003	Positive Selection
Human CD4 Isolation Kit	KMS302	Negative Selection
Human CD3 Isolation Kit	KMS309	Negative Selection
Human CD8 Isolation Kit	KMS303	Negative Selection
Human CD3/CD28 T Cell Activation Beads Kit	KMS310	T Cell Activation

HumanKine® Cytokines and Growth Factors for T Cell Polarization

To drive polarization towards a certain T helper cell subset, naïve T cells need to be treated with various combinations of cytokines. Several HumanKine® products, available both as RUO and GMP, can be used in this process.

Protein	Catalog No.	Purity	Activity	Source	GMP-grade?
IFN gamma	HZ-1301	>95%	0.02-0.14 ng/mL	HEK293	✓
IL-1 alpha	HZ-1320	>95%	0.075-0.375 ng/mL	HEK293	
IL-2	HZ-1015	>95%	0.05-0.35 ng/mL	HEK293	✓
IL-4	HZ-1004	>95%	0.07-0.4 ng/mL	HEK293	✓
IL-6	HZ-1019	>95%	0.03-0.24 ng/mL	HEK293	✓
IL-12	HZ-1256	>95%	1-5 ng/mL	HEK293	✓
IL-21	HZ-1319	>95%	0.25-1.25 ng/mL	HEK293	✓
IL-23	HZ-1254	>95%	1.25-6.5 ng/mL	HEK293	
IL-27	HZ-1275	>95%	3-16 ng/mL	HEK293	
TGF beta 1	HZ-1011	>95%	0.01-0.17 ng/mL	HEK293	✓
TGF beta 2	HZ-1092	>95%	0.018-0.18 ng/mL	HEK293	✓
TGF beta 3	HZ-1090	>95%	0.14-0.75 ng/mL	HEK293	✓
TNF alpha	HZ-1014	>95%	0.002-0.026 ng/mL	HEK293	✓

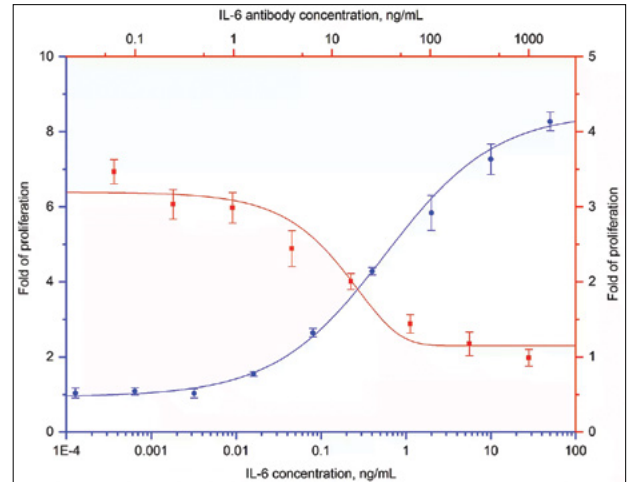


▲ **HumanKine® Recombinant IL-6**: The activity was determined by the dose-dependent stimulation of 3G12B10 (mouse hybridoma) cell proliferation. Cell number was quantitatively assessed by PrestoBlue® Cell Viability Reagent.

NeutraKine™ Neutralizing Antibodies

Neutralizing antibodies can be used to block the effects of unwanted cytokines in culture media, which can help to better drive T cell polarization towards a desired subset. Proteintech's NeutraKine™ line of neutralizing antibodies are developed using HumanKine® proteins, allowing for superior neutralizing activity and biological effects.

Protein	Catalog No.	Type	ND50
IFN gamma	69007-1-Ig	Mouse Monoclonal	100-400 ng/mL
IL-4	69005-1-Ig	Mouse Monoclonal	200-500 ng/mL
IL-6	69001-1-Ig	Mouse Monoclonal	3-15 ng/mL
TGF beta 1	69012-1-Ig	Mouse Monoclonal	0.5-2 µg/mL
TNF alpha	69002-1-Ig	Mouse Monoclonal	10-50 ng/mL



▲ Neutralization Experiment of NeutraKine™ IL-6 (69001-1-Ig): Recombinant IL-6 (HZ-1019) stimulates proliferation of 3G12B10 (mouse hybridoma) cells in a dose-dependent manner (blue curve). The activity of human IL-6 is neutralized by mouse anti-human IL-6 monoclonal antibody (69001-1-Ig) in a dose-dependent manner (red curve). The ND50 of this effect is typically 10-30 ng/mL.

ELISA/AuthentiKine™ Kits for Detection of Secreted Cytokines

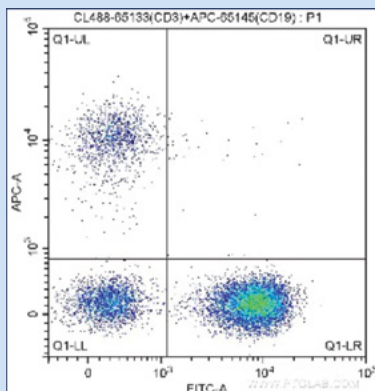
T helper cell populations can be phenotypically characterized by the cytokines that they secrete. Proteintech offers several ELISA kits to assist in this detection process.

Target	Catalog No.	Species	Range	Sensitivity
AuthentiKine IFN gamma	KE00146	Human	7.8-500 pg/mL	0.4 pg/mL
IL-2	KE00017	Human	15.6-1000 pg/mL	3.6 pg/mL
IL-4	KE00016	Human	15.6-1000 pg/mL	2.2 pg/mL
AuthentiKine IL-4	KE00232	Human	15.6-500 pg/mL	1.4 pg/mL
IL-5	KE00217	Human	7.8-500 pg/mL	1.0 pg/mL
AuthentiKine IL-6	KE00139	Human	7.8-500 pg/mL	1.2 pg/mL
AuthentiKine IL-10	KE00170	Human	15.6-1000 pg/mL	2.3 pg/mL
IL-13	KE00020	Human	62.5-4000 pg/mL	1.0 pg/mL
AuthentiKine IL-17A	KE00203	Human	31.25-2000 pg/mL	0.36 pg/mL
IL-21	KE00022	Human	15.6-1000 pg/mL	2.0 pg/mL
IL-22	KE00008	Human	31.25-2000 pg/mL	14.2 pg/mL
TGF beta 1	KE00002	Human	15.6-1000 pg/mL	3.3 pg/mL
AuthentiKine TNF alpha	KE00154	Human	15.6-500 pg/mL	8.6 pg/mL

Antibodies for Flow Cytometry

Each T helper subset can be distinguished by the expression of specific cell surface markers and transcription factors. Proteintech offers antibodies against many of these targets, conjugated in multiple formats for easy flow panel construction.

Target	Clone	Unconjugated	FITC	Coralite® 488	PE	APC	Coralite® 647	Coralite Plus 650
CD3	Hit3a	65112-1-Ig	FITC-65112	CL488-65112	PE-65112	APC-65112	CL647-65112	
	OKT3	65113-1-Ig	FITC-65133	CL488-65133	PE-65133	APC-65133	CL647-65133	
	SK7	65148-1-Ig	FITC-65148	CL488-65148	PE-65148	APC-65148	CL647-65148	
CD4	UCHT1	65151-1-Ig	FITC-65151	CL488-65151	PE-65151	APC-65151	CL647-65151	
	OKT4	65134-1-Ig	FITC-65134	CL488-65134	PE-65134	APC-65134	CL647-65134	
	RPA-T4	65143-1-Ig	FITC-65143	CL488-65143	PE-65143	APC-65143	CL647-65143	
CD161	HP-3G10	65115-1-Ig	FITC-65115	CL488-65115	PE-65115	APC-65115	CL647-65115	
CD25	BC96	65096-1-Ig		CL488-65096	PE-65096	APC-65096	CL647-65096	
CD73	AD2	65162-1-Ig	FITC-65162	CL488-65162	PE-65162	APC-65162	CL647-65162	CL650-65162
TGF beta	2E7	65057-1-Ig	FITC-65047	CL488-65047	PE-65047		CL647-65047	
	1E3E9	69012-1-Ig					CL647-69012	
CD40L	N/A	21898-1-AP						
	1E6D10	66502-1-Ig		CL488-66502				
PD-1	J110	65119-1-Ig	FITC-65156		PE-65156			
CD183	1B2D6	60065-1-Ig		CL488-65119	PE-65119	APC-65119	CL647-65119	
CD119	N/A	10808-1-AP						
CD366	4C4G3	60355-1-Ig						
CD184	4B5E4	60042-1-Ig						
IRF4	N/A	11247-2-AP		CL488-11247				CL650-11247
CCR10	N/A	22071-1-AP						
FOXP3	N/A	22228-1-AP						
OX40	N/A	20006-1-AP						
BCL6	1E6B1	66430-1-Ig		CL488-66340				CL650-66430
CD195	N/A	17476-1-AP						



◀ Coralite488 Anti-Human CD3

(CL488-65133): Human peripheral blood lymphocytes were surface stained with APC-Anti-Human CD19 and 5.00 ul Coralite 488-conjugated Anti-Human CD3. Cells were not fixed.

▶ APC Anti-Human CD25 (APC-65096)

: Human peripheral blood lymphocytes were surface stained with 0.125 ug FITC-Anti-Human CD4 and 0.125 ug APC-Anti-Human CD25. Cells were not fixed.

Additional conjugated formats available at ptglab.com/products/flow-cytometry-antibodies

Antibody Labeling kits (FlexAble) for customized conjugations to any antibody of choice are available at ptglab.com/products/flexible-antibody-labeling-kits

