Cytokines and Growth factors

Growth factors are proteins that bind to receptors on the cell surface, with the primary result of activating cellular proliferation and/or differentiation. Many growth factors are quite versatile, stimulating cellular division in numerous different cell types; while others are specific to a particular cell-type.
Cytokines are a unique family of growth factors that stimulate both the humoral and cellular immune responses, as well as the activation of phagocytic cells. They are secreted primarily from leukocytes, including lymphocytes (**lymphokines**), monocytes or macrophages (**monokines**), but also by various cells of the body. Cytokines which are factors targeted to cells of hematopoietic origin are termed **interleukins** (**ILs**) : i.e. many are secreted by lymphocytes and able to affect the cellular responses of other leukocytes.

See also :
- Leukotrienes, Prostaglandines and Troboxane assays are presented in section "Inflammation".
- Histamine assays are presented in section "Allergy".
- Angiotensin and other blood activation factors are presented in section "Haematology"
- Ab Research Area #9 (Cytokine/Chemokines/ GrowthFactors)
- Ab Research Area #14 (Hormones & Steroids)

Technical tip

Factor	Principal Source (members)	Primary Activity	
PDGF	Platelets, endothelial cells, placenta	Promotes proliferation of connective tissue, glial and smooth muscle cells	
EGF	Submaxillary gland, Brunners gland	Promotes proliferation of mesenchymal, glial and epithelial cells	*
TGF-α	Common in transformed cells (related to EGF)	May be important for normal wound healing	
FGFs	Wide range of cells; protein is associated with the ECM (>19 members, 4 receptors)	Promotes proliferation of many cells; inhibits some stem cells; induces mesoderm to form in early embryos. FGFReceptors responsible of many bone disorders.	
NGF	Several related proteins first identified as proto-oncogenes; trkA (trackA), trkB, trkC	Promotes neurite outgrowth and neural cell survival	
Erythropoietin	Kidney	Promotes proliferation and differentiation of erythrocytes	
TGF-βs	Activated TH_1 cells (T-helper) and natural killer (NK) cells(>100 members incl. activin and inhibin proteins)	Anti-inflammatory (suppresses cytokine production and class II MHC expression), promotes wound healing, inhibits macrophage and lymphocyte proliferation	
TGF-α	Carcinomas, activated macrophages and keratinocytes	A potent keratinocyte growth factor in normal cell populations.binds to the EGF receptor & others	*
IGF-I	Primarily liver (also called Somatomedin C)	Promotes proliferation of many cell types	*
IGF-II	Variety of cells (related to IGF-I and proinsulin)	Promotes proliferation of many cell types primarily of fetal origin	
TNF-α	(also called cachectin)	Modifying cytokine produced primarily by activated macrophages	*
TNF-β	(also called lymphotoxin)	Kill a number of different cell types, and induce terminal differentiation in others. Also inhibits lipoprotein lipase present on the surface of vascular endothelial cells.	*
Interleukins	**Principal Source**	**Primary Activity**	
IL1-α and -β	Macrophages and other antigen presenting cells (APCs)	Costimulation of APCs and T cells, inflammation and fever, acute phase response, hematopoiesis	*
IL-2	Activated TH_1 cells, NK cells	Proliferation of B cells and activated T cells, NK functions	*
IL-3	Activated T cells	Growth of hematopoietic progenitor cells	*
IL-4	TH_2 and mast cells	B cell proliferation, eosinophil and mast cell growth and function, IgE and class II MHC expression on B cells, inhibition of monokine production	*
IL-5	TH_2 and mast cells	Eosinophil growth and function	*
IL-6	Activated TH_2 cells, APCs, other somatic cells	Acute phase response, B cell proliferation, thrombopoiesis, synergistic with IL-1 and TNF on T cells	*
IL-7	Thymic and marrow stromal cells	T and B lymphopoiesis	*
IL-8	Macrophages, other somatic cells	Chemoattractant for neutrophils and T cells	*
IL-9	T cells	Hematopoietic and thymopoietic effects	*
IL-10	Activated TH_2 cells, $CD8^+$ T and B cells, macrophages	Inhibits cytokine production, promotes B cell proliferation and antibody production, suppresses cellular immunity, mast cell growth	*
IL-11	Stromal cells	Synergisitc hematopoietic and thrombopoietic effects	
IL-12	B cells, macrophages	Proliferation of NK cells, INF-g production, promotes cell-mediated immune functions	*
IL-13	TH_2 cells	IL-4-like activities	*
Interferons	**Principal Source**	**Primary Activity**	
INF-α and -β	Macrophages, neutrophils and some somatic cells	Antiviral effects, induction of class I MHC on all somatic cells, activation of NK cells and macrophages	
INF-γ	Activated TH_1 and NK cells	Induces of class I MHC on all somatic cells, induces class II MHC on APCs and somatic cells, activates macrophages, neutrophils, NK cells, promotes cell-mediated immunity, antiviral effects	*

* available in this catalog.

Cytokines and growth factors

We offer three types of kits : ELISA sandwich, EIA competitive and ELISA development kits.

1- ELISA Kits : Sandwich assays

The ELISA kits use a sandwich enzyme immunoassay, which measures the free forms of human and mouse cytokines and growth factors. With the ELISA system, human or mouse monoclonal antibodies generated against the target cytokine/growth factor are used to capture the cytokine/growth factor in a sample. Simultaneously, specific rabbit polyclonal antibodies detect the target cytokine/growth factor in the sample. With the addition of Goat anti Rabbit conjugated alkaline phosphatase (which binds to the rabbit polyclonal cytokine/growth factor antibody), followed by the addition of the color generating solution, the amount of cytokine is detected. A standard curve is generated and demonstrates a direct relationship between Optical Density and cytokine concentration : ie, the higher the OD the higher the cytokine concentration in the sample.

2- EIA Kits : Competitive assays

The EIA kits are a competitive enzyme immunoassay (EIA), used for detection of total cytokines in complex biological fluids. These kits measure both natural and recombinant forms of the growth factors and cytokines. With this assay system, Goat anti Rabbit antibodies are used to capture a specific cytokine/growth factor complex in each sample consisting of antibodies, biotinylated cytokine/growth factor and sample/standard. Biotinylated cytokine/growth factor conjugate (competitive ligand) and sample/standard form a competition reaction for specific cytokine/growth factor antibody binding site. Therefore as the concentration of cytokine/growth factor in the sample increases, the amount of biotinylated cytokine/growth factor captured by the antibody decreases. With the addition of streptavidin conjugated alkaline phosphatase (which binds only to the biotinylated cytokine/growth factor), followed by the addition of the color generating solution, the amount of biotinylated cytokine/growth factor is detected. The results are in an inverse relationship between Optical Density (OD) and concentration : ie the higher the OD the lower the cytokine/growth factor concentration in the sample.

3- ELISA Development kits :

For researchers interested in producing their own ELISA kits, we also offer systems for development of "sandwich" assays for measuring the Cytokine / Growth Factor of choice. Each kit contains : capture antibody, biotinylated detection antibody and a calibrated standard, as well as its own easy to use protocol. Kits are sufficient to coat and detect Cytokines / Growth factors in 960 wells (10 x 96 wells).

Legend species : Hu : Human ; Mk : Monkey ; Ms : mouse ; Rt : Rat ; Sw : Swine

Cytokines and Growth factors

	ELISA sandwich kits		EIA competitive assay kits		ELISA development kits		Species cross reactivity			
	96 wells		96 wells		Reagents for 10 plates (960 wells)					
	Cat. #	Sensitivity	**Cat. #**	Sensitivity	**Cat. #**	Range	Ms	Rt	Sw	Mk
Human Cytokines and Growth Factors Assay kits										
CD40 Ligand					**GI8630**					
CXCL16					**GI8620**					
Endostatin	**AT6460**		**AT6820**	1.95 ng/ml						
EGF	**AS8900**	8.3 pg/ml	**AT0190**	0.195 ng/ml	**AT3510**	8-700pg/ml	-	-	-	-
EMAP-2			**AT0200**	0.8 ng/ml						
Eotaxin 3					**AT3520**					
FGF basic			**AT0210**	0.488 ng/ml	**GI8640**		-	-	-	-
GM-CSF	**AS8910**	0.8 pg/ml	**AT0220**	0.195 ng/ml						
GRO beta					**GI8650**					
Interferon alpha			**AT0230**	0.391 ng/ml						
Interferon gamma	**AS8920**	0.72 pg/ml			**AT3540**	32-4000pg/ml	-	-	-	+
Interleukin 1 alpha	**AS8930**	0.8 pg/ml	**AT0240**	0.195 ng/ml			-	-	+	+
Interleukin 1 beta					**AT3560**	16-3000pg/ml				
Interleukin 2	**AS8940**	1.1 pg/ml	**981774**	0.195 ng/ml	**GI8660**		-	-	+	+
Interleukin 3			**AT0250**	1.95 ng/ml			-	-	-	-
Interleukin 4	**AS8950**	0.87 pg/ml	**AT0260**	1.95 ng/ml			-	-	-	+
Interleukin 5	**AS8960**						-	-	-	-
Interleukin 6	**AS8970**	3,4 pg/ml	**AT0270**	0.195 ng/ml	**GI8670**		-	-	+	+
Interleukin 7			**AT0280**	0.195 ng/ml			-	-	+	-
Interleukin 8	**AS8980**	9,2 pg/ml	**AT0290**	1.95 ng/ml			-	-	-	-
Interleukin 10	**AS8990**	1.6 pg/ml	**AT0300**	1.95 ng/ml	**AT3590**	64-4000pg/ml	-	-	+	-
Interleukin 12	**AS9000**	9.0 pg/ml	**AT0310**	0.49 ng/ml	**AT3600**	32-3000pg/ml				
Interleukin 13	**AS9010**	9.9 pg/ml	**AT0320**	1.95 ng/ml			-	-	-	-
Interleukin 15	**AS9020**	4.6 pg/ml	**AT0330**	1.95 ng/ml			-	-	-	-
Interleukin 20					**AT3610**					
IP-10	**AS9030**	16.2 pg/ml	**AT0340**	0.195 ng/ml	**GI8680**					
Leptin			**AT0350**	0.488 ng/ml						
MCP-1	**AS9040**	11.5 pg/ml			**GI8690**	8-3000 pg/ml				
MIP-1 alpha			**AT0360**	1.95 ng/ml	**GI8700**		-	-	-	-
MIP-1 beta	**AS9050**	10.1 pg/ml								
PDGF-BB					**GI8720**					
RANTES					**GI8740**					
Resistin					**AT3630**					
SCF	**AS9060**	10.8 pg/ml								
sRANKL					**AT3620**					
TNF alpha	**AS9070**	4.8 pg/ml	**AS9070**	0.195 ng/ml	**AT3650**	16-2000pg/ml	-	-	+	+
TNF beta			**AT0370**	0.195 ng/ml						
TPO					**GI8760**					
TSP-1			**AT0380**	3.91 ng/ml						
TWEAK					**GI8770**					
VEGF	**AS9080**	18.6 pg/ml	**AT0400**	0.195 ng/ml	**AT3660**	32-4000pg/ml	-	+	+	-
Mouse Cytokines and Growth Factors Assay kits										
Endostatin	**AT6470**	9.1 pg/ml	**AT6840**	1.953 ng/ml						
GM-CSF			**AT0420**	0.195 ng/ml			-	-	-	-
Interferon gamma	**AS9101**	8.9 pg/ml			**AT3680**	64-5000 pg/ml				
Interleukin 1 alpha			**AT0430**	0.195 ng/ml			-	+	-	-
Interleukin 2							-	+	-	-
Interleukin 3			**AT0440**	0.195 ng/ml	**AT3710**	64-4000pg/ml	-	-	-	-
Interleukin 4	**AS9110**	0.96 pg/ml								
Interleukin 6	**AS9120**	16.8 pg/ml	**AT0450**	0.489 ng/ml			-	-	-	-
Interleukin 10	**AS9130**	10.2 pg/ml								
Interleukin 12					**AT3720**	128-2000 pg/ml				
MIP-1 alpha					**GI8710**					
SCF										
sRANKL					**GI8730**					
TNF alpha	**AS9140**	16.6 pg/ml	**AT0460**	0.195 ng/ml	**GI8750**	8-2000 pg/ml	-	+	-	-
VEGF	**AS9080**	18,6 pg/ml	**AT0470**	0.488 ng/ml	**GI8780**					
Rat Cytokines and Growth Factors Assay kits										
Interferon gamma	**AS9150**	9,1 pg/ml			**BF4430**	32-4000 pg/ml				
Interleukin 1beta					**BF4450**	32-3000 pg/ml				
TNF alpha	**AS9160**	16.6 pg/ml			**BF4410**	32-3000 pg/ml				