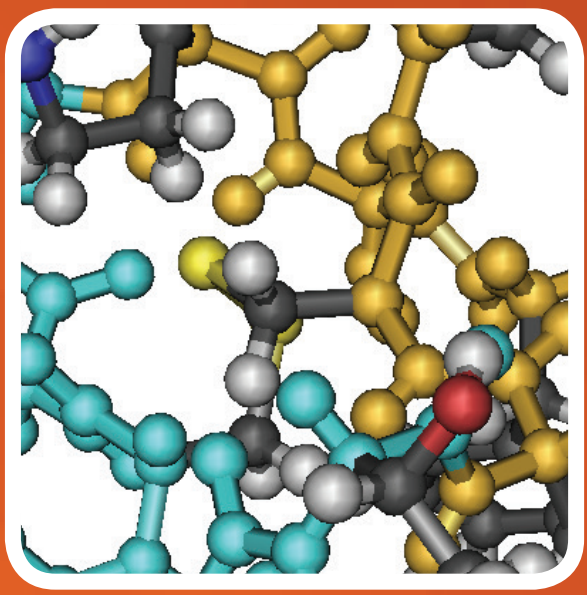
Apply Natural Mechanisms *in vitro*



Growth Factors and Cytokines

Growth factors and cytokines are signaling molecules that control cell proliferation, differentiation, apoptosis, immunological/ hematopoietic responses, morphogenesis, and maintenance of tissue homeostasis. Their crucial roles make them valuable tools in the study of a wide variety of cell functions and their associated signaling pathways, with many utilized in preclinical and clinical applications as well as immunotherapy.

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1 Growth Factors and Cytokines

Growth factors and cytokines are naturally occurring signalling molecules that are crucial players in complex cell-to-cell communication networks in higher organisms. These molecules carry regulatory messages between cells that practically determine the fate of all cellular processes. While cytokines are mostly associated with immune system housekeeping, growth factors regulate a wide range of processes during an organism's developmental and mature stages. Uncontrolled growth factor activation is often associated with oncogenesis.

Considering their vital roles, it is not surprising that growth factors and cytokines are indispensable to many aspects of cell biology research and development. Traditional cell biology experiments use animal serum as a rich, but heterogeneous source of growth factors and nutrients required for normal cell metabolism. However, the use of animal serum is undesirable due to:

- Increased risk of viral, mycoplasma and prion contamination
- High cost and ethical concerns associated with serum collection
- Inaccurate interpretation of results due to non-standardized media that may also contain growth inhibitors

A switch from animal serum to recombinant growth factors is the logical choice for many types of research. **abm**'s reliable, high quality products have the following features:

- High Purity—production under exacting conditions ensure consistent quality and ≥95% purity on every lot as assessed by SDS-PAGE
- Minimal Endotoxin—guaranteed to be below the acceptable limit of 1 EU/ug recombinant protein as tested by the standard Limulus Amebocyte Lysate (LAL) assay
- Assured Biological Activity with every lot
- Flexible Aliquot Sizes with our custom-package services
- Option of an Animal-Free Version for particularly sensitive applications

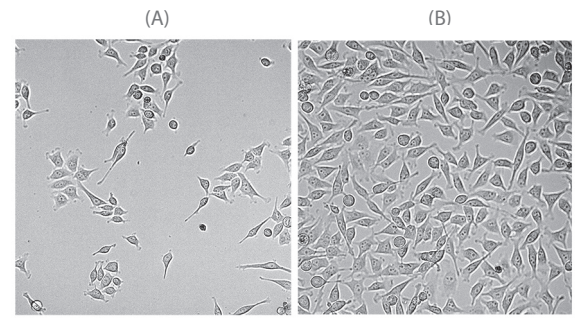

Figure 1: Increase in proliferation of Human Cervical Epithelial cells upon addition of Human Beta-Defensin 2 (DEFB4A): Negative Control (B) DEFB4A at the final concentration of 50 ng/ml.

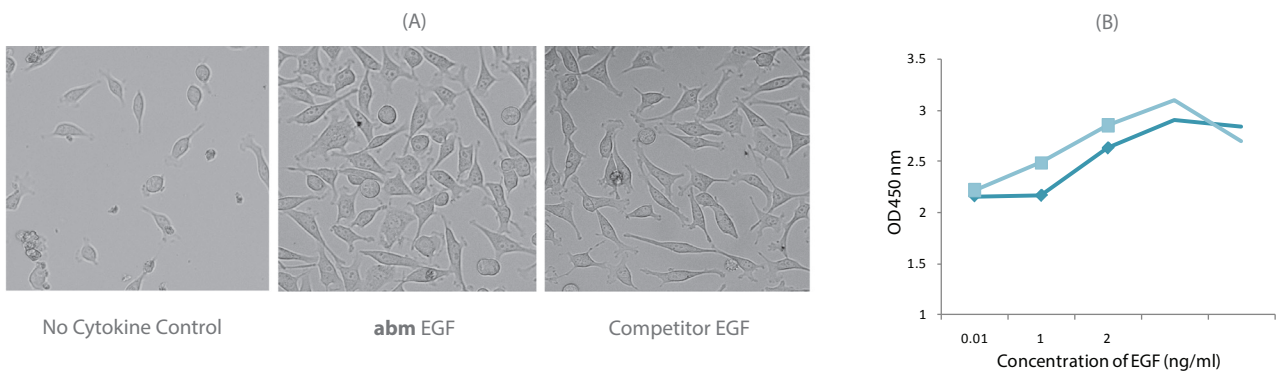

Figure 2: (A) Increase in proliferation of Human Cervical Epithelial cells upon addition of **abm**'s and competitor's Human EGF at a final concentration of 20 ng/ml. (B) Comparison of Bioactivity Activity of **abm**'s and competitor's EGF in a dose-dependent proliferation assay of Human Cervical Epithelial cells.

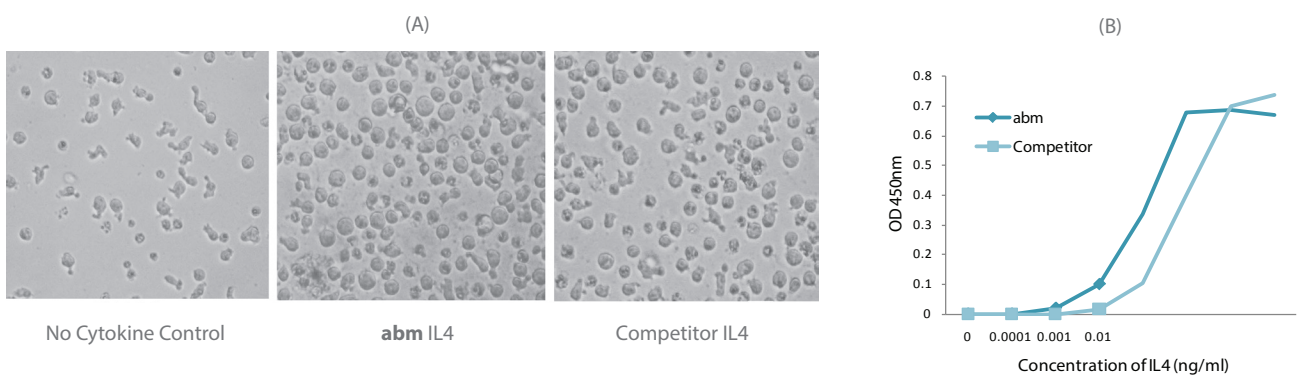

Figure 3: (A) Increase in proliferation of Human Megakaryocytic Leukemia cells upon addition of **abm**'s and competitor's Human IL4 at a final concentration of 10 ng/ml. (B) Comparison of Bioactivity Activity of **abm**'s and competitor's IL4 in a dose-dependent proliferation assay of Human Megakaryocytic Leukemia cells.

abm is proud to offer a wide-repertoire of bioactive, recombinant human, mouse and rat growth factors and cytokines that are ≥95% pure, have <1.0 EU of endotoxin/µg of protein and available in customizable aliquots.

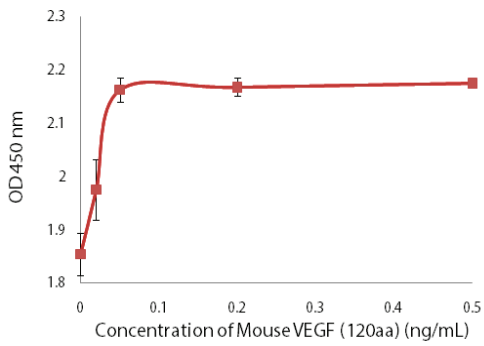

Figure 4: abm's Recombinant Mouse VEGF (120 aa) stimulates proliferation of mouse endothelial cells in a dose-dependent manner with an ED50 <0.1 ng/ml.

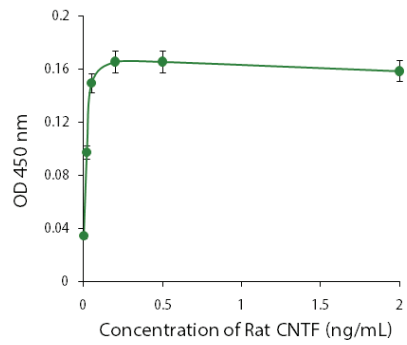

Figure 5: abm's Recombinant Rat CNTF stimulates proliferation of human megakaryocytic leukemia cells in a dose-dependent manner with an ED50 <0.5 ng/ml.

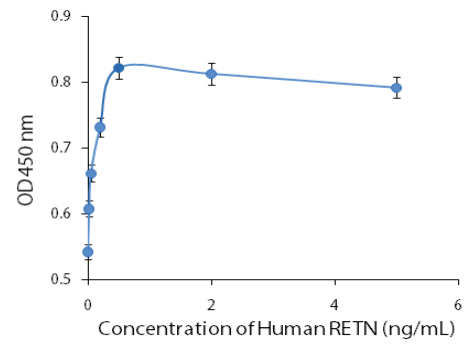

Figure 6: abm's Recombinant Human Resistin (RETN) that stimulates proliferation of human aortic smooth muscle cells in a dose-dependent manner with an ED50 <1 ng/ml.

Recombinant Mouse Growth Factors and Cytokines

Product Name	Cat.No.	Source
Beta-Defensin 1 (DEFB1)	Z200265	*E. coli*
Beta-Defensin 2 (DEFB2)	Z200285	*E. coli*
Beta-Defensin 3 (DEFB3)	Z200275	*E. coli*
CCL22	Z200315	*E. coli*
CCL25	Z200325	*E. coli*
CXCL1	Z200345	*E. coli*
CXCL2	Z200355	*E. coli*
CXCL4 (PF4)	Z200305	*E. coli*
CXCL12 (SDF-1 beta)	Z200205	*E. coli*
EGF	Z200025	*E. coli*
Eotaxin (CCL11)	Z200035	*E. coli*
Eotaxin-2 (CCL24)	Z200405	*E. coli*
Exodus-2 (CCL21A)	Z200045	*E. coli*
FGF1	Z200005	*E. coli*
FGF2	Z200015	*E. coli*
FLT3 Ligand (FLT3LG)	Z200055	*E. coli*
G-CSF (CSF3)	Z200605	*E. coli*
GH1	Z200065	*E. coli*
GM-CSF (CSF2)	Z200075	*E. coli*

Product Name	Cat.No.	Source
GRO gamma (CXCL3)	Z200415	*E. coli*
IFNG	Z200085	*E. coli*
IGF1	Z200625	*E. coli*
IL1A	Z200095	*E. coli*
IL1B	Z200105	*E. coli*
IL2	Z200135	*E. coli*
IL3	Z200145	*E. coli*
IL4	Z200165	*E. coli*
IL6	Z200175	*E. coli*
IL10	Z200465	CHO
IL10	Z200115	*E. coli*
IL11	Z200125	*E. coli*
IL12A	Z200445	CHO
IL13	Z200245	*E. coli*
IL17	Z200435	*E. coli*
IL18BP	Z200425	*E. coli*
IL25	Z200255	*E. coli*
IL33	Z200155	*E. coli*
KGF (FGF7)	Z200185	*E. coli*

Product Name	Cat.No.	Source
LIF	Z200485	CHO
LIX (CXCL5)	Z200555	*E. coli*
MCP-2 (CCL8)	Z200395	*E. coli*
MCP-5 (CCL12)	Z200385	*E. coli*
MEC (CCL28)	Z200335	*E. coli*
MIF	Z200295	*E. coli*
MIP-1 gamma (CCL9)	Z200375	*E. coli*
MIP-3 (CCL19)	Z200455	*E. coli*
Noggin (NOG)	Z200235	*E. coli*
SHH	Z200615	*E. coli*
SR-PSOX (CXCL16)	Z200365	*E. coli*
Stem Cell Factor (KITLG)	Z200505	CHO
Stem Cell Factor (KITLG)	Z200595	*E. coli*
THPO	Z200535	*E. coli*
TNF	Z200215	*E. coli*
VEGF (120aa)	Z200585	*E. coli*
VEGF (164aa)	Z200575	*E. coli*

Recombinant Rat Growth Factors and Cytokines

Product Name	Cat.No.	Source
CNTF	Z300035	*E. coli*
CXCL1	Z300105	*E. coli*
CXCL2	Z300115	*E. coli*
EGF	Z300045	*E. coli*
Eotaxin (CCL11)	Z300145	*E. coli*
FGF2	Z300005	*E. coli*
G-CSF (CSF3)	Z300185	*E. coli*

Product Name	Cat.No.	Source
GRO gamma (CXCL3)	Z300135	*E. coli*
IFNG	Z300015	*E. coli*
IGF1	Z300055	*E. coli*
IL1B	Z300075	*E. coli*
IL2	Z300195	*E. coli*
IL3	Z300205	*E. coli*
IL5	Z300155	*E. coli*

Product Name	Cat.No.	Source
IL6	Z300085	*E. coli*
IL10	Z300025	*E. coli*
IL13	Z300095	*E. coli*
IL17	Z300175	*E. coli*
IL20	Z300165	*E. coli*
LIX (CXCL5)	Z300125	*E. coli*
TNF	Z300065	*E. coli*

Recombinant Human Growth Factors and Cytokines

Product Name	Cat.No.	Source
4-1BB Receptor (TNFRSF9)	Z101425	CHO
4-1BB Receptor (TNFRSF9)	Z101085	*E. coli*
4-BBL (TNFSF9)	Z102255	*E. coli*
Activin A (INHBA)	Z101665	*E. coli*
Activin A (INHBA)	Z102635	HEK293
Adiponectin (Acrp30)	Z102595	*E. coli*
AIMP1	Z100155	*E. coli*
AITRL (TNFSF18)	Z101725	E. coli
AREG	Z101875	E. coli
Artemin (ARTN)	Z102355	E. coli
BAFF/BLYS (TNFSF13B)	Z101135	CHO
BAFF-R (TNFRSF13C)	Z100015	E. coli
BCA-1 (CXCL13)	Z100075	E. coli
B-cell Activating Factor (TNFSF13B)	Z100965	E. coli
B-cell Maturation Protein (TNFRSF17)	Z101445	E. coli
BDNF	Z100065	E. coli
Beta-Defensin 1 (DEFB1)	Z100025	E. coli
Beta-Defensin 2 (DEFB4A)	Z100035	E. coli
Beta-Defensin 3 (DEFB103A)	Z100045	E. coli
Beta-Defensin 4 (DEFB104A)	Z100055	E. coli
Beta-NGF	Z101545	CHO
Beta-NGF	Z102645	HEK293
BMP2	Z100085	E. coli
BMP2	Z102665	HEK293
BMP-3 beta (GDF10)	Z100095	E. coli
BMP4	Z100105	E. coli
BMP4	Z102675	HEK293
BMP7	Z102655	HEK293
Cardiotrophin-1 (CT-1)	Z102365	*E. coli*
CCL1	Z101905	*E. coli*
CCL2	Z100625	*E. coli*
CCL3	Z100675	*E. coli*
CCL4	Z100685	*E. coli*
CCL21	Z100195	*E. coli*
CCL22	Z101015	*E. coli*
CCL25	Z101525	*E. coli*
CD40 Ligand (CD40LG)	Z100125	*E. coli*
Chemerin	Z102205	*E. coli*
CNTF	Z100955	*E. coli*
CTACK (CCL27)	Z101885	*E. coli*
CTGF	Z102025	*E. coli*
CXCL1	Z100285	*E. coli*
CXCL2	Z100295	*E. coli*
CXCL4 (PF4)	Z101005	*E. coli*
CXCL11	Z100585	*E. coli*
CXCL12 (SDF-1 α)	Z101635	*E. coli*
CXCL12 (SDF-1 β)	Z101645	*E. coli*
CXCL14 (BRAK)	Z102375	*E.coli*
CXCL16	Z102385	*E. coli*

Product Name	Cat.No.	Source
Cystatin C	Z102685	HEK293
DAND5	Z102135	*E. coli*
DHH	Z101695	*E. coli*
EGF	Z100135	*E. coli*
EGFL7	Z101535	Insect Cells
ENA-78 (CXCL5)	Z100165	*E. coli*
Eotaxin (CCL11)	Z100175	*E. coli*
Eotaxin-2 (CCL24)	Z100185	*E. coli*
Eotaxin-3 (CCL26)	Z101575	*E. coli*
Epiregulin (EREG)	Z100995	*E. coli*
EPO	Z101435	HEK293
FGF1	Z100005	*E. coli*
FGF2	Z101455	*E. coli*
FGF3	Z102285	*E. coli*
FGF4	Z102605	*E. coli*
FGF4	Z102715	HEK293
FGF6	Z101685	*E. coli*
FGF7 (KGF)	Z102725	HEK293
FGF8	Z101705	*E. coli*
FGF8	Z102735	HEK293
FGF9	Z101125	CHO
FGF9	Z100215	*E. coli*
FGF10	Z100205	*E. coli*
FGF16	Z102295	*E. coli*
FGF17	Z102305	*E. coli*
FGF18	Z102315	*E. coli*
FGF19	Z102325	*E. coli*
FGF20	Z101715	*E. coli*
FGF21	Z101105	*E. coli*
FGF23	Z100985	*E. coli*
FLT3 Ligand (FLT3LG)	Z100225	*E. coli*
FLT3 Ligand (FLT3LG)	Z101145	CHO
FLT3 Ligand (FLT3LG)	Z102745	HEK293
Follistatin (FST)	Z101035	*E. coli*
Fractalkine (CX3CL1)	Z101895	*E. coli*
FSHB	Z100235	CHO
Galectin-1 (LGALS1)	Z101845	*E. coli*
Galectin-3 (LGALS3)	Z101825	*E. coli*
GCP-2 (CXCL6)	Z101805	*E. coli*
G-CSF (CSF3)	Z101155	CHO
G-CSF (CSF3)	Z100245	*E. coli*
G-CSF (CSF3)	Z102755	HEK293
GDF3	Z101735	*E. coli*
GDNF	Z101055	*E. coli*
GGF2	Z101655	*E. coli*
GH1	Z100265	*E. coli*
GM-CSF (CSF2)	Z101165	CHO
GM-CSF (CSF2)	Z100275	*E. coli*
GM-CSF (CSF2)	Z102765	HEK293
GMFB	Z101115	*E. coli*

Product Name	Cat.No.	Source
GRO gamma (CXCL3)	Z101465	*E. coli*
HB-EGF (Heparin Binding EGF)	Z102155	*E. coli*
HCC-1 (CCL14)	Z100305	*E. coli*
HCC-2 (CCL15)	Z100315	*E. coli*
HGH	Z100335	
HGF	Z102775	HEK293
HGH	Z102785	HEK293
HSA	Z102795	HEK293
IFNA1 (IFN-alpha1)	Z102395	*E. coli*
IFNA2A	Z101585	*E. coli*
IFNA2A	Z102805	HEK293
IFNA2B	Z102815	HEK293
IFNA4	Z102405	*E. coli*
IFNB1	Z101485	
IFNG	Z101175	
IFNG	Z100345	*E. coli*
IGF1	Z100385	*E. coli*
IGF2	Z102345	*E. coli*
IGF2BP2	Z101185	
IGFBP3	Z100375	*E. coli*
IGFBP5	Z102015	*E. coli*
IGFBP7	Z102035	*E. coli*
IL10	Z101195	
IL1A	Z101225	
IL1A	Z100405	*E. coli*
IL1B	Z100395	*E. coli*
IL1B	Z102825	HEK293
IL1RN	Z100415	*E. coli*
IL2	Z101235	
IL2	Z100485	*E. coli*
IL2	Z102875	HEK293
IL3	Z101295	
IL3	Z100515	*E. coli*
IL3	Z102935	HEK293
IL4	Z101305	
IL4	Z100545	*E. coli*
IL4	Z102945	HEK293
IL6	Z101315	
IL6	Z100555	*E. coli*
IL6	Z102955	HEK293
IL7	Z101325	
IL7	Z100975	*E. coli*
IL7	Z102965	HEK293
IL8 (72aa)	Z101605	*E. coli*
IL8 (77aa)	Z101615	*E. coli*
IL9	Z102475	*E. coli*
IL9	Z102975	HEK293
IL10	Z101195	
IL10	Z101495	*E. coli*

Product Name	Cat.No.	Source
IL10	Z102835	HEK293
IL11	Z100425	*E. coli*
IL12	Z102845	HEK293
IL13	Z100445	*E. coli*
IL15	Z101205	CHO
IL15	Z100455	*E. coli*
IL16	Z101215	CHO
IL16	Z102415	*E. coli*
IL17A	Z100465	*E. coli*
IL17A	Z102855	HEK293
IL17C	Z102225	*E. coli*
IL17D	Z102425	*E. coli*
IL17F	Z102435	*E. coli*
IL17F	Z102865	HEK293
IL18	Z100475	*E. coli*
IL18BP	Z101045	HEK293
IL19	Z102445	*E. coli*
IL20	Z101075	*E. coli*
IL21	Z101245	CHO
IL21	Z100495	*E. coli*
IL22	Z101255	CHO
IL22	Z100945	*E. coli*
IL23	Z102885	HEK293
IL24	Z101265	CHO
IL27	Z101275	CHO
IL27	Z102895	HEK293
IL28A	Z102455	*E. coli*
IL28A	Z102905	HEK293
IL28B	Z101285	CHO
IL28B	Z102915	HEK293
IL29	Z102925	HEK293
IL29 (IFNL1)	Z100505	*E. coli*
IL31	Z100525	*E. coli*
IL33	Z100535	*E. coli*
IL36A	Z101865	*E. coli*
IL36B	Z102465	*E. coli*
IL36G	Z102215	*E. coli*
IL37/IL23	Z102085	*E. coli*
Insulin (INS)	Z101065	Yeast Cells
IP-10 (CXCL10)	Z100575	*E. coli*
KGF (FGF7)	Z101335	CHO
KGF (FGF7)	Z100595	*E. coli*
LEC (CCL16)	Z100325	*E. coli*
Leptin (LEP)	Z101855	*E. coli*
LIF	Z101345	CHO
LIF	Z100605	*E. coli*
LTA	Z101565	CHO
LTA	Z100865	*E. coli*
Lymphotactin (XCL1)	Z100615	*E. coli*

Product Name	Cat.No.	Source
M-CSF	Z102985	HEK293
MANF	Z102065	*E. coli*
Maspin (SerpinB5)	Z102505	*E. coli*
MCP-2 (CCL8)	Z100635	*E. coli*
MCP-3 (CCL7)	Z101915	*E. coli*
MCP-4 (CCL13)	Z100645	*E. coli*
M-CSF (CSF1)	Z100655	*E. coli*
MEC (CCL28)	Z101025	*E. coli*
MIA	Z102045	*E. coli*
MIA2	Z102055	*E. coli*
Midkine (NEGF2)	Z102175	*E. coli*
MIF	Z100915	*E. coli*
MIG (CXCL9)	Z100665	*E. coli*
MIP-1 beta (CCL4L1)	Z102105	*E. coli*
MIP-3 (CCL23)	Z100695	*E. coli*
MIP-3 alpha (CCL20)	Z100705	*E. coli*
MIP-3 beta (CCL19)	Z101945	*E. coli*
MIP-4 (CCL18)	Z100715	*E. coli*
MMP2	Z101815	*E. coli*
MSTN	Z100255	*E. coli*
NAP-2 (PPBP) (CXCL7)	Z100725	*E. coli*
Neuritin	Z102185	*E. coli*
Nodal	Z102485	*E. coli*
Noggin (NOG)	Z101355	CHO
Noggin (NOG)	Z100925	*E. coli*
Noggin (NOG)	Z102995	HEK293
NOV	Z102075	*E. coli*
NRG1	Z101625	*E. coli*
NRG4	Z100905	*E. coli*
OPG (TNFRSF11B)	Z101775	*E. coli*
OSM	Z101365	CHO
OSM	Z100755	*E. coli*
OSM	Z103005	HEK293
PDGFA	Z100365	*E. coli*
PDGFA	Z103015	HEK293
PDGFB	Z100355	*E. coli*
PDGFC	Z101785	*E. coli*
Persephin (PSPN)	Z102495	*E. coli*
PIGF	Z102615	*E. coli*
Pro-IGF-II	Z103025	HEK293
Prolactin (PRL)	Z102145	*E. coli*
PTH	Z100775	*E. coli*
RANKL (TNFSF11)	Z102265	*E. coli*
RANTES (CCL5)	Z100785	*E. coli*
Resistin (RETN)	Z100805	*E. coli*
Resistin-like beta (RETNLB)	Z101955	*E. coli*
S100A13	Z102195	*E. coli*
S100A4	Z101505	*E. coli*
sCD23 (FCER2)	Z101835	*E. coli*

Product Name	Cat.No.	Source
SCF	Z103035	HEK293
SERPINF1	Z100765	*E. coli*
SHH	Z101675	*E. coli*
SOD1	Z100795	*E. coli*
Stem Cell Factor (KITLG)	Z101375	CHO
Stem Cell Factor (KITLG)	Z100815	*E. coli*
TARC (CCL17)	Z100835	*E. coli*
TFF1	Z101975	*E. coli*
TFF2	Z101985	*E. coli*
TFF3	Z101995	*E. coli*
TGF Beta-1	Z101555	HEK293
TGF Beta-2	Z103055	HEK293
TGF Beta-3 (TGFB3)	Z102515	*E. coli*
TGF Beta-3 (TGFB3)	Z103065	HEK293
TGFA	Z101935	*E. coli*
THBS1	Z101395	Insect Cells
THPO	Z101515	*E. coli*
Thymosin-Beta 4 (TMSB4X)	Z102005	*E. coli*
TNF	Z101385	CHO
TNF	Z100855	*E. coli*
TNFA	Z103075	HEK293
TNFRSF10B	Z102245	*E. coli*
TNFRSF1A	Z102235	*E. coli*
TNFRSF1B	Z101745	*E. coli*
TPO	Z103085	HEK293
TRAIL (TNFSF10)	Z101755	*E. coli*
TSLP	Z101095	*E. coli*
TWEAK (TNFSF12)	Z102275	*E. coli*
TWEAK Receptor (TNFRSF12A)	Z102525	*E. coli*
Uteroglobin (SCGB1A1)	Z101965	*E. coli*
VEGF121	Z103095	HEK293
VEGF (121aa)	Z101405	CHO
VEGF (121aa)	Z102115	*E. coli*
VEGF165	Z103105	HEK293
VEGF (165aa)	Z101415	CHO
VEGF (165aa)	Z100895	*E. coli*
VEGFB	Z102535	*E. coli*
WISP2	Z101925	*E. coli*
WISP3	Z102545	*E. coli*
WNT1	Z102125	*E. coli*

More Resources

For more information about Growth Factors and Cytokines, visit our Knowledge Base and YouTube Channel!

Knowledge Base

https://www.abmgood.com/marketing/knowledge_base.php

YouTube Channel

www.youtube.com/c/abmgood

Growth Factors & Cytokines - An Introduction
https://youtu.be/7g2f0dhp2w8

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