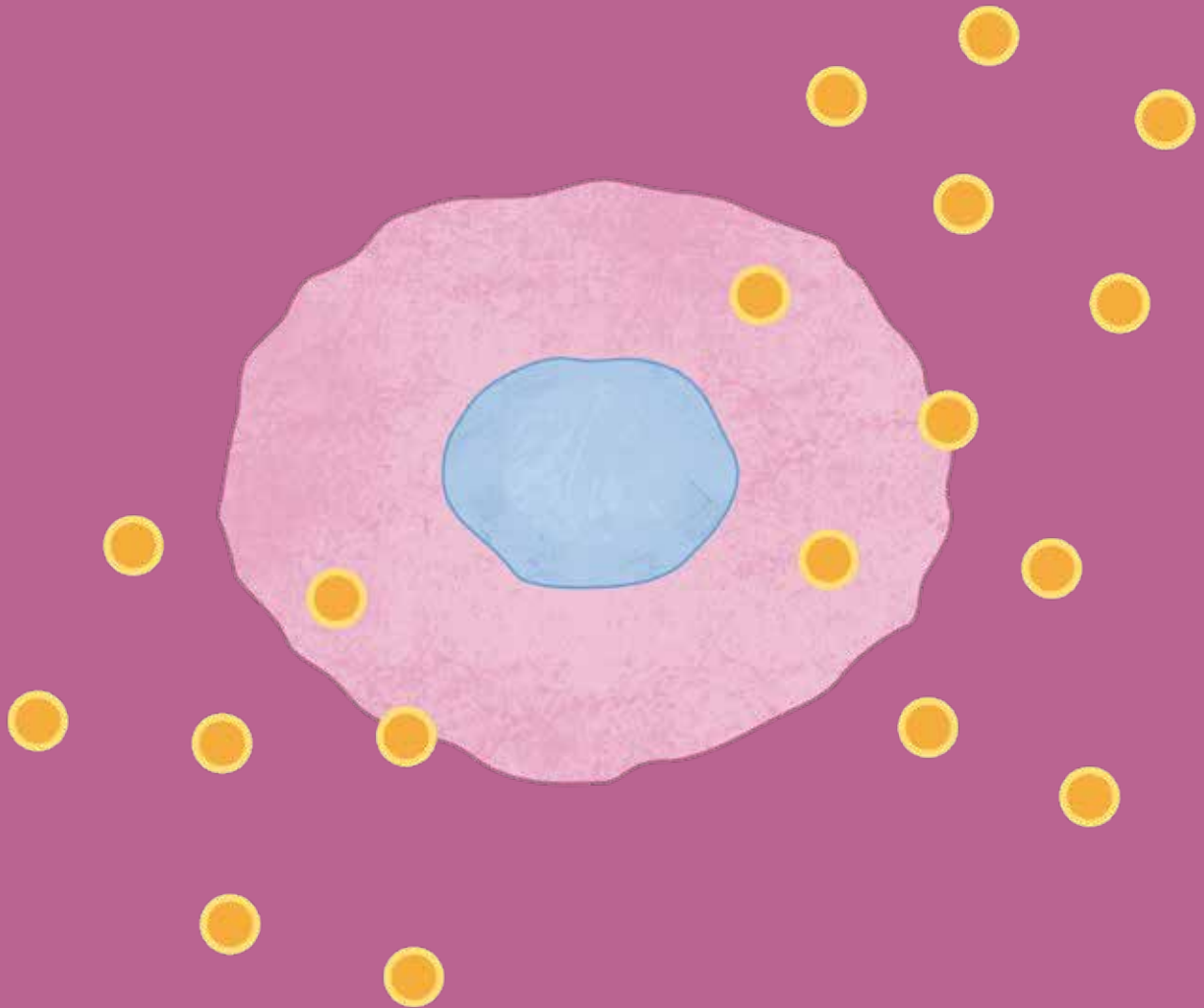


Cytokines



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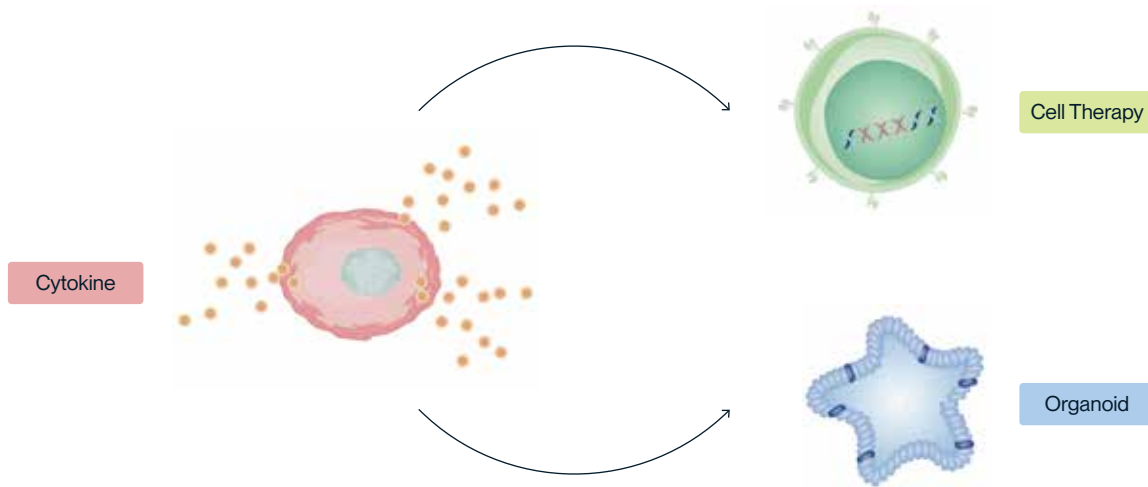
CliniSciences Group

Recombinant Cytokines for Cell Culture

Cell culture is the cornerstone for advancements in cell therapy and organoid development. KACTUS has crafted an array of premium cytokines tailored for the cultivation of cells and organoids, creating a reliable foundation for research in these areas.

Cytokines are a class of low-molecular-weight soluble proteins with a wide range of biological activities that are synthesized and secreted by immune cells and certain non-immune cells upon stimulation. Their function is to regulate cell growth and differentiation, control immune responses, and repair damaged tissues by binding to corresponding receptors. Cytokines can generally be divided into several types such as interleukins, interferons, tumor necrosis factor superfamily, colony-stimulating factors, chemokines, growth factors, etc. They play an important role in the fields of cell therapy and organ-like structures.

KACTUS has successfully developed an extensive series of high-activity cytokines using its unique protein engineering and production platform, Structure Assisted Multiplex Screening (SAMS™). All cytokines have passed strict quality inspections and can be applied in various scenarios such as immune cell culture, stem cell differentiation, and organ-like tissue culture in cell therapy.



High Purity ($\geq 95\%$)

Low endotoxin (< 0.1 EU/ μ g)

Batch-to-batch consistency

Rigorously verified biological activity

Various cell types & applications

Customization Services

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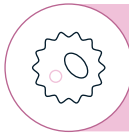
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Seamlessly Transition your Cell Culture Protein to GMP Production

With the rise of gene and cell therapy, cytokines and other key raw and auxiliary materials are increasingly valued, giving rise to a market demand for GMP-grade recombinant protein raw materials.

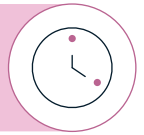
KACTUS possesses a mature and comprehensive GMP-grade recombinant protein production and quality management system. Tailoring to the specific requirements and applications of our clients, we can smoothly transition cell culture-related proteins to our large-scale GMP-grade production facility. This capability both simplifies and accelerates the transition from preclinical to clinical applications and eventual market approval for cell therapies.

We have established a quality management system in accordance with ISO13485:2016 and pharmaceutical GMP regulations. Our comprehensive documentation programs undergo continuous updates and improvements to ensure the effectiveness, appropriateness, and adequacy of our quality management system. Every production stage from transfection and cell culture through isolation and purification is rigorously checked to ensure the process is documented and the product quality is stable and reliable, meeting the stringent requirements of drug manufacturing.



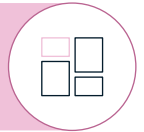
Strict management of cell strains, segmented into Master Cell Banks (MCB) and Working Cell Banks (WCB), overseen with multi-tiered personnel oversight and layered security protocols.

Systematic validation of analytical methods to ensure the validity and reproducibility of results



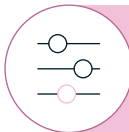
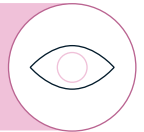
Animal-origin free

Comprehensive quality control and release testing conducted on in-process samples, raw materials, intermediates, and finished products



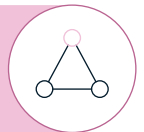
Through inspection and quality approval of all raw materials, auxiliary ingredients, and packaging components utilized in the production process prior to release

Continuous monitoring of batch-to-batch variances to ensure consistency across batches



Stringent control of key parameters ensures consistent batch-to-batch quality during production

Validation of product stability, including influencing factor testing, accelerated stability studies, and long-term stability studies



GMP-Grade Manufacturing Facility



Comprehensive Suite of Analytical Equipment



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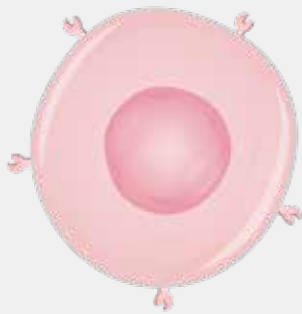
CliniSciences Group

Cytokines for Cell Therapy: High-Quality Proteins for CAR-T, CAR-NK, & Stem Cells

Cell therapy refers to the process of specifically modifying certain immune cells or stem cells to enable them to kill tumors or repair and reconstruct normal cellular tissues, with the goal of treating diseases. During these cell culture processes, a variety of cytokines are needed to maintain cell growth and/or differentiation. These cytokines ensure normal cell function in CAR-T, CAR-NK, CAR-M cell therapies, differentiation of iPSCs into T cells or NK cells and other immune cells, as well as the cell culture of mesenchymal stem cells (MSC), hematopoietic stem cells (HSC), and other stem cells in stem cell transplantation therapies.

KACTUS provides a variety of high-quality cytokines that can be used for cell therapies, meeting the specific cell culture needs of CAR-T, CAR-NK, and stem cells.

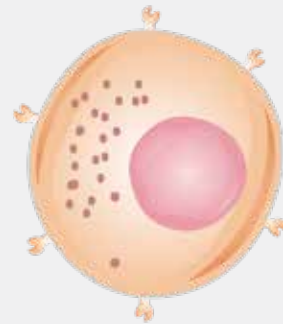
T cell therapy



IL-7
IL-15
.....

CAR-T
UCAR-T
TCR-T
TIL
.....

NK cell therapy



IL-15
IL-21
IL-18
.....

CAR-NK
iPSC-CAR-NK
.....

M cell therapy



FGF-2
VEGF
GM-CSF
BMP-4
.....

CAR-M
iPSC-CAR-M
.....

Stem cell therapy



HGF
SCF
LIF
Flt3L
.....

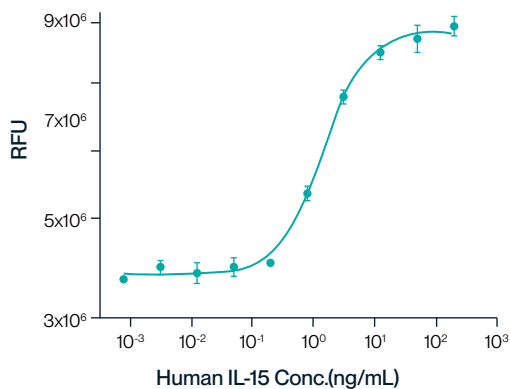
MSC
HSC
ADSC
.....

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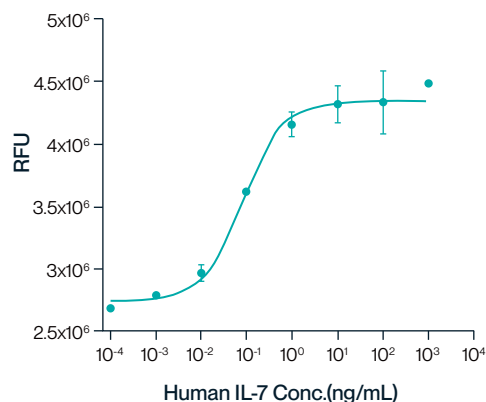
Product Validation Data

Recombinant Human IL-15 Bioactivity



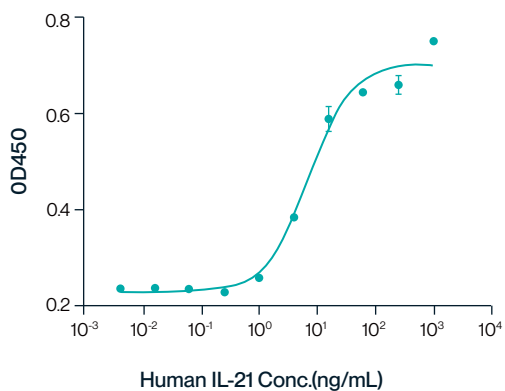
Measured in a cell proliferation assay using MO7e human megakaryocytic leukemic cells. The ED50 for this effect is 1-2 ng/mL. The specific activity of recombinant human IL-15 is >5x10⁷ units/mg, which is calibrated against the human IL-15 reference standard (NIBSC code: 95/554).

Recombinant Human IL-7 Bioactivity



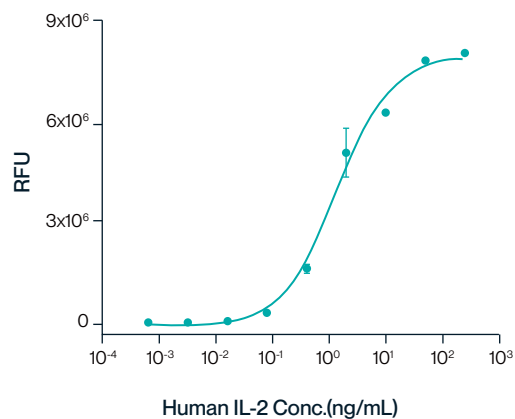
Measured in a cell proliferation assay using murine 2E8 cells. The ED50 for this effect is 0.1 - 0.5 ng/mL.

Recombinant Human IL-21 Bioactivity



Measured by its ability to enhance IFN-gamma secretion in NK-92 human natural killer lymphoma cells. The ED50 for this effect is < 8 ng/mL.

Recombinant Human IL-2 Bioactivity



Measured in a cell proliferation assay using CTLL-2 mouse cytotoxic T cells. The ED50 for this effect is 0.5-2 ng/mL.

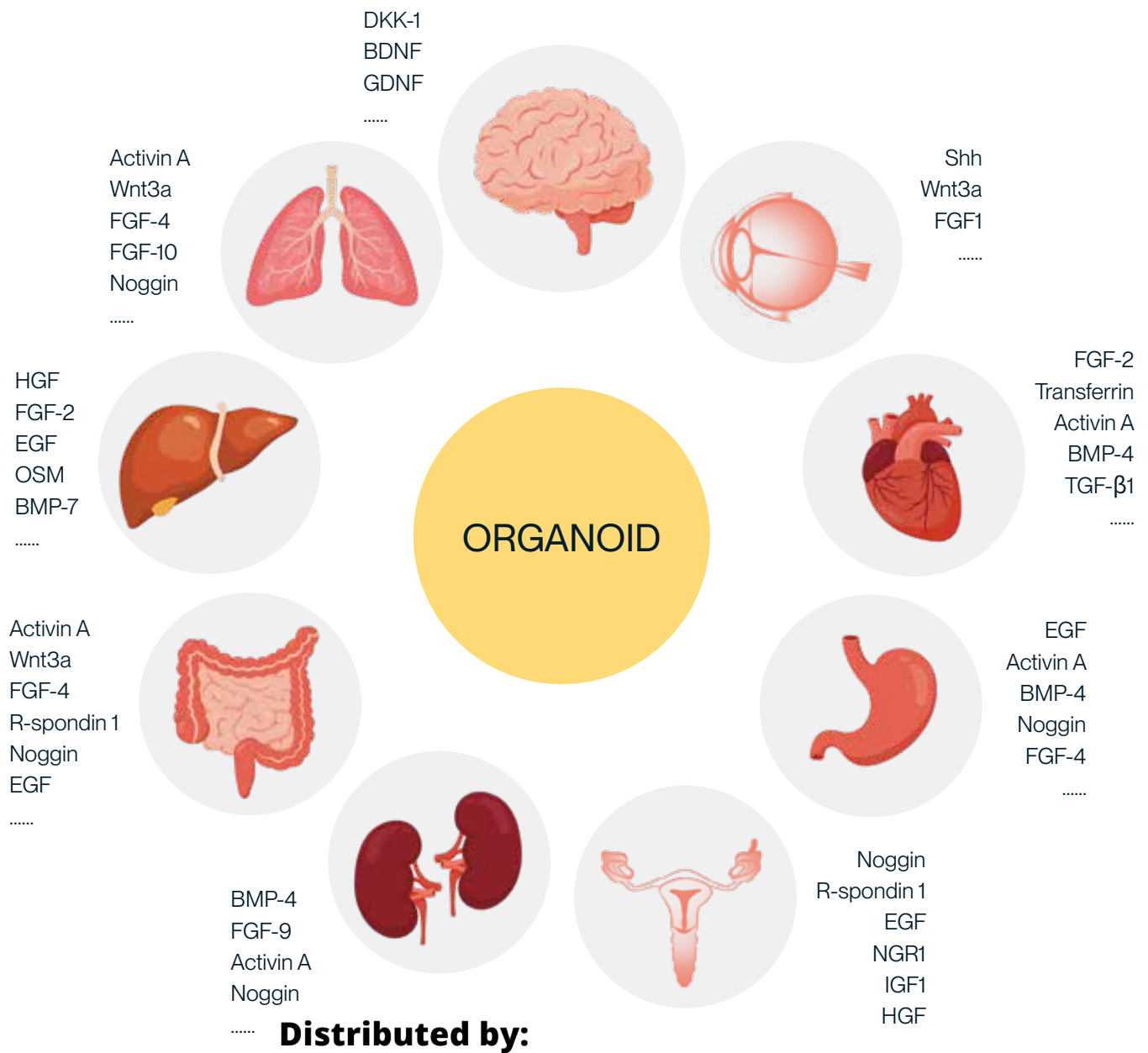
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CliniSciences Group

Cytokines for Organoid Culture: High Bioactivity & Low Endotoxin

Organoids are three-dimensional (3D) cultures derived from stem cells that form structures resembling tissue. They are capable of self-renewal and self-organization, and their structure and function are similar to those of actual tissues or organs. Organoids play a significant role in fields such as developmental and disease modeling, drug screening, stem cell engineering, and regenerative medicine. They are a hot topic in both basic and clinical research.

The culture of organoids requires various cytokines to precisely and directionally induce the differentiation of stem cells (such as iPSCs), and the types and amounts of cytokines needed for different tissues or different stages of the same tissue culture can vary. KACTUS offers a series of cytokines for various organoids. Our cytokines feature low-endotoxin levels, high-bioactivity, and batch-to-batch consistency. This aids efficient and accurate research on organoids.

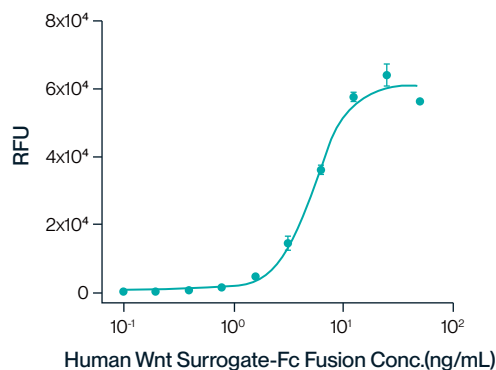


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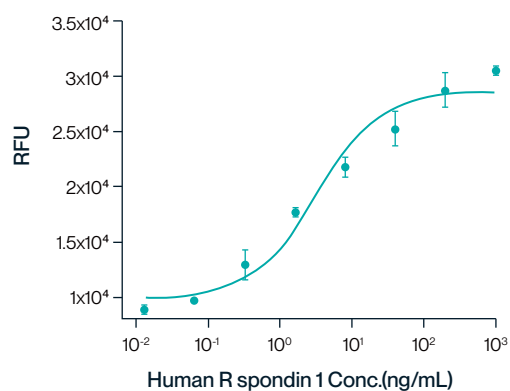
Product Validation Data

Recombinant Human Wnt Surrogate-Fc Fusion Bioactivity



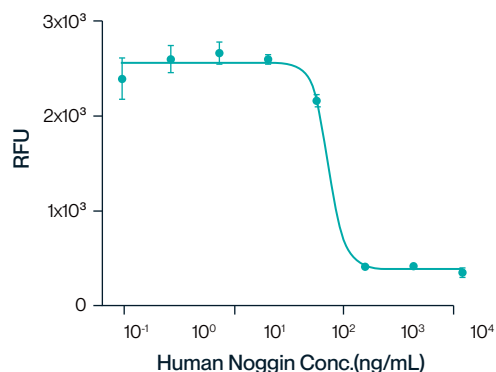
The ability of Human Wnt Surrogate-Fc Fusion to induce Topflash reporter activity in HEK293T cells was measured. The ED50 for this effect is 5.2 ng/mL.

Recombinant Human R spondin 1 Bioactivity



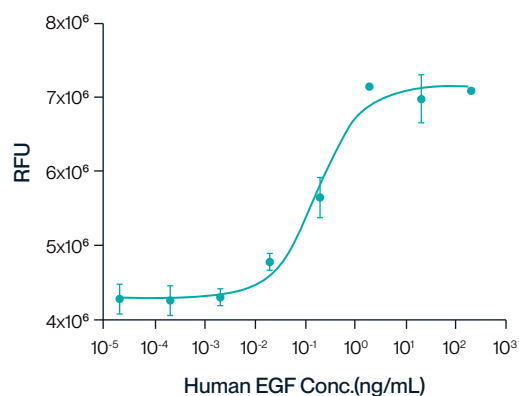
The ability of Human R Spondin 1 to induce Topflash reporter activity in HEK293T was measured. The ED50 for this effect is 1.0 - 10.0 ng/mL in the presence of 5 ng/mL recombinant Human Wnt Surrogate-Fc Fusion.

Recombinant Human Noggin Bioactivity



Human Noggin bioactivity was measured by its ability to inhibit BMP-4-induced alkaline phosphatase production by ATDC5 mouse chondrogenic cells. The ED50 for this effect is 4-80 ng/mL in the presence of 50 ng/mL of recombinant Human BMP 4.

Recombinant Human EGF Bioactivity



Human EGF bioactivity was measured in a cell proliferation assay using Balb/C 3T3 mouse embryonic fibroblast cells. The ED50 for this effect is 0.1-0.2ng/mL.

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Catalog #	Target	Species	Tag	Exact Sequence	Express System
BBL-HM241	4-1BB Ligand	Human	N-hFc	Arg71-Glu254	HEK293
ACV-HM001	Activin A	Human	No Tag	Gly311-Ser426	HEK293
BDF-HE001	BDNF	Human/Murine/Rat	No Tag	His129-Arg247	E.coli
KLB-HM101	Beta Klotho	Human	C-His	Met30-Thr983	HEK293
KLB-MM101	Beta Klotho	Mouse	C-His	Phe53-Pro994	HEK293
NGF-HM00B	Beta-NGF	Human	No Tag	Ser122-Ala241	HEK293
BMP-HE002	BMP-2	Human	No Tag	Gln283-Arg396	E.coli
DLL-HM004	DLL4	Human	No Tag	Ser27-Pro524	HEK293
DLL-HM204	DLL4	Human	C-hFc	Ser27-Pro524	HEK293
DLL-HM104	DLL4	Human	C-His	Ser27-Pro524	HEK293
EGF-HE001	EGF	Human	No Tag	Asn971-Arg1023	E.coli
EPO-HM001	EPO/Erythropoietin	Human	No Tag	Ala28-Arg193	HEK293
FGF-HE010	FGF-10	Human	No Tag	Gln38-Ser208	E.coli
FGF-HE001	FGF-2 (146aa)	Human	No Tag	Pro143-Ser288	E.coli
FGF-HE002	FGF-2 (154aa)	Human	No Tag	Ala135-Ser288	E.coli
KGF-HE101	FGF-7	Human	N-His	Cys32-Thr194	E.coli
FGF-HE08A	FGF8a	Human	No Tag	Gln23-Arg204	E.coli
FGF-HE08B	FGF8b	Human	No Tag	Gln23-Arg215	E.coli
FLT-HE03L	FLT3 Ligand	Human	No Tag	Thr27-Ala181	E.coli
FLT-HM13L	FLT3 Ligand	Human	C-His	Thr27-Pro185	HEK293
FLT-MM13L	FLT3 Ligand	Mouse	C-His	Gly27-Gln189	HEK293
GDF-HE001	GDNF	Human	No Tag	Ser78-Ile211	E.coli
GSF-ME001	GM-CSF	Mouse	No Tag	Ala18-Lys141	E.coli
GSF-HE001	GM-CSF	Human	No Tag	Ala18-Glu144	E.coli
HGF-HM101	HGF	Human	C-His	Gln32-Ser728	HEK293
IFN-HM00G	IFN gamma	Human	No Tag	Gln24-Gln166	E.coli
IL1-MM10A	IL-1 alpha/IL-1A	Mouse	C-His	Ser115-Ser270	HEK293
IL1-HE00A	IL-1 alpha/IL1A	Human	No Tag	Ser113-Ala271	E.coli
IL1-HM010	IL-10	Human	No Tag	Ser19-Asn178	HEK293
IL1-HM111	IL-11	Human	N-His	Pro22-Leu199	HEK293
IL1-MM112	IL-12	Mouse	C-His	Arg23-Ala215(IL-12A) & Met23-Ser335(IL-12B)	HEK293
IL1-HM013	IL-13	Human	No Tag	Gly21-Asn132	HEK293
IL5-HE015	IL-15	Human	No Tag	Asn49-Ser162	E.coli
ILA-HM118	IL-17A/CTLA-8	Human	C-His	Gly24-Ala155	HEK293
IL7-ME17B	IL-17B	Mouse	N-His	His21-Phe180	E.coli
ILF-HM119	IL-17F	Human	C-His	Arg31-Gln163	HEK293
IL1-HE018	IL-18	Human	No Tag	Tyr37-Asp193	E.coli
IL8-HM2BP	IL-18BP	Human	C-hFc	Thr31-Gly194	HEK293
IL8-HM1BP	IL-18BP	Human	C-His	Thr31-Gly194	HEK293
IL8-MM2BP	IL-18BP	Mouse	C-hFc	Thr29-Ala193	HEK293
IL8-MM1BP	IL-18BP	Mouse	C-His	Thr29-Ala193	HEK293
IL9-HM219	IL-19	Human	C-hFc	Leu25-Ala177	HEK293
IL2-HE001	IL-2	Human	No Tag	Ala21-Thr153	E.coli
IL2-HM001	IL-2	Human	No Tag	Ala21-Thr153	HEK293
IL2-HE021	IL-21	Human	No Tag	Gln32-Ser162	E.coli
IL2-HM122	IL-22	Human	N-His	Ala34-Ile179	HEK293
IL2-HM1AB	IL-23 alpha&IL-12 beta	Human	C-His	Arg20-Pro189(IL-23 alpha) & Ile23-Ser328(IL-12 beta)	HEK293
IL2-MM1AB	IL-23 alpha&IL-12 beta	Mouse	N-His	Val22-Ala196(IL-23 alpha) & Met23-Ser335(IL-12 beta)	HEK293
IL2-HM125	IL-25/IL-17E	Human	C-His	Tyr33-Gly177	HEK293
IL2-HM127	IL-27	Human	C-His	Arg21-Lys229(IL-27B) & Phe29-Pro243(IL-27A)	CHO
IL3-HE003	IL-3	Human	No Tag	Ala20-Phe152	E.coli
IL3-MM101	IL-3	Mouse	C-His	Ala27-Cys166	HEK293
IL3-HM101	IL-31	Human	N-His	Ser24-Thr164	HEK293
IL3-HE001	IL-33	Human	No Tag	Ser112-Thr270	E.coli
IL7-HE037	IL-37	Human	No Tag	Lys27-Asp192	E.coli
ILB-HE037	IL-37b	Human	No Tag	Val46-Asp218	E.coli
IL4-HM001	IL-4	Human	No Tag	His25-Ser153	HEK293
IL6-HE001	IL-6	Human	No Tag	Val30-Met212	E.coli
IL7-HE001	IL-7	Human	No Tag	Asp26-His177	E.coli
IL9-HM101	IL-9	Human	C-His	Gln19-Ile144	HEK293
IL9-MM101	IL-9	Mouse	C-His	Gln19-Pro144	HEK293
JAG-HM101	Jagged 1/JAG1	Human	C-His	Gln34-Ser1046	HEK293
LIF-HE001	LIF	Human	No Tag	Ser23-Phe202	E.coli
LIF-HM001	LIF	Human	No Tag	Ser23-Phe202	HEK293
CSF-HM001	M-CSF	Human	No Tag	Glu33-Asn190	HEK293
TG1-HM00M	Mature TGF beta 1	Human	No Tag	Ala279-Ser390	HEK293
TG2-HM00M	Mature TGF beta 2	Human	No Tag	Ala303-Ser414	HEK293
TG3-HM00M	Mature TGF beta 3	Human	No Tag	Ala301-Ser412	HEK293
NOG-HM001	Noggin	Human	No Tag	Gln28-Cys232	CHO
NOG-MM001	Noggin	Mouse	No Tag	Gln28-Cys232	HEK293
PDF-DY10A	PDGFA	Canine	N-His	Ser87-Arg196	Yeast
PGA-RY101	PDGFA	Rat	N-His	Arg86-Lys204	Yeast
RS1-HM101	R-spondin 1	Human	C-His	Arg31-Ala263	CHO
RS1-MM101	R-spondin 1	Mouse	C-His	Ser21-Gln265	HEK293
RKL-HM001	RANKL	Human	No Tag	Gly63-Asp244	HEK293
SCF-HE001	SCF	Human	No Tag	Glu26-Ala189	E.coli
SHH-HE001	Sonic Hedgehog (Shh)	Human	No Tag	Cys24-Gly197	E.coli
TFN-HM101	Transferrin	Human	C-His	Val20-Pro698	HEK293
VEG-HM065	VEGF165	Human	No Tag	Ala27-Arg191	HEK293
WNT-HM23A	Wnt Surrogate-Fc Fusion	Human	C-hFc	---	HEK293

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