Serum-Free Media and Applications

Serum-free media are media designed to grow a specific cell type or perform a specific application in the absence of serum.

The use of serum-free media (SFM) represents an important tool, that allows cell culture to be done with a defined set of conditions as free as possible of confounding variables.

Advantages of using serum-free media:

- Increased definition.
- More consistent performance.
- Easier purification and downstream processing.
- Precise evaluations of cellular function.
- Increased growth and/or productivity.
- Better control(s) over physiological responsiveness.
- Enhanced detection of cellular mediators.

Certain applications may require the addition of growth factors and/or cytokines.

Note: Customized cell culture media are available. Submit your requests to our Custom Products Services group for timely evaluation and production of the formulation and delivery system that best fits your needs.

Glossary:

Serum-Free Media — GIBCO® Serum-Free Media do not require supplementation with serum, but may contain discrete proteins or bulk protein fractions.

Protein-Free Media — GIBCO® Protein-Free Media contain no proteins, but may contain plant or yeast hydrolysates. Many are animal-origin-free.

Chemically-Defined Media — GIBCO® Chemically-Defined Media contain no proteins, hydrolysates, or components of unknown composition. These media are animal-origin-free and all components have a known chemical structure.

Animal-Origin-Free Products — GIBCO® animal-origin-free products do not contain material directly derived from animal tissues, cells, or body fluids of higher eukaryotic organisms, such as mammals (including humans), fish, birds, insects, etc. The term "animal-origin" does not pertain to lower eukaryotic organisms such as the higher plants, fungi, protozoa, and algae, nor does it include prokaryotic organisms such as bacteria or blue-green algae.

Hybridoma Culture

Product	Optimized For	Applications	Size	Cat. No.
CD Hybridoma Medium†	Human, mouse, rat hybridomas, myelomas, NS0, NS-1, and other steroid-dependent cells when used with 250X Cholesterol Lipid Concentrate	Growth and MAb production. Can be used to express other proteins in engineered myeloma cell lines.	500 ml 1,000 ml	11279-015 11279-023
CD Hybridoma AGT™ Dry granular format of CD Hybridoma Medium			1 × 1 L 1 × 10 L	12372-025 12372-017
Hybridoma-SFM Low-protein 20 µg/ml.	Human, mouse, rat hybridomas, myelomas	Growth and MAb production. Can be used to express other proteins in engineered myeloma cell lines.	500 ml 1,000 ml	12045-084 12045-076
PFHM-II Protein-free Hybridoma Medium.	Human, mouse, rat hybridomas, myelomas	Growth and MAb production. Can be used to express other proteins in engineered myeloma cell lines.	1,000 ml	12040-077

Chinese Hamster Ovary (CHO) Cell Culture

Product	Optimized For	Applications	Size	Cat. No.
CD CHO Medium†	Suspension CHO cells (including CHO-S cells)	Growth and production of recombinant proteins.	500 ml 1,000 ml	10743-011 10743-029
CD CHO Medium AGT™† Dry granular format of CD CHO Medium.			1 × 1 L 1 × 10 L	12490-017 12490-025
CD CHO-A Medium	Adherent CHO cells		500 ml 1,000 ml	097-0182DJ 097-0182DK
CHO-S-SFM II† Available without Hypoxanthine and Thymidine; cat. no. 31033-020.	Suspension CHO cells (including CHO-S cells)	Growth and production of recombinant proteins in suspension culture.	500 ml 1,000 ml	12052-114 12052-098
CHO III PFM†	Suspension CHO cells (including CHO-S cells)	Growth and production of recombinant proteins in suspension culture.	500 ml 1,000 ml	096-0334DJ 096-0334SA
CHO III-A-PFM	Adherent CHO cells	Growth and production of recombinant proteins in adherent culture.	1,000 ml	097-0147DK
CHO-S Cells, Adapted to CD CHO Medium, CHO-S-SFM II and CHO III PFM			1.5 ml	11619-012

† Drug Master File available

Animal-Origin Free Product

Human Embryonic Kidney (293) Cell Culture

Product	Optimized For	Applications	Size	Cat. No.
CD 293 Medium†	Suspension 293 cells (including 293-F, 293-H)	Growth and recombinant protein or adenovirus production in suspension culture.	1,000 ml	11913-019
CD 293 AGT™ † Dry granular format of CD 293 Medium.			1 × 1 L 1 × 10 L	12529-020 12529-012
293 SFM II† Low-protein <10 µg/ml.	Suspension 293 cells and HeLa S3 cells	Growth and recombinant protein or adenovirus production in suspension culture.	500 ml 1,000 ml	11686-011 11686-029
FreeStyle™ 293 Expression Medium	Suspension 293-F cells	Growth and transfection in suspension culture.	1,000 ml 6 × 1,000 ml	12338-018 12338-026
293-F Cells, Adapted to CD 293 Medium and 293 SFM II			1.5 ml	11625-019
293-H Cells, Adapted to CD 293 Medium and 293 SFM II			1.5 ml	11631-017
FreeStyle™ 293-F Cells, Adapted to FreeStyle™ 293 Expression Medium			1×10^7 cells	R790-07

Mammalian Cell Culture for Virus Production

Product	Optimized For	Applications	Size	Cat. No.
VP-SFM† Low-protein <10 µg/ml.	Suspension BHK-21 cells, Adherent VERO, COS-7L, MDCK, HEp-2	For culture of kidney epithelial and related cells used in virus production.	1,000 ml	11681-020
VP-SFM AGT™† Dry granular format of VP-SFM			1 × 1 L 1 × 10 L	12559-027 12559-019
OptiPro™ SFM† Low-protein <10 µg/ml.	Adherent MDCK, VERO, PK-15, MDBK, BHK-21	For culture of kidney epithelial andrelated cells used in virus production.	1,000 ml	12309-019
COS-7L Cells, Adapted to VP-SFM			1.5 ml	11622-016

† Drug Master File available

Animal-Origin Free Product

Insect Cell Culture

Product	Optimized For	Applications	Size	Cat. No.
Drosophila-SFM	Suspension *Drosophila melanogaster* cells (D.Mel-2, Schneider S2 cells)	Growth and maintenance medium for adherent or suspension culture.	500 ml 1,000 ml	10797-017 10797-025
Express Five® SFM	Suspension BTI-TN-5B1-4 insect cells	Growth and maintenance of cells used for the baulovirus expression vector system (BEVS) for adherent or suspension culture. Large-scale production of recombinant protein expressed by BEVS.	1,000 ml	10486-025
Sf-900 II SFM†	Suspension Sf9, Sf21, (*Spodoptera frugiperda*), TN368 cells (*Trichoplusia ni*)	Growth and maintenance of cells used for BEVS for adherent or suspension culture. Large-scale production of recombinant protein expressed by BEVS.	500 ml 1,000 ml 10 L	10902-096 10902-088 10902-070
D.Mel-2 Cells, Adapted to Drosophila SFM			1.5 ml	10831-014
High Five™ Cells, Adapted to Express Five® SFM			3×10^6 cells/ml	B855-02
Sf9 Cells, Adapted to Sf-900 II SFM			1.5 ml	11496-015
Sf21 Cells, Adapted to Sf-900 II SFM			1.5 ml	11497-013

Neuronal Cell Culture

Product	Optimized For	Applications	Size	Cat. No.
Neurobasal™ Medium	Fetal neurons	Basal medium lacking excitatory amino acids used or in conjunction with supplements to make a complete serum-free medium. Long-term growth of neurons.	500 ml	21103-049
Neurobasal™ Medium without Phenol Red			500 ml	12348-017
Neurobasal™-A Medium	Adult and postnatal neurons (> 1 week old)		500 ml	10888-022
Neurobasal™-A Medium without Phenol Red			500 ml	12349-015
with B-27 Serum-Free Supplement	Primary embryonic hippocampal neurons; primary neurons from striatum, substantia nigra, septum	Growth and maintenance. Minimizes glial cell proliferation. B-27 minus AO to study free-radical damage, apoptosis. (B-27 minus AO is formulated without any cortical antioxidants).	10 ml	17504-044
with B-27 Supplement Minus AO			10 ml	10889-038
with B-27 Supplement Minus Vitamin A (Retinoic Acid)		Study growth of CNS progenitor or stem cells.	10 ml	12587-010
with N-2 Supplement	Primary embryonic hippocampal neurons, tumor cell lines of neuronal origin (PC12, B104, N1E-115 and NS20)	Maintenance of primary neurons (low protein, < 125 µg/ml). Growth and maintenance of neuronal tumor cell lines.	5 ml	17502-048
with G-5 Supplement	Primary glial cells, tumor cell lines of glial origin (U-251, MGsp, C62BD, RN-22), astrocytes, microglia, oligodendrocytes	Growth and maintenance of primary and serial tumor glial cells.	1 ml	17503-012

† Drug Master File available

Blood and Bone Marrow Culture

Product	Optimized For	Applications	Size	Cat. No.
AIM V® Medium, liquid† Research Grade, with HSA.	Lymphocytes, macrophages, monocytes, lymphoid cell lines	*Ex vivo* activation of cytotoxic lymphocytes with IL-2 supplementation.	500 ml 1,000 ml	12055-091 12055-083
AIM V® Medium, liquid Therapeutic Grade.		Growth of tumor infiltration lymphocytes (TIL cells), cytotoxic T-cells, and monocytes.	1,000 ml 10 L	087-0112DK 087-0112BK
Macrophage-SFM	Macrophages, monocytes	Growth and maintenance (addition of GM-CSF may be necessary). Demonstration of macrophage phagocytosis. Activation of cells to kill tumor cells with γ interferon or lipopolysaccharide supplementation.	500 ml	12065-074
StemPro®-34 SFM Supplied with hematopoietic StemPro ® -Nutrient Supplement.	Human hematopoietic progenitor cells (CD34 +) from bone marrow, peripheral blood, or neonatal cord blood	Growth and maintenance of human hematopoietic progenitor cells (addition of factors necessary). Study synergistic/individual effects of growth.	500 ml	10639-011

Other Mammalian Cell Culture

Product	Optimized For	Applications	Size	Cat. No.
Human Endothelial-SFM†	Primary and secondary human umbilical venous, microvascular, and arterial endothelial cells	Growth and maintenance to study cell-cell interactions, injury analysis, atherosclerosis, signal transduction, cytokine production, and cell matrix interaction. Requires supplementation with bFGF, EGF, and fibronectin. Sold separately.	500 ml	11111-044
Hepatozyme-SFM	Primary human, monkey, and rat hepatocytes	Maintenance of hepatocytes (cytochrome P450 induction maintained > 9 days).	500 ml	17705-021
Keratinocyte-SFM (with EGF, BPE)†	Human epidermal keratinocytes and cervical epithelial cells (will not support fibroblast or melanocyte cells)	Growth and maintenance for dermal substitutes, gene therapy, and *in vitro* toxicology.	500 ml	17005-042
Keratinocyte-SFM(without $CaCl_2$)†		Without bovine pituitary.	500 ml	37010-022
Defined Keratinocyte-SFM†	Human epidermal keratinocytes cervical epithelial cells and (will not support fibroblast or melanocyte cells)	Low-protein (< 25 µg/ml) without BPE medium for cultivation of keratinocytes. Can be used for cervical epithelial cells for studies involving the human papilloma virus.	500 ml	10744-019
KnockOut™ D-MEM	Murine and human embryonic stem (ES) cells	Growth and maintenance of undifferentiated ES cells for production of transgenic mice. Growth and maintenance of both human and murineES cells used in differentiation studies.	500 ml	10829-018
KnockOut™ Serum Replacement			500 ml	10828-028
Primary Human Keratinocytes, Adapted to Defined Keratinocyte-SFM			1 ml	12332-011

† Drug Master File available