Product	Cat. No.	Size
OptiPRO™ SFM (1X), liquid	12309-019	1,000 ml
VP-SFM(1X), liquid	11681-020	1,000 ml
Opti-MEM® I Reduced-Serum Medium (1X), liquid*	31985-070	500 ml

All of the formulations listed above can be customized to suit your needs. Please inquire.

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GIBCO™ Invitrogen Corporation

Innovations in Mammalian Cell Culture

Researchers and manufacturers involved in virus production are increasingly concerned about the risk of culture contamination by viruses and prions.

Invitrogen, under the GIBCO™ brand name, has developed a variety of serum-free media expressly designed for virus production. Manufactured without any components of animal or human origin, these unique GIBCO™ formulations minimize the potential for contamination by mammalian pathogens, eliminating many of the problems associated with the use of animal sera.

These media provide cell growth and virus production equivalent or superior to serum-supplemented systems and are economical to use in large-scale production.

New OptiPRO™ SFM for Multiple Cell Lines

OptiPRO™ SFM is the newest serum-free GIBCO™ medium designed for the cultivation of mammalian cell lines for virus production and recombinant protein production. Its ultra-low protein concentration (7.5 ug/mL) eases downstream purification.

One factor that immediately differentiates OptiPRO™ from other serum-free media is its great versatility—it sustains the growth of a broad range of kidney epithelial cell lines at levels equal to or better than serum-supplemented and serum-free formulations. It has demonstrated production of multiple viruses to high titer in multiple kidney-derived cell lines including BHK-21, MDCK, MDBK, and PK-15. It is also suitable for the growth of COS-7 and HeLa cell lines.

OptiPRO™ SFM is also the only serum-free medium devoid of human- and animal-origin components that does not require the addition of attachment proteins or pre-treatment of the attachment surface.

Growth of Cells and Virus in OptiPRO™ SFM

Flasks

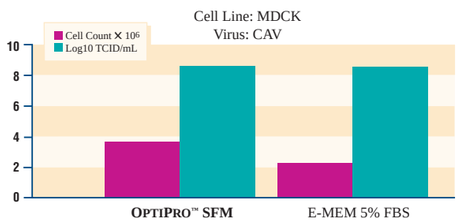

Figure 1. Cultures carried for 4 subcultures in respective media. Counts represent the average for two 25 cm^2 flasks. Titer of inoculum: 5 × 10^5 $TCID_{50}$/mL. 0.1 mL virus/10 cells. Length of incubation dictated by % CPR in serum control.

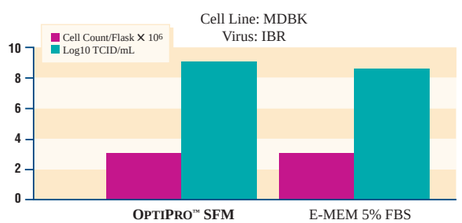

Figure 2. Cultures carried for 6 subcultures in respective media. Counts represent the average for two 25 cm^2 flasks. Titer of inoculum: 1.3 × 10^8 $TCID_{50}$/mL. 0.1 mL virus/10 cells. Length of incubation dictated by % CPE in serum control.

Cell Factories

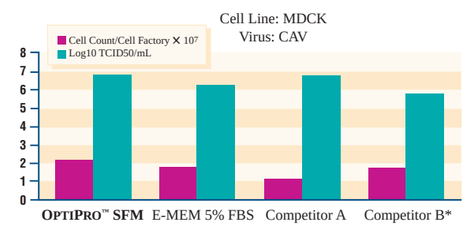

Figure 3. Cell factories plated with 7.2 × 10^6 cells and counted or inoculated on Day 2. Titer of inoculum: 1 × 10^8/$TCID_{50}$/mL. 0.1 mL virus/10 cells.
** Contains animal-derived proteins.*

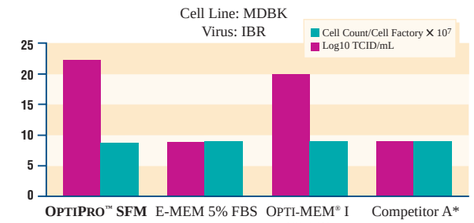

Figure 4. Cell factories plated with 9.6 × 10^6 cells and counted or inoculated on Day 4. Titer of inoculum: 1 5 10^8/$TCID_{50}$/mL. 0.1 mL virus/10 cells. High cell counts were due to the lack of contact-inhibition with MDBK cells.
** Contains animal-derived proteins.*

New VP-SFM

Newly available as a catalogue product, GIBCO™ VP-SFM is a serum-free, ultra low protein medium designed specifically for the culture of VERO cells. It is also suitable for the growth of COS-7, MDCK, BHK-21, and HEp2 cell lines. It is particularly suitable for growing viruses, as well as other cell culture applications, such as producing recombinant proteins and monoclonal antibodies.

The trace protein in VP-SFM is from a recombinant source. Transferrin has been replaced with an iron chelate, and albumin has been replaced with di- and tripeptides from plants. The only additive required is L-glutamine, which, depending on the cell system used, should be added at a concentration of 2 to 6 mM. Many cell lines, such as VERO, BHK and HEp2 require no adaptation to VP-SFM; however, some cells may require sequential adaptation.

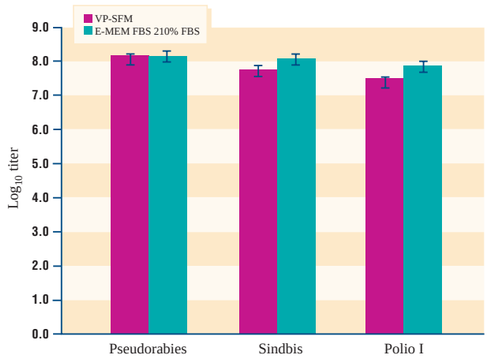

Figure 5. Virus titration results in VERO cells. *Virus production in triplicate plates using VERO cells grown in either VP-SFM or E-MEM with 10% FBS.*

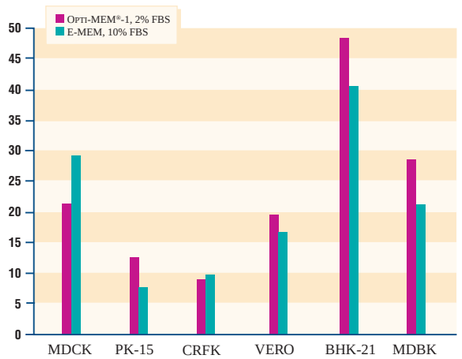

Figure 8. Mean cell growth over three subcultures.

OPTI-MEM® I Reduced Serum Medium

Used for years in the vaccine and virus production industries, OPTI-MEM® I has become a preferred medium among researchers, developers and manufacturers worldwide.

OPTI-MEM® I is suitable for the growth and maintenance of both adherent and suspension cultures. Highly versatile, it promotes the growth of a wide variety of mammalian cell types, and produces virus yields equivalent to or better than those produced by classical media plus serum.

Most cells routinely cultured in serum-supplemented medium may be transferred directly into OPTI-MEM® I with a minimum of 50% reduction in serum.

When supplemented with 2% to 4% fetal bovine serum or alternative sera, OPTI-MEM® I supports proliferative rates and maximal cell densities that are comparable to, and in some cases superior to, conventional media supplemented with 10% fetal bovine serum (see growth chart). Relatively non-fastidious cell lines may be maintained in long-term culture with even greater serum reduction[1].

VP-SFM Growth Studies

VERO

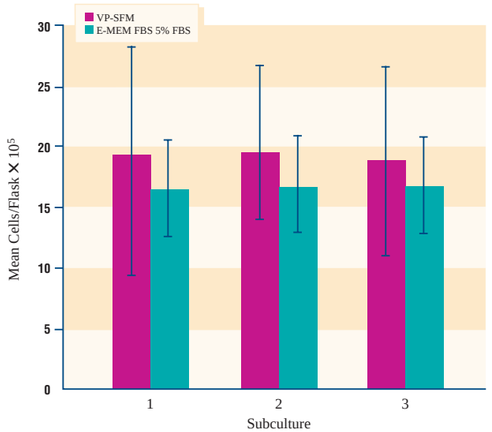

Figure 6. VERO cell growth comparison. *VERO cells were passaged every 4 days for 3 subcultures at 2.5 X 10^5 cells/25 cm^2 plastic flask in VP-SFM or E-MEM with 5% FBS.*

BHK-21

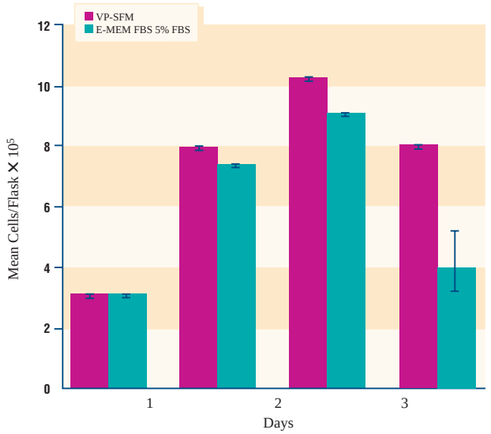

Figure 7. BHK-21 cell growth comparison. *BHK-21 cells were grown in suspension in shaker flasks in duplicate on an orbital shaker for 5 days without refeeding in VP-SFM or E-MEM with 5% FBS.*

Growth Comparison Table

Cell Designation		Source	Control Growth Medium Plus 10% FBS	A Percent FBS Concentration with OPTI-MEM® I	B Minimum Percent FBS Concentration
Continuous	VERO	African Green Monkey Kidney	E-MEM	2	0.5
	BHK-21	Hamster Kidney	Glasgow MEM	2	1
	MDCK	Canine Kidney	E-MEM	1	0.5
	PK 15	Porcine Kidney	E-MEM	3	1
Diploid	MRC-5	Human Diploid Lung	H-BME/E-BME	2-4	1
Primary	BEK	Bovine Embryonic Kidney	H-BME	4	2
	HEK	Human Embryonic Kidney	H-BME	4	2
	CEF	Chick Embryo Fibroblasts	Glasgow MEM	4	2

Table 1. Use Less FBS with OPTI-MEM® I. When OPTI-MEM® I is supplemented with 1% to 4% FBS, growth rates comparable to the control medium containing 10% FBS can be achieved with a wide variety of cell types. *Even lower FBS levels may be employed with OPTI-MEM® I with only a modest reduction in proliferation rate or a single adaptive "weaning" subculture. Column A compares the growth of various cell types using OPTI-MEM® I with reduced FBS to control medium with 10% FBS. Column B illustrates that further significant reductions in FBS supplementation can be achieved with adaptive weaning procedures.*

[1] *For very low serum supplementation (<1%) with anchorage-dependent cells, OPTI-MEM® I should be supplemented with 500 to 1,000 mg/L calcium chloride.*