ANH Application Catalog

Protein Production

Protein Production

Protein production is the biotechnological process of generating a specific protein. Commonly used protein production systems include those derived from bacteria yeast, baculovirus/insect, mammalian cells. When biopharmaceuticals are produced with one of these systems, process-related impurities termed host cell proteins also arrive in the final product in trace amounts.

Protein purification is a series of processes intended to isolate one or a few proteins from a complex mixture. Protein purification is vital for the characterization of the function, structure and interactions of the protein of interest. The purification process provides several steps such as extraction, precipitation and differential solubilization, ultracentrifugation, size exclusion chromatography (HPLC), concentration, and analytical (gel electrophoresis)

ANH provides a diverse set of single-use products for cultivating cells, ultrafiltration, and concentration.

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1. HYPER Flask

The mass-production of high-quality proteins and other biologicals is crucial to basic research as well as drug discovery. The Corning High Yielding Performance Flask (HYPERFlask) cell culture vessel was introduced to meet this demand.

With the same overall dimensions as a conventional T175 flask but with approximately ten times the total growth surface generated by ten individual, gas permeable layers, the HYPERFlask vessel serves as an ideal option for maximizing cell yield and protein production while minimizing investment [1].

The Corning High Yielding Performance Flask (HYPERFlask) cell culture vessel offers a 1720 cm² growth area in the footprint of a traditional 175 cm² flask. This high yield, high performance flask utilizes a multilayered gas permeable growing surface for efficient gas exchange.

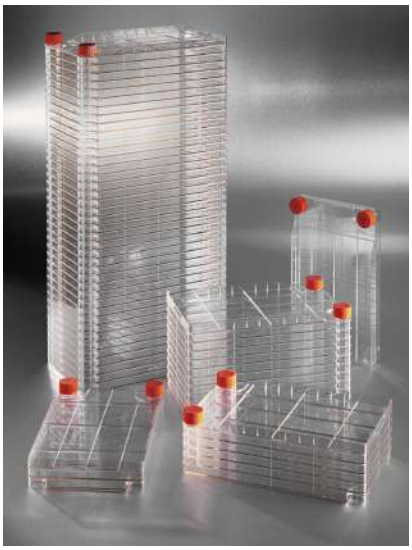
- Innovative Design – 10 interconnected polystyrene growth surfaces
- Optimal Growth – Corning CellBIND® Surface treated gas permeable polystyrene for superior cell attachment and growth
- Increase Cell Yield – 10-fold higher cell yields increases productivity and capacity and reduces processing time and incubator space
- Save Time and Space – Reduce processing time and incubator storage space by handling one flask as compared to 10 traditional 175 cm² flasks

The Corning HYPERFlask Cell Culture Vessel has the same external dimensions as a standard T 175 cm² flask with 10 times the cell yield.

Brand	Cat. No	Description	Unit/Case	Stock Items
Corning	10020	HYPERFlask M Cell Culture Vessel, CellBIND Surface, Sterile, Barcode	4 pcs	
Corning	10024	HYPERFlask Cell Culture Vessel, CellBIND Surface, Sterile, Barcode	24 pcs	

Corning	10030	HYPERFlask M Cell Culture Vessel, CellBIND, Sterile, Barcode	4 pcs	✓
Corning	10031	HYPERFlask M Cell Culture Vessel, Not Treated, Sterile, Barcode	4 pcs	
Corning	10034	HYPERFlask M Cell Culture Vessel, CellBIND, Sterile, Barcode	24 pcs	

2. CellSTACK



Corning® CellSTACK® is a stackable cell culture that provides a large growth area polystyrene surface. CellSTACK® is available in five sizes.

- 1-Stack with 636 cm^2 cell growth area
- 2-Stack with 1,272 cm^2 cell growth area
- 5-Stack with 3,180 cm^2 cell growth area
- 10-Stack with 6,360 cm^2 cell growth area
- 40-Stack with 25,440 cm^2 cell growth area

Choice of TC-treated for attachment cells, Corning CellBIND® surface for enhanced cell attachment, or Ultra-Low Attachment surface for reduced cell attachment on selected.

Use of recombinant protein in investigating cellular signaling by adhesion receptors is highly versatile During labor-intensive, time-consuming and costly procedures to generate recombinant protein, considerable effort, time and expense was saved by using the Corning® CellSTACK®-5 chamber with the Corning CellBIND® [2].

Brand	Cat. No	Description	Unit/Case
Corning	3268	CellSTACK, 1-layer Polystyrene vessel with Vent Cap, TC treated Growth Surface, Sterile	8 pcs
Corning	3269	CellSTACK, 2-layer Polystyrene vessel with Vent Cap, TC treated Growth Surface, Sterile	5 pcs
Corning	3270	CellSTACK, 10-layer Polystyrene vessel with Vent	2 pcs

		Cap, TC treated Growth Surface, Sterile	
Corning	3271	CellSTACK, 10-layer Polystyrene vessel with Vent Cap, TC treated Growth Surface, Sterile	6 pcs
Corning	3303	CellSTACK, 1-layer Polystyrene vessel with Vent Cap, Ultra Low Attachment (ULA) treated Growth Surface, Sterile	8 pcs
Corning	3310	CellSTACK, 2-layer Polystyrene vessel with Vent Cap, CellBIND treated Growth Surface, Sterile	5 pcs
Corning	3311	CellSTACK, 5-layer Polystyrene vessel with Vent Cap, CellBIND treated Growth Surface, Sterile	2 pcs
Corning	3312	CellSTACK, 10-layer Polystyrene vessel with Vent Cap, CellBIND treated Growth Surface, Sterile	2 pcs
Corning	3313	CellSTACK, 5-layer Polystyrene vessel with Vent Cap, TC treated Growth Surface, Sterile	8 pcs
Corning	3319	CellSTACK, 5-layer Polystyrene vessel with Vent Cap, TC treated Growth Surface, Sterile	2 pcs
Corning	3320	CellSTACK, 10-layer Polystyrene vessel with Vent Cap, CellBIND treated Growth Surface, Sterile	6 pcs
Corning	3321	CellSTACK, 40-layer Polystyrene vessel with Vent Cap, CellBIND treated Growth Surface, Sterile	2 pcs
Corning	3330	CellSTACK, 1-layer Polystyrene vessel with Vent Cap, CellBIND treated Growth Surface, Sterile	8 pcs

3. HYPERStack

Closed System for High Yield Cell Growth: Introducing the next generation in Corning's High Yield PERformance (HYPER) platform – the Corning HYPERStack cell culture vessel. This product line combines the best of two Corning products: the Corning CellSTACK® culture chamber and the Corning HYPERFlask® vessel.

The utilization of the proprietary gas-permeable film technology provided in the format of the CellSTACK culture chamber allows the HYPERStack vessel to be the most efficient, scalable cell culture vessel for adherent cell culture available today.

Corning HYPERStack comes in 2 types: 12-layer vessel provides 6,000 cm^2 of growth area, and 36-layer vessel provides 18,000 cm^2 of growth area.

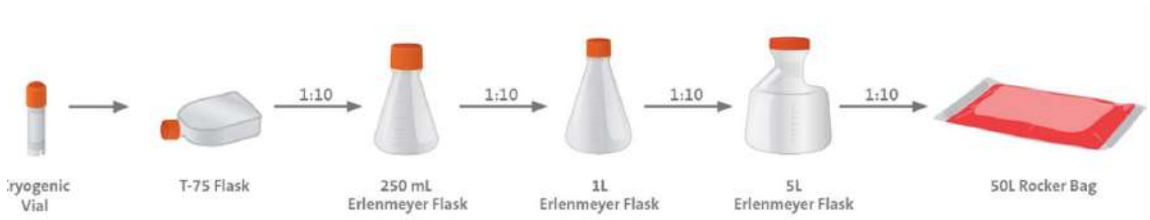
Prepare the cell inoculum in 1.3L for 12-layer vessel or 3.9L for 36-layer vessel.

Surface Treatment Guide: The Corning CellBIND surface is designed to enhance cell attachment and increase cell yields. Alternatively,Untreated can support conventional cell attachment and allow for a faster and gentler harvest procedure (i.e., growing and harvesting cells for downstream assays).

Brand	Cat. No	Description	Unit/Case
Corning	10012	HYPERStack 12-Layer Cell Culture Vessel, CellBIND treated Growth Surface, Sterile	4 pcs
Corning	10013	HYPERStack 12-Layer Cell Culture Vessel, Non-treated (Gamma) Growth Surface, Sterile	4 pcs
Corning	10036	HYPERStack 36-Layer Cell Culture Vessel, CellBIND treated Growth Surface, Sterile	2 pcs
Corning	10037	HYPERStack 36-Layer Cell Culture Vessel,	2 pcs

		Non-treated (Gamma) Growth Surface, Sterile	
Corning	10042	HYPERStack Disposable Tubing Set for Use with Glass Bottle, C-Flex tubing with MPC, Sterile	2 pcs
Corning	10043	Aseptic Transfer Cap for use with 850cm² Polystyrene Roller Bottle, 3/8" ID x 1/2" OD, 0.2 um filter, MPC Quick Connect, Sterile	2 pcs
Corning	431644	431644 850cm² Polystyrene Roller Bottle with Easy Grip Cap, Sterile	40 pcs

4. Erlenmeyer Shaker Flask



Erlenmeyer shaker flask is used for bacteria, or animal cell cultivation, Corning Polycarbonate (PC) and Polyethylene terephthalate glycol-modified (PETG) Erlenmeyer flasks are ideal for all shaker culture applications. These flasks are single-use, sterile, individually packaged, and constructed of USP Class VI PC or PETG. Molded graduations are standard, and the vented threaded caps feature a 0.2 µm hydrophobic membrane to provide continuous gas exchange while ensuring sterility with a liquid-tight seal. There are 2 types of bottom: plain or flat bottom; baffled for increasing more O_2.

There are several sizes of erlenmeyer flask. The sizes of PC flasks have 125 mL, 250 mL, 500 mL, 1 L, 2L, 3L, and 5 L. Three sizes of PETG flask, 2 L, 3L and 5 L of PETG are designed for CHO cell cultivation. The 5L Erlenmeyer occupies the same footprint as the 3L Erlenmeyer while offering an additional 2.5L of working volume.

Brand	Cat. No	Description	Unit/Case
Corning	430183	250 mL Polycarbonate Erlenmeyer Shake Flask with Vent Cap, Sterile	50 pcs
Corning	430421	125 mL Polycarbonate Erlenmeyer Shake Flask with Flat Cap, Sterile	50 pcs
Corning	430422	500 mL Polycarbonate Erlenmeyer Shake Flask with Flat Cap,Sterile	25 pcs
Corning	431401	500 mL Baffled Polycarbonate Erlenmeyer Flask with Vent Cap	25 pcs
Corning	431402	1L Polycarbonate Baffled Erlenmeyer Shake Flask with Flat Cap,Sterile	25 pcs
Corning	431403	1L Baffled Polycarbonate Erlenmeyer Flask with Vent Cap	25 pcs
Corning	431404	125 mL Polycarbonate Baffled Erlenmeyer Shake Flask with Flat Cap, Sterile	50 pcs
Corning	431405	125 mL Baffled Polycarbonate Erlenmeyer Flask with Vent Cap	50 pcs
Corning	431406	250 mL Polycarbonate Baffled Erlenmeyer Shake Flask with Flat Cap,Sterile	50 pcs
Corning	431407	250 mL Polycarbonate Baffled Erlenmeyer Shake Flask with Vent Cap,Sterile	50 pcs
Corning	431408	500 mL Polycarbonate Baffled Erlenmeyer Shake Flask with Flat Cap,Sterile	25 pcs
Corning	431143	125 mL Polycarbonate Erlenmeyer Shake Flask with Vent Cap, Sterile	50 pcs
Corning	431144	250 mL Polycarbonate Erlenmeyer Shake Flask with Flat Cap, Sterile	50 pcs
Corning	431145	500 mL Polycarbonate Erlenmeyer Shake Flask with	25 pcs

		Vent Cap, Sterile	
Corning	431146	1L Polycarbonate Erlenmeyer Shake Flask with Flat Cap, Sterile	25 pcs
Corning	431147	1L Polycarbonate Erlenmeyer Shake Flask with Vent Cap, Sterile	25 pcs
Corning	431252	3L Polycarbonate Erlenmeyer (Fernbach Design) Flask with Vent Cap	4 pcs
Corning	431253	3L Baffled Polycarbonate Erlenmeyer (Fernbach Design) Flask with Vent Cap	4 pcs
Corning	431255	2L Polycarbonate Erlenmeyer Shake Flask with Vent Cap,Sterile	6 pcs
Corning	431256	2L Baffled Polycarbonate Erlenmeyer Flask with Vent Cap	6 pcs
Corning	431281	2L Baffled PETG Erlenmeyer Flask with Vent Cap, Sterile	6 pcs
Corning	431282	3L Plain bottom PETG Erlenmeyer flask, vent cap, Sterile	4 pcs
Corning	431284	5L Plain bottom PETG Erlenmeyer flask, vent cap, Sterile	4 pcs
Corning	431285	5L Baffled PETG Erlenmeyer flask, vent cap, Sterile	4 pcs
Corning	431684	5L Polycarbonate Baffled Erlenmeyer Shake Flask with Vent Cap, Sterile	4 pcs
Corning	431685	5L Polycarbonate Erlenmeyer Shake Flask with Vent Cap, Sterile	4 pcs
Corning	431684	5L Polycarbonate Baffled Erlenmeyer Shake Flask with Vent Cap, Sterile	4 pcs

5. Mini Bioreactor

Corning® Mini Bioreactors are ideal for high throughput process optimization for suspension cell culture. The product consists of the Corning 50 mL centrifuge tube with a vented cap. This product is used in cell line development, clone selection, media optimization, and recombinant protein development. Tube has a large marking spot to clearly identify tube contents and experimental parameters. Polyethylene cap has 4 vents, and the hydrophobic membrane provides gas exchange.

Brand	Cat. No	Description	Unit/Case
Corning	431720	50mL Mini Bioreactor CT, W/VE	300 pcs

6. Centrifuge Tube

Centrifuge tube is used for cell harvesting after the end point of cultivation. Corning® 250 and 500 mL polypropylene (PP) centrifuge tubes are ideal for applications requiring large volume centrifugation

- High Density Polyethylene plug seal caps
- Maximum RCF of 6,000xg
- Tubes are sterile and nonpyrogenic.

Brand	Cat. No	Description	Unit/Case
Corning	430776	250mL PP Centrifuge Tube with Plug Seal Cap, Sterile	102 pcs
Corning	431123	500mL PP Centrifuge Tube with Plug Seal Cap, Sterile	36 pcs

7. Spin-X Centrifuge Tube Filters

Spin-X centrifuge tube filters consist of a membrane-containing (either cellulose acetate or nylon) filter unit within a polypropylene centrifuge tube. They filter small sample volumes by centrifugation for bacteria removal, particle removal, HPLC sample preparation, removal of cells from media and purification of DNA from agarose and polyacrylamide gels

Cellulose acetate (CA) membranes have a very low binding affinity for most macromolecules and are especially recommended for applications requiring low protein binding, such as filtering culture media containing sera, purification DNA from gel, preparing protein samples for HPLC.

Nylon (NY) membranes are greater chemical resistance makes them better for filtering more aggressive solutions, such as alcohols, DMSO and preparing chemical solutions for HPLC.

Brand	Cat. No	Description	Unit/Case
Corning	8160	Spin-X Centrifuge Tube Filter, 0.22um Pore CA Membrane, Sterile	96 pcs
Corning	8161	Spin-X Centrifuge Tube Filter, 0.22um Pore CA Membrane, Non-Sterile	100 pcs
Corning	8162	Spin-X Centrifuge Tube Filter, 0.45um Pore CA Membrane, Sterile	96 pcs
Corning	8163	Spin-X Centrifuge Tube Filter, 0.45um Pore CA Membrane, Non-Sterile	100 pcs
Corning	8169	Spin-X Centrifuge Tube Filter, 0.22um Pore NY Membrane, Non-Sterile	200 pcs
Corning	8170	Spin-X Centrifuge Tube Filter, 0.45um Pore NY Membrane, Non-Sterile	200 pcs

8. Spin-X® UF concentrators

Spin-X UF centrifugal concentrators offer a simple, one-step procedure for concentrating or desalting proteins and other biomolecules with 90% or better recovery.

The vertical membrane design and thin channel filtration chamber minimizes membrane fouling and provides fast, high-speed concentrating, even with particle-laden solutions.

Integrated dead stop design reduces risk of spinning to dryness; no respinning necessary

Choice of three sizes for greater flexibility:
- Spin-X UF 500 for samples up to 500 µL
- Spin-X UF 6 for samples up to 6 mL
- Spin-X UF 20 for samples up to 20 mL, 14 mL if using fixed-angle rotors

Low binding polyethersulfone (PES) membranes are available with five molecular weight cut-offs (MWCO): 5,000, 10,000, 30,000, 50,000 and 100,000 to meet all of your concentrating needs. Choose an MWCO 1/2 to 1/3 smaller than the protein to be concentrated.

The MWCO and graduations are printed right on the side of the concentrator tube to avoid mix-ups. Spin-X UF 6 and 20 concentrators can be used with either swinging buckets or fixed-angle rotors. Spin-X UF 500 concentrators require fixed-angle rotors.

Spin-X® UF Applications

- Concentration, desalting of proteins, enzymes, monoclonal antibodies, immunoglobulins
- Removal of labeled amino acids and nucleotides
- HPLC sample preparation
- Deproteinization of samples
- Recovery of biomolecules from cell culture supernatants, lysates
- Concentrating virus from cell culture supernatants

Brand	Cat. No	Description	Unit/Case
Corning	431477	Spin-X Ultrafiltration 500uL Centrifugal Concentrator, 5,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431478	Spin-X Ultrafiltration 500uL Centrifugal Concentrator, 10,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431479	Spin-X Ultrafiltration 500uL Centrifugal Concentrator, 30,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431480	Spin-X Ultrafiltration 500uL Centrifugal Concentrator, 50,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431481	Spin-X Ultrafiltration 500uL Centrifugal Concentrator, 100,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431482	Spin-X Ultrafiltration 6mL Centrifugal Concentrator, 5,000 MWCO Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431483	Spin-X Ultrafiltration 6mL Centrifugal Concentrator, 10,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431484	Spin-X Ultrafiltration 6mL Centrifugal Concentrator, 30,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431485	Spin-X Ultrafiltration 6mL Centrifugal Concentrator, 50,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs
Corning	431486	Spin-X Ultrafiltration 6mL Centrifugal Concentrator, 100,000 Molecular Weight Cut-Off Membrane, Non-Sterile	25 pcs

Corning	431487	Spin-X Ultrafiltration 20mL Centrifugal Concentrator, 5,000 Molecular Weight Cut-Off Membrane, Non-Sterile	12 pcs
Corning	431488	Spin-X Ultrafiltration 20mL Centrifugal Concentrator, 10,000 Molecular Weight Cut-Off Membrane, Non-Sterile	12 pcs
Corning	431489	Spin-X Ultrafiltration 20mL Centrifugal Concentrator, 30,000 Molecular Weight Cut-Off Membrane, Non-Sterile	12 pcs
Corning	431490	Spin-X Ultrafiltration 20mL Centrifugal Concentrator, 50,000 Molecular Weight Cut-Off Membrane, Non-Sterile	12 pcs
Corning	431491	Spin-X Ultrafiltration 20mL Centrifugal Concentrator, 100,000 Molecular Weight Cut-Off Membrane, Non-Sterile	12 pcs

9. Kerry

Kerry protein hydrolysates are manufactured primarily in Norwich (NY), but also Rochester (MN) USA and Utrecht, The Netherlands. The existence of these three sites offers unique flexibility in capabilities and contingency. Our sites are supported by product development groups and state of the art pilot plants to accommodate new development, process optimization and customer-specific projects

Protein hydrolysates are obtained by (enzymatic or acid) hydrolysis of protein. Protein hydrolysates are nitrogen sources for fermentation.

Typical protein raw materials for the protein hydrolysates include: Milk, Casein, Whey protein, Animal derived proteins, Meat, Collagen, Vegetable proteins, Wheat gluten, Soy protein, Rice protein, Pea protein and Cottonseed protein

Nitrogen Source

Brand	Name	Microorganism	Application
Kerry	HY-Express System I	*Escherichia coli*	rProtein
Kerry	HY-Express System II	*Escherichia coli*	rProtein
Kerry	Hy-Yest 101	*Escherichia coli*	rProtein
Kerry	N-Z Amine A	*Escherichia coli, Saccharomyces cerevisiae,*	rProtein
Kerry	Hy-Soy	*Pichia pastoris*	rProtein
Kerry	Hy-Express System IV	*Saccharomyces cerevisiae*	rProtein

[1] Kerry Spillane and Todd Upton, Large-Scale Adherent Cell Protein Production Using The Corning® HYPERFlask® Cell Culture Vessel, Corning Incorporated

[2] Mari Masuda, Application of Corning®CellSTACK®-5Chamberwith the Corning CellBIND® Surface to Simplify and Enhance Mass-Production of Recombinant Proteins, Chuo-ku, Tokyo

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