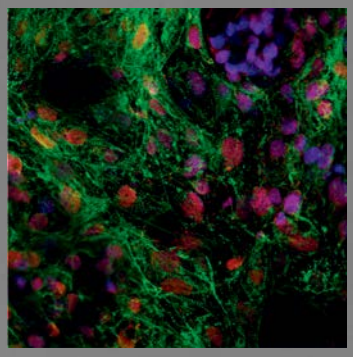
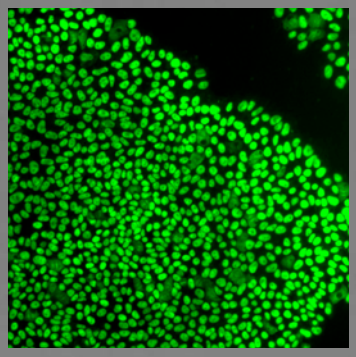
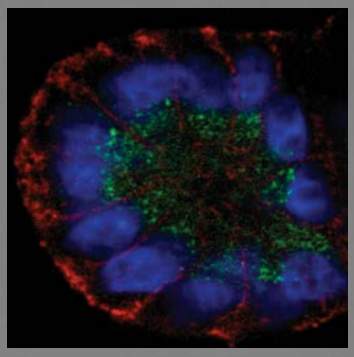




CORNING

Corning® Cell Culture Surfaces

The right surface for every cell

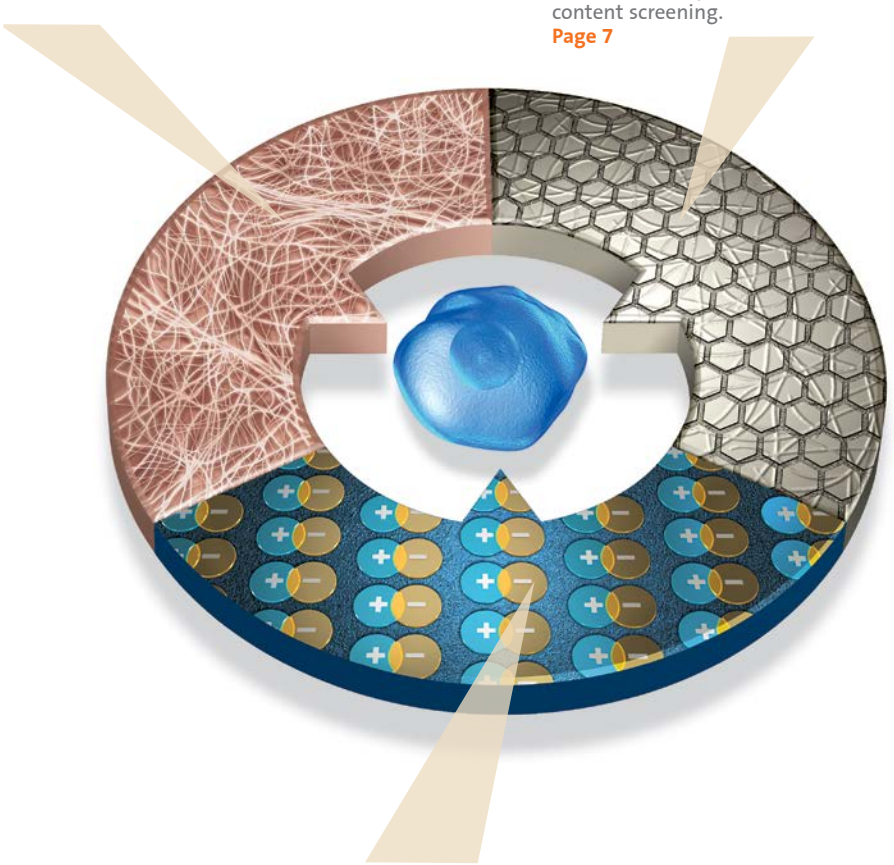
The Right Surface for Every Cell

Corning's history in cell culture surfaces extends back more than 100 years. During that time, we have introduced numerous new surface technologies, including Corning® Matrigel® matrix, Corning BioCoat® pre-coated cultureware, and synthetic ECM mimetic peptides.

In addition to non-treated and tissue culture-treated Corning and Falcon® polystyrene cell culture vessels, Corning offers a number of technologies for enhanced binding and growth of specialized and fastidious cell types in low- and non-serum media environments. These technologies include functional, structural, and surface charge modalities.

Extracellular Matrices and Biologically Coated Surfaces
Corning extracellular matrices (ECMs) enable researchers to mimic in vivo environments for 2D and 3D cell culture applications. Products include Corning Matrigel matrix, purified ECMs, and Corning BioCoat pre-coated cultureware.
Page 1

ECM Mimetic and Advanced Surfaces
Corning ECM Mimetic and Advanced Surfaces provide unique, functional surface activity for a range of specialized cell expansion and assay applications. Examples include Corning PureCoat™ ECM mimetic cultureware for defined stem and progenitor cell expansion and Corning Ultra-Low Attachment (ULA) surface for 3D spheroid formation and high content screening.
Page 7



Enhanced Tissue Culture-treated Surfaces
A novel family of treatments that alter the surface charge of culture vessels. Compared to cells grown on traditional tissue culturetreated surfaces, enhanced surfaces improve the attachment and growth of fastidious cell types, such as primary or transfected cell lines in low- or serum-free environments.
Page 12

Front cover: Electron microscopy image of a muscle myoblast (primitive embryonic muscle cell) attached to a tissue culture surface by extracellular matrix.

Extracellular Matrices and Biologically Coated Surfaces

Corning provides a wide range of animal, human, and synthetic matrices to support cell attachment, propagation, differentiation, and migration. Corning's extensive experience purifying ECMs and other proteins, rigorous quality processes, and ISO 9001 manufacturing, results in high quality, consistent vialed and pre-coated products.

Corning® Matrigel® Matrix – the Original, Trusted Extracellular Matrix

Corning Matrigel matrix is a solubilized basement membrane preparation extracted from the Engelbreth-Holm-Swarm (EHS) mouse sarcoma, a tumor rich in extracellular matrix proteins, including Laminin (a major component), collagen IV, heparan sulfate proteoglycans, entactin/nidogen and a number of growth factors.

Matrigel matrix is a key reagent used in the development of angiogenesis and tumorigenesis models. It is the basis of many angiogenesis assays both in vitro and in vivo, as well as various tumor cell invasion assays. Matrigel matrix has also been used for:

- *In vivo* xenograft generation of human tumors in immunosuppressed mice
- Feeder-free expansion of both human embryonic and induced pluripotent stem cells
- Directed differentiation of neurons, hepatocytes, vascular endothelial cells, beta-islets, cardiomyocytes, and many other cell lineages.
- A scaffold for *in vivo* cell engraftment and functionality testing

Industry-Leading Manufacturing and Quality

Since Corning Matrigel matrix was first introduced more than 25 years ago, the manufacturing process has a history of protein consistency and superior product performance.

Matrigel matrix is certified lactose dehydrogenase/lactic dehydrogenase (LDEV/LDHV)-free. The manufacturing process incorporates triple-redundant testing, including both LDEV-free mouse colony testing and finished product PCR testing. Matrigel matrix is tested for 27 murine viruses and pathogens in addition to LDEV/LDHV. Corning also offers custom Matrigel matrix production for researchers that need increased levels of validation, testing, documentation, and/or process control.

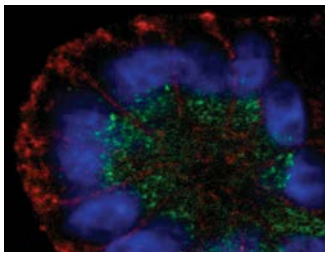
You can review the Matrigel matrix quality control specifications at **www.corning.com/matrigel.**

Lot Matching and Reservation Service

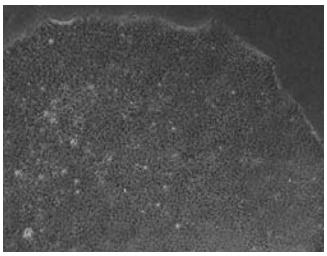
Extracellular matrices are complex biological reagents, and, like all biologically-derived reagents, they may be subject to lot-to-lot variation. Corning's stringent quality control and manufacturing practices minimize variation. In addition, researchers can use Corning's online lot matching and reserve tool to:

- Set up a lot reserve, which simplifies storage and supply chain resources
- Find a production lot with similar specifications to the previously requested lot number

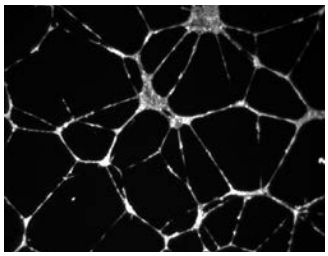
A link to the Corning Lot Matching and Reserve Tool is available at **www.corning.com/reservematrigel.**



***In vitro* 3D acinar formation on Corning Matrigel matrix.** Malignant T4-2 mammary epithelial cells were grown in a 3D culture on Matrigel matrix GFR. Immuno fluor escence was used to analyze cell polarity markers for basolateral (β-catenin-red) and apical (GM130-green) membrane domains.



Feeder-free expansion of pluri-potent stem cells. Phase contrast images of H9 cells grown on Corning Matrigel hESC-qualified Matrix.



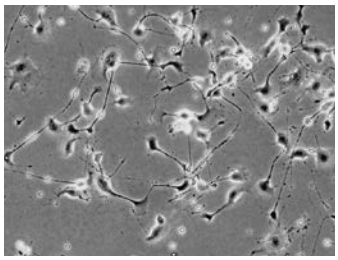
Endothelial Tube Formation. Corning HUVEC-2 cells grown on Corning Matrigel matrix demonstrating elongation, differentiation, and endothelial cell tube formation.

Corning® BioCoat® Cultureware

Corning has extensive experience in thin film coating technology and offers highly consistent and biologically functional pre-coated surfaces in a wide range of vessel and microplate formats.

Our stringent quality control measures and documentation are designed to meet the needs of drug discovery and biotechnology applications. Coating is conducted in a highly controlled, aseptic manufacturing environment to ensure lot-to-lot consis tency, reproducibility, and contamination control.

In addition to off-the-shelf BioCoat products, Corning's custom coating service offers a wide selection of biological and synthetic coatings for Corning and Falcon® cultureware and microplates.



Neuronal cell attachment and dendrite formation on Corning BioCoat Laminin cultureware. NG-108 rat glioma/mouse neuroblastoma cells cultured on Corning BioCoat Laminin cultureware exhibit a spindle-shaped morphology and dendritic processes.processes.

Characteristics of ECMs and Biologically Coated Surfaces

Corning Matrigel® Matrix Products

	Standard Formulation	High Concentration (HC)	Growth Factor Reduced (GFR)	Phenol Red Free	hESC-qualified	Organoid Culture
Application	Suitable for culture of polarized cells, such as epithelial cells. Promotes differentiation of many cell types, including hepatocytes, neurons, beta-islets, mammary epithelial, endothelial, and smooth musclecells.	Higher protein concentration provides greater matrix stiffness and scaffold integrity. Suitable for in *vivo* cell delivery applications for improved cell engraftment and augmentation of solid tumor formation.	Suited for applications where a more highly defined basement membrane preparation is desired. Available in standard, Phenol red-free, and GFR formulations.	Suitable for assays that require color detection (e.g., colorimetric, fluorescence). Available in standard, GFR, and HC formulations.	Pre-screened for compatibility with mTeSR®1 medium by Stem Cell Technologies, providing the reproducibility and consistency essential for human embryonic and induced pluripotent feeder-free stem cell culture.	Validated to support growth of human intestinal organoids with typical budding morphology and marker expression. Also, verified to supportgrowth of mouse intestinal organoids and human airway organoids, providing reproducibility and consistency essential for organoid culture.
Source	Mouse	Mouse	Mouse	Mouse	Mouse	Mouse
Protein Concentration	7-12 mg/mL	18-22 mg/mL	7-12 mg/mL	7-12 mg/mL	See certificate of analysis for dilution factor which is calculated based on protein concentration.	See certificate of analysis for lot specific protein concentration.
Shelf Life	2 years from date of manufacture. Date of expiration is located on a lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on a lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on a lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on a lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on a lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on a lot-specific certificate of analysis.
Vialed Formats (Cat. No./Qty.)	356234 | 5 mL 354234 | 10 mL 356237 | 10 mL (Phenol red-free)	354248 | 10 mL 354262 | 10 mL (Phenol red-free) 354263 | 10 mL (GFR)	356230 | 5mL (Standard) 354230 | 10 mL (Standard) 354263 | 10 mL (HC) 356231 | 10 mL (Phenol red-free)	356237 | 10 mL (Standard) 354262 | 10 mL (HC) 356231 | 10 mL (GFR)	354277 | 5 mL	356255 I 10 mL
Corning BioCoat Options	**Plates:** 6-, 24-, 96-well **Inserts:** for 6-, 24-well plates **Dishes:** 60 mm, 100 mm	N/A	**3D Plates:** 96- and 384-well	**3D Plates:** 96- and 384-well	N/A	N/A

Characteristics of Coated Surfaces

Corning® Extracellular Matrix Products

	Human Fibronectin, sterile filtered	Human Vitronectin, sterile filtered	Corning Cell-Tak™ Cell and Tissue Adhesive
Application	Suitable as a thin coating on tissue culture surfaces to promote attach-ment, spreading and proliferation of a variety of cell types. It can also be used as an additive to serum-free cul-ture medium.	When used as a thin coating on tissue culture surfaces, Vitronectin is useful to promote cell attachment, spreading, pro-liferation, and differentiation of many normal and neoplastic cells, and to study cell migration.	Can be used for establishment of primary cultures, in situ hybridization, immuno assays, microinjection, immunohisto-chemistry, and patch clamping.
Source	Human plasma	Human plasma	*Mytilus edulis*
Protein Concentration	Lyophilized (100 mM CAPS, 0.15M NaCl, 1 mM $CaCl_2$, pH 11.0). Reconstitute at 1 mg/mL.	Lyophilized (dialyzed against 10 mM phosphate buffer pH 7.7); reconstitute in sterile distilled water or buffered solution at neutral pH.	1.5-2.0 mg/mL in 5% acetic acid solution
Shelf-life	2 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.
Vialed Formats (Cat. No./Qty.)	354008 | 1 mg 356008 | 5 mg 356009 | 25 mg (5 x 5 mg)	354238 | 250 µg	354240 | 1 mg 354241 | 5 mg 354242 | 10 mg (2 x 5 mg)
Corning BioCoat® Options	**Plates:** 6-, 24-, 96-, 384-well **Dishes:** 60 mm, 100 mm **Inserts:** for 6-, 24-, well plates **Coverslips:** 22 mm **Culture Slides:** 4- and 8-well **Flasks:** T-75, T-175	Custom coating options available	N/A

Corning® Collagen Products

	Rat Tail Collagen I, sterile filtered	Rat Tail Collagen I High Concentration, sterile filtered	Bovine Collagen I
Application	Suitable for a thin layer on tissue culture surfaces to enhance cell attachment and proliferation or as a gel to promote expression of cell-specific morphology and function. Commonly used to culture endothelial cells, hepatocytes, muscle cells, and a variety of other cell types.	High concentration provides greater matrix stiffness and scaffold integrity; suitable for 3D cell culture applications.	Preparation contains native collagen molecules with a small amount of nicked or shortened sequences due to pepsin treatment.
Source	Rat tail	Rat tail	Bovine
Protein Concentration	3-4 mg/mL in 0.02 N acetic acid	8-11 mg/mL in 0.02 N acetic acid	~3 - 4 mg/mL in 0.01 N hydrochloric acid
Shelf Life	2 years from date of manufacture. Date of expiration is located on lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on lot-specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on lot-specific certificate of analysis.
Vialed Formats (Cat. No./Qty.)	354236 | 100 mg 356236 | 1 g (10 x 100 mg)	354249 | 100 mg	354231 | 30 mg
Corning BioCoat® Options	**Plates:** 6-, 12-, 24-, 48-, 96-, 384-well **Dishes:** 35 mm, 60 mm, 100 mm, 150 mm **Flasks:** T-25, T-75, T-150, T-175 (vented cap) **Coverslip:** 22 mm, round **Culture slides:** 4- and 8-well **Inserts:** for 6-, 12-, 24-well plates Custom coating options available	Custom coating options available	Custom coating options available

	Mouse Collagen IV	Corning BioCoat® Gelatin
Application	A ubiquitous component of the basement membrane. The sheet-like matrix is found in close proximity to epithelial, muscle and nerve cells. Plays a role in the regulation of cell growth, differentiation, and tissue formation.	Gelatin substrate enhances the attach-ment of a variety of normal and transfected cell types.
Source	Engelbreth-Holm-Swarm lathrytic mouse tumor	Porcine
Protein Concentration	0.2-1 mg/mL, frozen in 0.05 M Hydrochloric acid	Coating concentration (900-1100 µg/mL)
Shelf Life	2 years from date of manufacture. Date of expiration is located on lot-specific certificate of analysis.	4.5 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.
Vialed Formats (Cat. No./Qty.)	354233 | 1 mg 356233 | 10.0 mg (10 x 1 mg)	N/A
Corning BioCoat Options	**Plates:** 6-, 24-, 96-well **Dishes:** 60 mm, 100 mm **Flasks:** T-75, T-175 **Culture Slides:** 4- and 8-well **Inserts:** for 6- and 24-well plates Custom coating options available	**Plates:** 6- and 96-well **Dishes:** 100 mm **Flasks:** T-75 Custom coating options available

Corning® Laminin Products

	Mouse Laminin, sterile filtered	Laminin/Entactin Complex (High Concentration), sterile filtered	Ultrapure Laminin (entactin-free), sterile filtered	Poly-D-Lysine/ Laminin	Poly-L-Ornithine/Laminin
Application	Suitable as a thin coating on tissue culture surfaces or as a soluble additive to culture medium. It has been shown in culture to stimulate neurite outgrowth, promote cell attachment, chemotaxis and cell differentiation.	A highly consistent ECM formulation that enables the study of 3D cell differentiation and functionality, and can be used as a consistent substitute for Corning Matrigel Matrix. Applications include endothelial cell tubulogenesis, and feeder-free culture of hESC and iPSC.	A highly pure preparation of mouse laminin that is devoid of the bridging entactin molecule. Ultrapure Laminin has the same functionality as standard Laminin but is suited for applications where entactin is not desired.	Corning® BioCoat® PDL/ Laminin enhances the attachment, propagation and differentiation of neuronal cell on plastic and glass surfaces.	Corning BioCoat PLO/ Laminin enhances the attachment, propagation and differentiation of neuronal cell on plastic and glass surfaces.
Source	Engelbreth-Holm-Swarm mouse tumor	Engelbreth-Holm-Swarm mouse tumor	Engelbreth-Holm-Swarm mouse tumor	Poly-D-Lysine: Synthetic molecule Laminin: Engelbreth-Holm-Swarm (EHS) mouse tumor	Poly-L-Ornithine: Synthetic molecule Laminin: Engelbreth-Holm-Swarm (EHS) mouse tumor
Protein Concentration	0.6 - 2.0 mg/mL, frozen in 0.05 M Tris-HCl, 0.15 M NaCl, pH 7.4	11 - 17 mg/mL , frozen in 0.05 M Tris-HCl, 0.15 M NaCl, pH 7.4	0.6 - 2.0 mg/mL, frozen in 0.05 M Tris-HCl, 0.15 M NaCl, pH 7.4	N/A	N/A
Shelf-life	2 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.	1 year from date of manufacture. Date of expiration is located on lot specific certificate of analysis.	1.5 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.	2 years from date of manufacture. Date of expiration is located on lot specific certificate of analysis.
Vialed Formats (Cat. No./Qty.)	354232 | 1 mg	354259 | 10.5 mg	354239 | 1 mg	N/A	N/A
Corning BioCoat Options	**Plates:** 6-, 24-, 96-well **Dishes:** 60 mm, 100 mm **Flasks:** T-75 (plug seal cap) Custom coating options available	Custom coating options available	Custom coating options available	**Plates:** 6-, 24-, 96-well clear **Culture dish:** 100 mm **Coverslip:** 12 mm round **Culture Slide:** 8-well Custom coating options available	**Plates:** 6-, 24-, 96-well clear Custom coating options available

ECM Mimetic and Advanced Surfaces

Corning is a leader in cell culture surface technology, with a long legacy of developing new surfaces with expanded capabilities. These surfaces enable cell biologists to develop new applications, such as defined expansion and differentiation of stem and progenitor cell types and tools for 3D spheroid generation and screening.

Corning PureCoat™ ECM Mimetic Cultureware

Corning PureCoat ECM mimetic surfaces contain biologically active, animal-free peptides that have been rationally designed to mimic the cell attachment process and motifs of native ECM proteins. The proprietary covalent linkage orients the peptides for optimal cell binding and signaling in a broad range of serum-free, xeno-free, and animal-free media formulations, supporting the propagation and differentiation of a range of stem, progenitor, and primary cell types.

There are two PureCoat ECM Mimetic types:

- **Corning PureCoat ECM mimetic Fibronectin peptide** contains the RGD sequence motif and supports the attachment of cell types that require Fibronectin binding, including alpha-5 integrin-positive cells. It is a drop-in, compatible, animal-free alternative to natural animal or human ECM surfaces, such as natural human Fibronectin, for hMSC expansion and differentiation.
- **Corning PureCoat ECM mimetic Collagen I peptide** supports the attachment of Collagen I-dependent cell types including alpha 2 integrin-positive cells. It is a compatible, animal-free alternative to natural animal or human ECM surfaces, such as natural animal-derived Collagen I for human keratinocyte expansion.

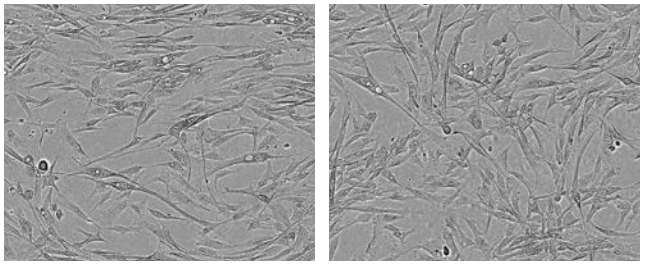
cGMP-compliant Manufacturing and Animal-free Traceability

Corning PureCoat surface cultureware products are Initial cap Class I medical devices (US only), manufactured in animal-free, cGMP compliant facilities that meet ISO 13485 and 21 CFR 820 standards using animal-free components. The animal-free nature of the surfaces helps mitigate variability and risk of contamination from adventitious organisms common to animal-sourced material.

Scalable, Pre-coated Vessel Platforms

Corning PureCoat surfaces streamline the cell expansion workflow by removing the need for tedious, time consuming, and inconsistent self-coating protocols. Pre-coated Fibronectin and Collagen I cultureware offer simple and efficient scale-up, available on multi-layered vessels, such as the Falcon® Multi-Flask vessels.

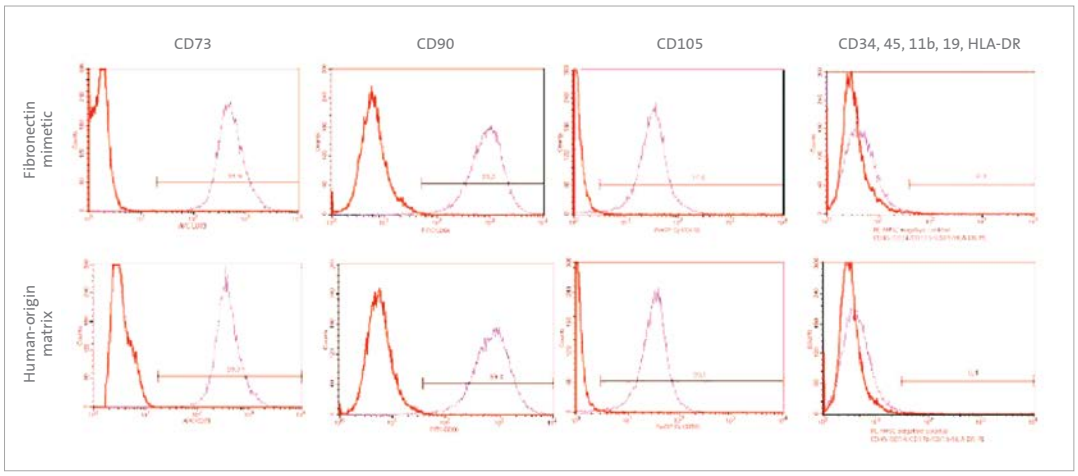
Each Corning ECM mimetic vessel and surface configuration has been validated to ensure predictable cell culture performance during scale-up.



Corning PureCoat ECM Mimetic Fibronectin Peptide

Defined, xeno-free MSC Kit with Human Origin Coating Matrix

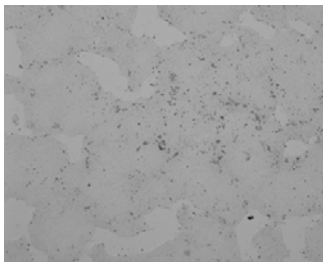
Comparable Cell Growth, Morphology. Bone marrow-derived hMSCs cultured in a defined and xeno-free media on the Corning® PureCoat™ ECM Mimetic Fibronectin peptide surface exhibit a tight and compact morphology and are comparable to the human origin matrix coating after 5 passages.



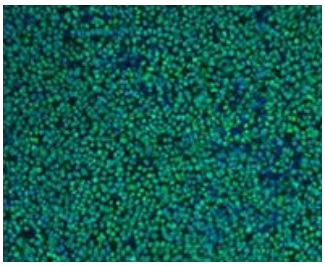
hMSCs cultured on Corning PureCoat ECM mimetic Fibronectin peptide displayed a cell surface marker profile characteristic of hMSCs. Data shows expression of CD73, CD90, CD105, and the absence of CD34, CD45, CD11b, CD19, and HLA-DR. Results were comparable to human ECM coating matrix.

Corning rLaminin-521 (Human)

Corning has partnered with BioLamina for the supply of recombinant human laminin-521. Corning rLaminin-521 (Human) is a heterotrimer composed of α5, β2, and γ1 chains expressed in a mammalian cell culture system. rLaminin-521 (Human) supports long-term self-renewal of human pluripotent stem cells (hPSC), including embryonic stem cells (hESC) and induced pluripotent stem cells (iPSC) in defined and xeno-free environments. rLaminin-521 provides additional benefits, including ROCK inhibitor independent single cell expansion of PSCs and inhibition of spontaneous differentiation, improving hPSC culture ease and efficiency.



hESC cultured on Corning rLaminin-521 (Human) in xeno-free medium exhibit characteristic colony morphology with a high nuclear-to-cytoplasm ratio.

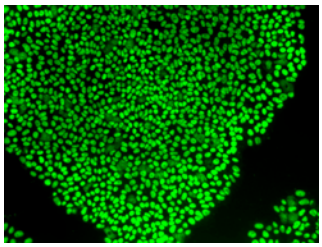


Immunocytochemistry data showing Oct-4 (green) expression in the cells. Nuclei were stained with DAPI (blue).

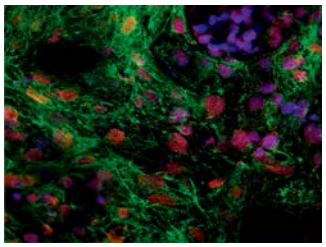
Corning® Synthemax® II-SC Substrate

Corning Synthemax self-coating substrate is a unique, animal-free, synthetic Vitronectin-based peptide containing the RGD motif and flanking sequences. The synthetic peptides can be covalently bound to a polymer backbone for passive coating, orienting, and presenting the peptide for optimal cell binding and signaling.

The Synthemax substrate allows for scalable, multi-passage expansion of pluripotent stem cells in serum-free media, such as mTeSR®, subsequent to differentiation into a number of cell types, including retinal pigment epithelial cells and cardiomyocytes, as well as propagation of various progenitor cell types. The Synthemax substrate is manufactured in a facility that has a Quality Management System which meets the requirements of ISO 9001, production environments that are cGMP compliant and meets 21 CFR 820 standards using animal-free components.



Oct-4 staining of hiPSC after 5 passages on Corning Synthemax II-SC substrate in mTeSR1 medium.



Differentiation of H7 hESCs into cardiomyocytes on Corning Synthemax surface. Confocal fluorescent image of beating structures immunostained for cardiomyocyte-specific markers: Nkx2.5 (red), α-actinin (green).

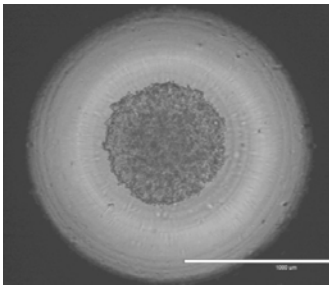
ECM Mimetic and Defined Surfaces Products

	Corning PureCoat™ ECM Mimetic Fibronectin Peptide	Corning PureCoat ECM Mimetic Collagen I Peptide	Corning Synthemax II-SC	Corning rLaminin-521 (Human)
Application	Ready-to-use cultureware suitable as a replacement for natural, self-coated Fibronectin for adult stem, progenitor, and primary cell types in defined media environments.	Ready-to-use cultureware suitable as a replacement for natural, self-coated Collagen I for adult stem, progenitor, and primary cell types in defined media environments.	A flexible coating substrate for the culture of hPS, adult, and progenitor cell types in defined media environments.	A robust, defined, xeno-free substrate enabling ROCK-independent, single cell passaging of pluripotent stem cells in defined media environments.
Surface Technology	Covalently bound, synthetic peptide containing the RGD sequence and flanking Fibronectin sequences	Covalently bound, synthetic peptide containing the GFOGOR sequence and flanking Collagen I sequences	Synthetic coating comprised of a Vitronectin-based peptide containing the RGD motif and flanking sequences covalently bonded to a polymer backbone or matrix allowing the peptide for optimal cell binding and signaling	Passively self-coated, full length recombinant Laminin protein
Cell types and environment	• Human mesenchymal stem cells (SF, XF, AF)* • Human adipose-derived stem cells • Human lung stromal cells (XF) • Human endothelial progenitors (XF) • Retinal pigment epithelial cells (XF)	• Human keratinocytes (XF, AF) • Human corneal cells (SF) • Human adipose-derived stem cells (XF) • Human endothelial progenitor cells (XF)	• Human embryonic stem cells • Human induced pluripotent stem cells • Cardiomyocytes (*in vitro* hESCs, hIPSCs differentiation) • Human mesenchymal stem cells (bone marrow-derived, adipose-derived) • Human retinal pigment progenitor and epithelial cells	• Human pluripotent stem cells (SF, XF, AF) • Human neural progenitor cells (SF)
Shelf-life	18 months at room temperature	18 months at room temperature	24 months - store at -20°C	24 months when stored at -20°C
Formats (Cat. No./ Description/ Qty.)	356240 | 6 well plate 356241 | 24 well plate 356242 | T-75 Flask 356243 | T-175 Flask	356270 | 6 well plate 356271 | 24 well plate 356272 | T-75 Flask 356273 | T-175 Flask	3535 | 10 mg	354221 | 100 µg 354222 | 10 x 100 µg 354223 | 10 x 500 µg 354224 | 500 µg
Options	**Plates:** 6- and 24-well **Flasks:** T-75, T-175 **Multi-layer Flasks:** 3- and 5-layer	**Plates:** 6- and 24-well **Flasks:** T-75, T-175 **Multi-layer Flasks:** 3- and 5-layer	Pre-coated microcarriers. Custom pre-coated vessels available.	N/A

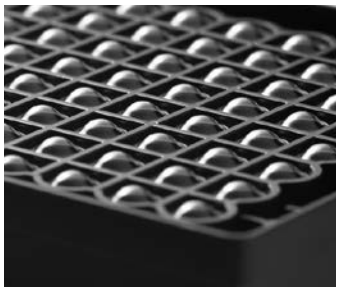
*SF = serum-free media, XF = xeno-free media, AF = animal-free media.

Corning® Ultra-Low Attachment Surface

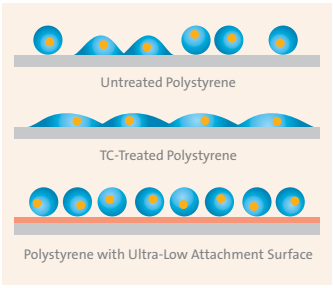
Corning Ultra-Low Attachment (ULA) surface is a hydrophilic, neutrally charged hydrogel coating that is covalently bound to the polystyrene surface of a vessel. The hydrogel inhibits specific and nonspecific immobilization, which forces cells into a suspended state that enables 3D spheroid formation. The coating is stable, noncytotoxic, biologically inert, and non-degradable. The ULA surface is available in plates, dishes, flasks, and Corning CellSTACK® vessels, as well as 96- and 384-well microplates for high throughput spheroid screening applications.



Multicellular spheroid formation after a 24-hour culture of HT-29 cells in a 384-well spheroid microplate.



96- and 384-well round bottom ULA surface microplates enable high throughput fluorescent spheroid assay screening. The unique microplate underside design shields well-to-well crosstalk.



Schematic demonstrating ULA surface function.

Other Advanced Surfaces Products

	Ultra-Low Attachment
Application	Enables 3D spheroid formation, such as embryoid body and tumorsphere formation.
Surface Technology	Covalently bound hydrophilic, non-ionic, neutrally charged hydrogel
Formats	**Plates:** 6 well, 24 well, 96 well flat (clear), 96 well round bottom (black/clear), 384 well flat bottom (black/clear), 384 well round bottom (black/clear). **Dishes:** 60 mm, 100 mm **Flasks:** T-25, T-75, **Corning CellSTACK vessel:** 1-layer

Enhanced Tissue Culture-treated Surfaces

Corning Enhanced Tissue Culture (TC)-treated surfaces are a family of treatments that alter the surface charge of culture vessels, improving the attachment and growth of fastidious cell types, such as primary or transfected cell lines in low or serum-free environments. Enhanced surfaces are suitable for research, drug discovery, and high throughput screening applications.

Corning® PureCoat™ Amine and Carboxyl Surfaces

Corning PureCoat amine (positively charged) and carboxyl (negatively charged) surfaces provide improved cell attachment, faster cell proliferation, and enhanced recovery post-thaw over standard TC surfaces. These surfaces function with a broad range of primary, transfected, transformed, and fastidious cell types, and have demonstrated utility in serum-reduced or serum-free conditions.

Corning Primaria™ Surface

The Corning Primaria surface features a unique mixture of oxygen-containing (negatively charged) and nitrogen-containing (positively charged) functional groups on the polystyrene surface. The surface supports the growth of cells that can exhibit poor attachment or limited differentiation potential when cultured on traditional TC surfaces, including neuronal, primary, endothelial, and tumor cells. The surface consistency of each lot is confirmed by electron spectroscopy chemical analysis (ESCA).

Corning CellBIND® Surface

The Corning CellBIND surface features a net negative surface charge due to oxygen-containing functional groups incorporated in the polystyrene surface. The surface is more hydrophilic, and thus more wettable, compared to standard TC surfaces, which facilitates cell attachment and spreading.

Enhanced Surfaces Products

	Corning PureCoat Amine	Corning PureCoat Carboxyl	Corning Primaria	Corning CellBIND Surface
Surface Technology/ Charge	Vacuum-gas plasma amine group polymerization treatment. Positive charge.	Vacuum-gas plasma carboxyl group polymerization treatment. Negative charge.	Vacuum-gas plasma treatment. Positive/negative and nitrogen functional groups.	Microwave plasma treatment. Negative net charge.
Formats	**Falcon® vessels** **Plates:** 6-, 24-, 96-, 384-, 1536-well **Dishes:** 100 mm **Flasks:** T-75, T-175	**Falcon vessels** **Plates:** 6- and 24-well **Dishes:** 100 mm **Flasks:** T-75, T-175	**Falcon vessels** **Plates:** 6-, 24-, 96-well **Dishes:** 10 mm, 15 mm, 20 mm **Flasks:** T-25, T-75	**Corning vessels** **Plates:** 6-, 12-, 24-, 48-, 96-, 384-, 1536-well **Dishes:** 35 mm, 60 mm, 100 mm **T-Flasks:** T-25 and T-225 **U-Flasks:** 75 cm^2, 150 cm^2, 175 cm^2 Corning HYPERFlask® vessel Corning CellSTACK® vessel Corning HYPERStack® vessel Corning CellCube® module Corning Microcarriers

Corning Surface Selection by Cell Type

Primary Cells

	Corning® Cell-Tak™	Collagen I	Collagen IV	Corning Matrigel® Matrix	Fibronectin	Gelatin	Laminin	Poly-Lysine (PDL, PLL)	PDL/LM and PLO/LM	Vitronectin	Corning PureCoat™ ECM Mimetic Fn	Corning PureCoat ECM Mimetic COL I	Corning Synthemax® II-SC Substrate	Ultra-Low Attachment	rLaminin-521 (Human)	Corning Primaria™	Corning CellBIND®	Corning PureCoat Amine	Corning PureCoat Carboxyl
	Extracellular Matrices (ECMs) and Biological Coatings										ECM Mimetics and Advanced Surfaces					Enhanced TC-treated Surfaces			
PRIMARY CELLS																			
Aortic endothelial cells, BAEC		■		■	■		■			■									
Bile duct cells (epithelial)		■		■															
Bone marrow cells (bone resorption, osteoclast)																			
Brain microvessel (endothelial)		■	■	■	■	■	■			■									
Cardiomyocytes; cardiac (endothelium, progenitor cells)		■		■	■		■	■								■			■
Colonocytes (epithelial)			■	■										■					
Dorsal root ganglia				■				■	■										
Embryonic cortical neurons				■					■										
Embryonic sympathetic neurons			■	■			■		■										
Endothelial Cells; endothelial colony forming cells			■		■		■				■	■				■			
Erythrocyte culture (parasite development stages [asexual, sexual])	■		■																
Hepatocytes		■	■	■			■	■								■	■		
Hippocampal neurons				■	■		■	■	■										
Human periodontium (periodontal ligament)	■																		
HUVEC (endothelial)		■		■	■	■	■			■						■			
HVSMC				■			■			■									
Keratinocytes		■		■	■					■				■					
Mammary epithelial cells; breast cells (luminal, myoepithelial and endothelial)		■		■			■							■					
Microvascular, BME (endothelial)		■	■	■	■	■				■									
Mouse splenic T-Cells	■		■	■															
Muscle cells, myoblasts, myogenic cells, myotubes				■			■										■		
Neuronal cells (cortical, cerebeller granule, astrocytes, sensory, sympathetic)			■				■	■	■									■	
Oligodendrocytes (glial; precursors)				■			■	■		■									
Pancreatic islet, neonatal (3- to 5-day-old) rat islets of Langerhans	■			■	■									■				■	
Parotid acinar cells	■			■															
Peripheral blood mononuclear cells		■	■	■	■					■				■					
Postnatal mouse vestibular ganglion neurons	■																		
Schwann cells (glial)			■	■			■												
Sertoli cells (spermogenic)	■			■															
Skeletal muscle cells (myocytes, myotubes)				■												■	■		
Smooth muscle cells (endothelial, vascular)	■	■	■	■	■											■			
Urothelial cells		■	■	■	■														
Valvular interstitial cells					■														
Zygote and blastocyst development stages	■																		

Cell Lines (transformed or transfected)

	Corning® Cell-Tak™	Collagen I	Collagen IV	Corning Matrigel® Matrix	Fibronectin	Gelatin	Laminin	Poly-Lysine (PDL, PLL)	PDL/LM and PLO/LM	Vitronectin	Corning PureCoat™ ECM Mimetic Fn	Corning PureCoat ECM Mimetic COL I	Corning Synthemax® II-SC Substrate	Ultra-Low Attachment	rLaminin-521 (Human)	Corning Primaria™	Corning CellBIND®	Corning PureCoat Amine	Corning PureCoat Carboxyl
	Extracellular Matrices (ECMs) and Biological Coatings										ECM Mimetics and Advanced Surfaces					Enhanced TC-treated Surfaces			
CELL LINES																			
ARH-77 (lymphoblast)					■														
BHK-21 (fibroblast)					■	■										■		■	
Breast cancer cells (established cell lines)	■			■															
C2C12 (myoblast)		■		■						■				■					
Cell immobilization (Gin-1, Nasal epithelial cells, Molt-4 and K562 human leukemia cells, Sf9 Cells)	■																		
Chinook Salmon Embryo Cells (CHSE-214)																	■		
CHO, CHO-1, CHO-K1 (epithelial, endothelial, transfected fusion protein)				■				■			■					■	■	■	
COS-7 (fibroblast, transfected)		■		■	■			■		■						■			
Dorsal Root Ganglia (transfected)				■						■									
H1299 (transfected-human non-small cell lung carcinoma cell line)				■	■														
HEK-293 (transfected, epithelial), EcoPack2™-293, HEK-SRAtet cells, Living Colors HEK-ZsGreen proteasome sensor (transfected)	■	■		■		■		■						■		■	■	■	■
HeLa																			■
HepG2 (hepatocyte), Hep3B (hepatoma)		■		■						■				■			■	■	■
HT-1080 (epithelial)		■	■	■										■					■
Human MOLT-4, drosophila S2 (biomaterial and tissue engineering applications)	■																		
Keratinocytes (human neonatal)		■			■							■							
L929 (fibroblast, transfected)				■															
LnCAP (prostate cancer cell line)		■		■										■			■		■
MCF7 (epithelial)		■	■		■					■				■					
MCF-10A (epithelial)		■		■	■		■		■	■				■					
MDA-MB-231		■	■	■	■	■	■	■		■				■					
MDA-MB 435		■		■						■									
MM41 (skeletal myoblasts, transfected)		■																	
MRC5																			■
N2AB-1 (neuroblastoma)	■																		
NIH/3T3, 3T3 (fibroblast)				■	■			■											
PC-3, PC-12		■		■			■	■	■							■	■	■	■
RTG-2 (rainbow trout gonad cells)				■													■		
SH-SY5Y		■	■	■			■		■	■									
SK-MEL-28			■		■		■			■									
U266 (lymphoblast)					■														
U937 (monocyte)		■					■			■				■					
Vero cells											■	■							

Stem and Progenitor Cell Expansion

	Corning® Cell-Tak™	Collagen I	Collagen IV	Corning Matrigel® Matrix	Fibronectin	Gelatin	Laminin	Poly-Lysine (PDL, PLL)	PDL/LM and PLO/LM	Vitronectin	Corning PureCoat™ ECM Mimetic Fn	Corning PureCoat ECM Mimetic COL I	Corning Synthemax® II-SC Substrate	Ultra-Low Attachment	rLaminin-521 (Human)	Corning Primaria™	Corning CellBIND®	Corning PureCoat Amine	Corning PureCoat Carboxyl
	Extracellular Matrices (ECMs) and Biological Coatings										ECM Mimetics and Advanced Surfaces					Enhanced TC-treated Surfaces			
PRIMARY CELLS																			
Human embryonic stem cell (hESC)			■	■	■		■			■			■	■	■		■		
Human induced pluripotent stem cell (hiPSC)				■									■		■				
hMSCs (bone marrow derived, adipose derived)					■					■	■		■				■		
Human retinal progenitor cells (RPE)					■								■						
rESC; rat endothelial progenitor cells						■				■				■					
Neuronal stem cell (intestinal/enteric)					■		■							■					

In Vitro Differentiation of Pluripotent Stem Cells

	Extracellular Matrices (ECMs) and Biological Coatings											ECM Mimetics and Advanced Surfaces						Enhanced TC-treated Surfaces			
PRIMARY CELLS																					
hESC (cerebral organoid model)				■																	
hESC (pancreatic)				■		■															
hESC, hiPSC (cardiomyocytes)				■		■								■			■				
hESC, hiPSC, mESC (Germ Cell Layers: ectoderm, mesoderm, endoderm; hematopoietic progenitor; definitive differentiation; cardiomyocytes)		■	■	■	■	■	■					■		■	■		■				
hESC, hiPSC, mESC, miPSC (endothelial)	■	■		■			■														
hESC, hiPSC (intestinal organoids)				■											■						
hESC, hiPSC (neuronal)				■	■		■		■	■	■	■			■		■				
hESC, hiPSC (smooth muscle)				■	■		■		■			■									
hESC, mESC (lung epithelial)		■		■		■									■						
hESC, mESC, rESC (hepatocyte, hepatocyte-like)		■		■	■	■	■		■			■			■						
Human NPCs (differentiation to neuronal cells)				■			■				■						■				
hPSCs, mPSCs (renal progenitor cells, renal tubular cells, endoderm)		■		■											■						
mESC (hematopoietic)	■			■			■														
mESC, Chicken (cardiomyocytes)		■		■	■	■	■														
mESC, rESC, miPSC (neuronal, progenitor)				■	■	■	■			■		■			■						
mPSCs (inner ear sensory epithelia)				■																	
hESC, hiPSC (retinal pigment epithelial)				■										■							

In Vitro Differentiation of Adult Stem Cells

	Corning® Cell-Tak™	Collagen I	Collagen IV	Corning Matrigel® Matrix	Fibronectin	Gelatin	Laminin	Poly-Lysine (PDL, PLL)	PDL/LM and PLO/LM	Vitronectin	Corning PureCoat™ ECM Mimetic Fn	Corning PureCoat ECM Mimetic COL I	Corning Synthemax® II-SC Substrate	Ultra-Low Attachment	rLaminin-521 (Human)	Corning Primaria™	Corning CellBIND®	Corning PureCoat Amine	Corning PureCoat Carboxyl
	Extracellular Matrices (ECMs) and Biological Coatings										ECM Mimetics and Advanced Surfaces					Enhanced TC-treated Surfaces			
STEM CELLS																			
hADSCs; adipose (endothelial)				■										■					
Cardiac progenitor cells (cardiomyocyte)		■					■	■		■				■					
Colon (epithelial organoids)		■		■										■					
Hair follicle (melanocytes, neurons, smooth muscle)				■	■														
Hepatic progenitor cells (hepatic, biliary cells)							■							■					
Intestinal (organoids, crypt-villus)		■		■															
Keratinocytes (epidermal)		■				■													
Lung (sphere)				■										■					
Mammary epithelial cells				■										■					
MSC (cardiomyocyte, chondrocyte, hematopoietic, hepatocyte, neuron, osteocyte, spheroid)		■		■	■		■			■				■					
MSC (endothelial progenitors)		■												■					
Muscle (skeletal)							■												
Neural progenitor/stem cells (neuron, astrocytes, neuroblast)				■		■	■		■					■					
Pancreatic (endocrine)			■	■			■												
Prenatal rat cells (neuron, glial cells)							■												
Retinal (retinal neuron)																			
Salivary gland			■																
Stomach (gastric units)			■																

3D Cell Culture Applications

	Corning® Cell-Tak™	Collagen I	Collagen IV	Corning Matrigel® Matrix	Fibronectin	Gelatin	Laminin	Poly-Lysine (PDL, PLL)	PDL/LM and PLO/LM	Vitronectin	Corning PureCoat™ ECM Mimetic Fn	Corning PureCoat ECM Mimetic COL I	Corning Synthemax® II-SC Substrate	Ultra-Low Attachment	rLaminin-521 (Human)	Corning Primaria™	Corning CellBIND®	Corning PureCoat Amine	Corning PureCoat Carboxyl
	Extracellular Matrices (ECMs) and Biological Coatings										ECM Mimetics and Advanced Surfaces					Enhanced TC-treated Surfaces			
CELL TYPES																			
4T1 (mouse breast cancer cell line)				■															
Cardiac fibroblast		■																	
Hep3B (hepatoma; toxicity/drug screening)		■																	
MCF-7 (epithelial)		■												■					
MCF-10A (epithelial)		■		■										■					
MDA-MB-231		■		■										■					
MDA-MB-361				■															
HeLa				■										■					
HT-1080 (epithelial)		■		■										■					
hESC, Rat (endothelium)		■		■										■					
Human melanoma cell lines SBCL2 (RGP), WM-115, (VGP) and 451-LU (MM) and keratinocytes (spheroid model)		■																	
Mouse embryonic pancreatic progenitors (organoid)				■															
MSCs, Ovarian cancer cells (OCC)				■										■					
Primary rat hepatocytes				■															
Rat hepatocyte progenitor cells (spheroid)																			
SK-MEL-28 cells				■															
MEFs (stromal fibroblast)				■															
U266 (lymphoblast)				■															

The data in this surface selection guide has been derived from published papers accessed through NCBI database, as well as various web references. This guide will be periodically updated as additional literature becomes available. Products may not be available in all markets.

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