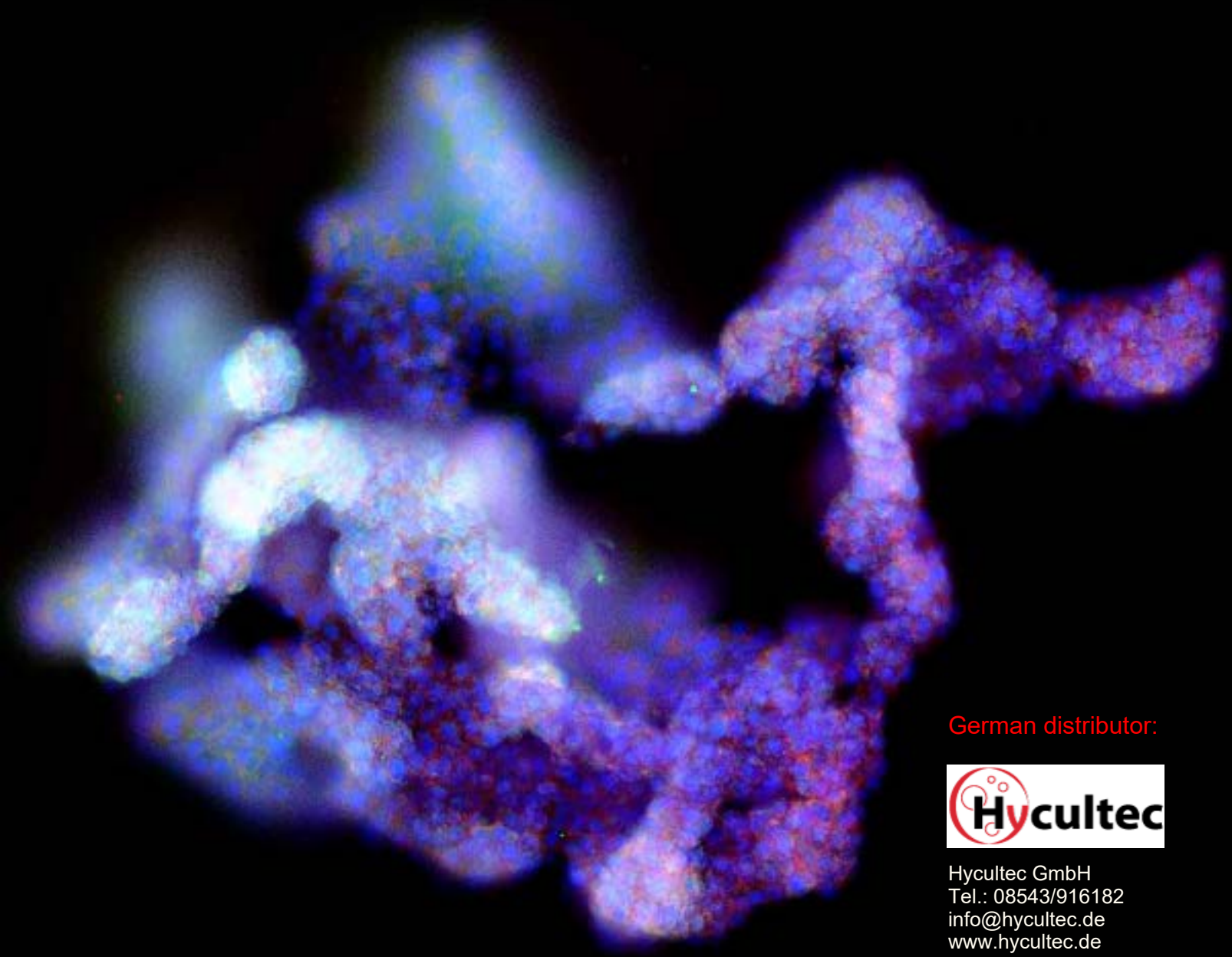
XENO-FREE HYDROGELS for 3D Cell Culture Research

Organoids • Stem Cells • MSCs • Cancer Spheroids • Invasion Assay
Co-Culture • Angiogenesis Assay • Animal Injection • 3D Bioinks



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TheWell BIOSCIENCE

PRODUCT CATALOG

www.thewellbio.com

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For research use only. Not for use in diagnostic procedures.

VITROGEL - A XENO-FREE FUNCTIONAL HYDROGEL SYSTEM

Closely mimicking the natural extracellular matrix (ECM) environment, our state-of-the-art hydrogel system gives an outstanding balance of biological functions and ease of operation to establish a robust 3D cell culture platform or an injectable delivery system for drug discovery, tissue engineering, cell therapy, and personalized medicine.

A xeno-free system is key for 3D cell culture in clinical applications. Our cutting-edge hydrogel enables high-throughput performance to establish 3D organotypic models from both cell lines and patient-derived cells. Using our hydrogel system as an injectable delivery system, scientists can achieve better cell retention and higher cell viability for cell therapy. This groundbreaking technology makes cell recovery from the 3D hydrogel matrix easier than ever before.

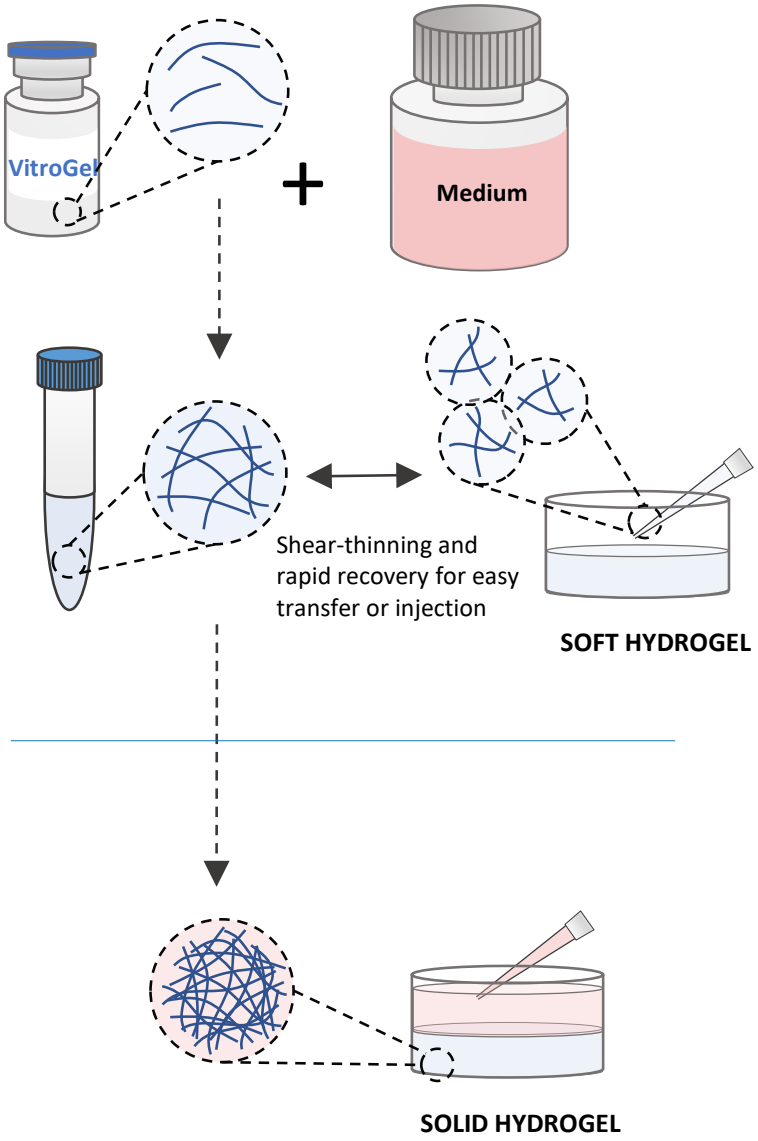
- Easy-to-use
- Xeno-free
- Room Temp Stable
- Transparent
- Reproducible
- Tunable Hydrogel
- Easy Cell Harvesting
- Biocompatible
- Biofunctional Modifiable
- Injectable
- Automation Friendly
- Mix & Match

	VitroGel	Basement Membrane Matrix	Polymer Matrix	Hanging Drop Plate	Low Adhesion Plate	Magnetic Levitation Plate
Easy-to-use	●		●	●	●	●
Mimic natural ECM	●	●				
Xeno-free	●		●	●	●	●
Room temperature stable	●		●	●	●	●
Neutral pH	●		N/A	N/A	N/A	N/A
Easy Cell harvesting	●			●	●	●
Transparent	●	●		●	●	●
Multi-functional ligands	●	●				
Wide range hydrogel strength	●					
Injectable	●	●				
Automation friendly	●		●	●	●	●

Performance Comparison To Other 3D Cell Culture Methods

VitroGel provides an outstanding balance of biological functions and operating feasibility. The system can closely mimic the natural extracellular matrix and allow the high-throughput performance to build robust 3D cell models.

HOW DOES GELATION WORK IN VITROGEL?



STAGE ONE:

VitroGel solution is room temperature stable and free-flowing. The hydrogel gelation/ formation starts by mixing the VitroGel solution with the cell culture medium. Hydrogel molecules interact with ionic molecules such as Ca2+ and Na+ from the cell culture medium and form the matrix structure (hydrogel).

The process of hydrogel formation is slow when a small amount of ionic molecules are used. At this stage, the hydrogel is soft and posses a shear-thinning and rapid recovering mechanical property, which makes the hydrogel easy to transfer to culture plate or use for injection

STAGE TWO:

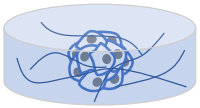
After soft hydrogel formation, adding an additional cell culture medium on top of the hydrogel would allow more ionic molecules to penetrate the hydrogel matrix and further saturate the hydrogel cross-linking. A solid hydrogel would form during this process.

MULTIPLE CELL CULTURE METHODS WITH VITROGEL HYDROGELS

The XENO-FREE bio-functional VitroGel hydrogel system is versatile for many applications. Choose either the "ready-to-use" hydrogel system for optimized formulation and simple operating process or the high-concentration hydrogel system to create a customized microenvironment by "Mix & Match" and tuning of the hydrogels. There are multiple ways to use our hydrogel system to fulfill many research needs. To show the flexibility of our hydrogels, we list five of the most popular cell culture methods that can be performed with our hydrogel: 3D cell culture, 2D hydrogel coating, static suspension culture, hydrogel-cell bead, and as an injectable carrier. These five culture methods apply to all of our ready-to-use VitroGel and high concentration VitroGel systems. Cells cultured in these methods can be easily harvested with the VitroGel® Cell Recovery Solution for downstream analysis or subculture.

3D CULTURE

Encapsulate cells in the hydrogel matrix to promote cell-matrix and cell-cell interactions.

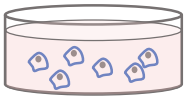


2D HYDROGEL COATING

Control the substance properties for culturing cells on top of the hydrogel. Great for cell submergence or invasion studies.

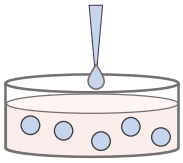
STATIC SUSPENSION CULTURE

Change the viscosity of the cell medium to create a cell suspension environment for large-scale cell expansion.



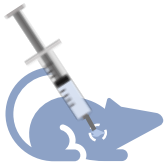
HYDROGEL-CELL BEAD

Encapsulate cells in the hydrogel matrix by creating hydrogel-cell droplets.



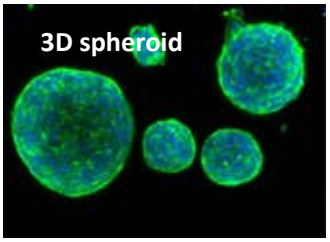
ANIMAL INJECTION

Mix compounds or cells with the injectable hydrogel to increase cell retention and viability for *in vivo* studies.

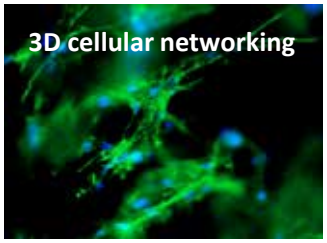


Multiple Applications

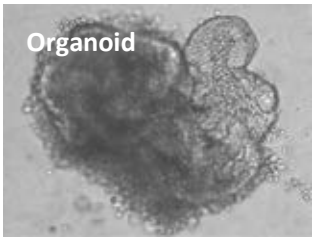
From simple 3D cell spheroids to comprehensive organoid and co-culture model to functional assay and *in vivo* studies, this powerful hydrogel system can help accomplish these research and more. Some application examples are listed below.



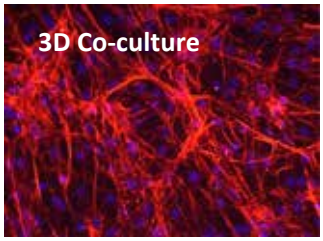
Human colon cancer cultured on VitroGel 3D



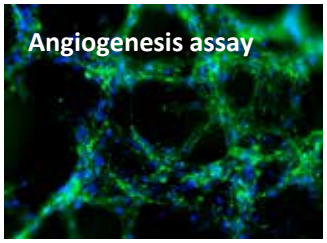
Fibroblast-like bone marrow 3D cultured on VitroGel Hydrogel Matrix



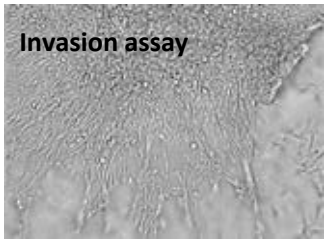
Mouse intestinal organoid culture on VitroGel ORGANOID



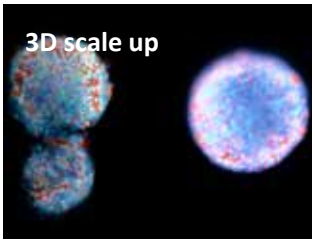
Co-culture of alveolar epithelial cells on VitroGel RGD



Tube formation of endothelial cells on top of VitroGel AAK hydrogel



Invasion of glioblastoma U87-MG cells from the top of VitroGel RGD hydrogel



Human pluripotent stem cells static suspension culture in VitroGel STEM

VitroGel is biocompatible without toxicity for animal study

VITROGEL® READY-TO-USE HYDROGEL

A series of user-friendly functional hydrogel offering an excellent balance of simplicity and versatility.

These ready-to-use VitroGel hydrogels have optimized formulations of multi-functional ligands and concentration to support a wide range of cell types for different applications, including various 3D cell models, stem cell spheroid, and organoids.

JUST ADD CELLS: Each ready-to-use VitroGel can mix with cell suspension directly. There is no additional adjustment required. For many users, this is the preferred hydrogel for 3D cell culture and 2D coating.

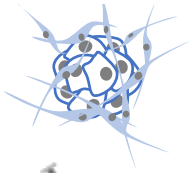
THE READY-TO-USE VITROGEL INCLUDES:

VitroGel® Hydrogel Matrix
VitroGel® STEM
VitroGel® MSC
VitroGel® ORGANOID
VitroGel® HEK293
VitroGel® Angiogenesis Assay

VitroGel Ready-to-use hydrogel is good for multiple applications:


3D cell model


2D hydrogel coating

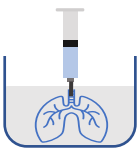

Co-culture

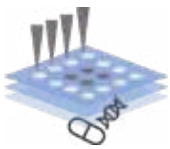

Invasion assay


3D migration


Animal injection


Control release


FRESH bioprinting


High-throughput screening

VITROGEL® HYDROGEL MATRIX

Xeno-free (animal origin-free) multi-functional hydrogel system.

VitroGel® Hydrogel Matrix is a ready-to-use, xeno-free (animal origin-free) functional hydrogel for 3D cell culture research. VitroGel Hydrogel Matrix is an optimized formulation of multi-functional ligands and concentration to support a wide range of cell types for different applications.

VitroGel Hydrogel Matrix closely mimics the natural extracellular matrix (ECM) environment to make cells feel more like at home. The hydrogel is room temperature stable, has a neutral pH, is transparent, permeable, and compatible with different imaging systems. The solution transforms into a hydrogel matrix by simply mixing with the cell culture medium. Cells cultured in this system can be easily harvested with our VitroGel Cell Recovery Solution.

Why VitroGel Hydrogel Matrix?

XENO-FREE: Without undesired proteins for pre-clinical/clinical applications

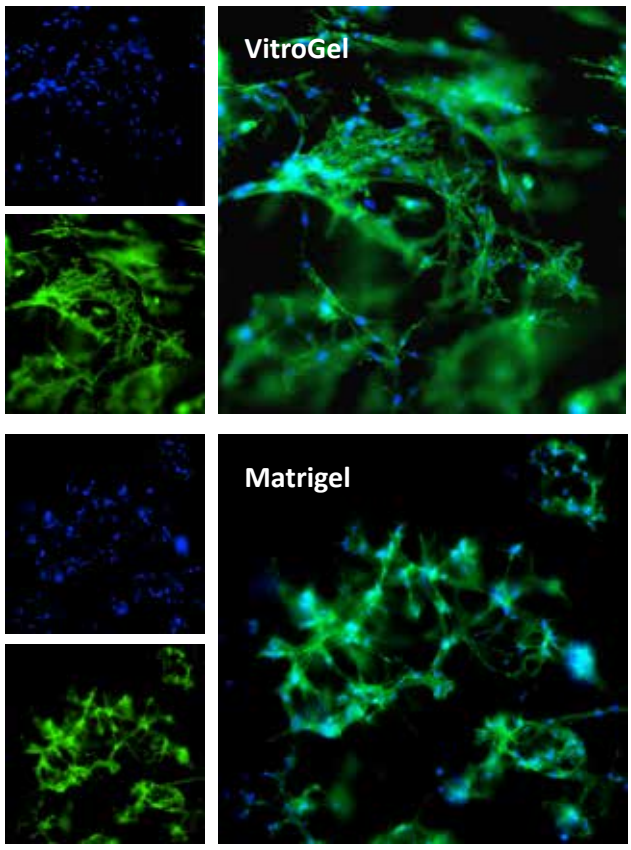
MULTIFUNTIONAL LIGANDS: Supports strong cell-matrix interactions for many cell types

READ-TO-USE & EASY CELL RECOVERY

BATCH-TO-BATCH CONSISTENT

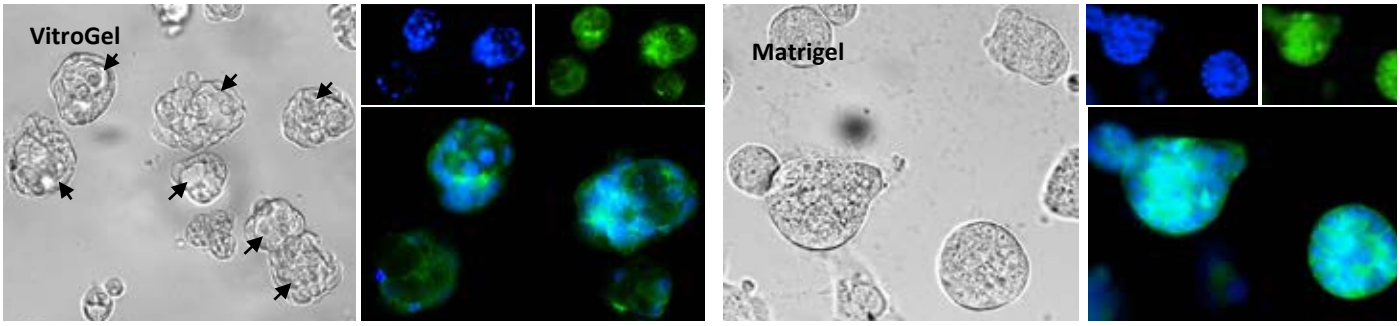
Features	Specifications
Formulation	Xeno-free, functional hydrogel
Use	3D and 2D cell culture
Operation	Ready-to-use at room temperature
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	20 min cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Storage	Store at 2-8°C. Ships at ambient temperature
Sizes	10 mL and 2 mL
Number of Uses	(10 mL) 300 uses (2 mL) 60 uses

Product	Size	SKU #
VitroGel Hydrogel Matrix	10 mL	VHM01
	2 mL	VHM01S



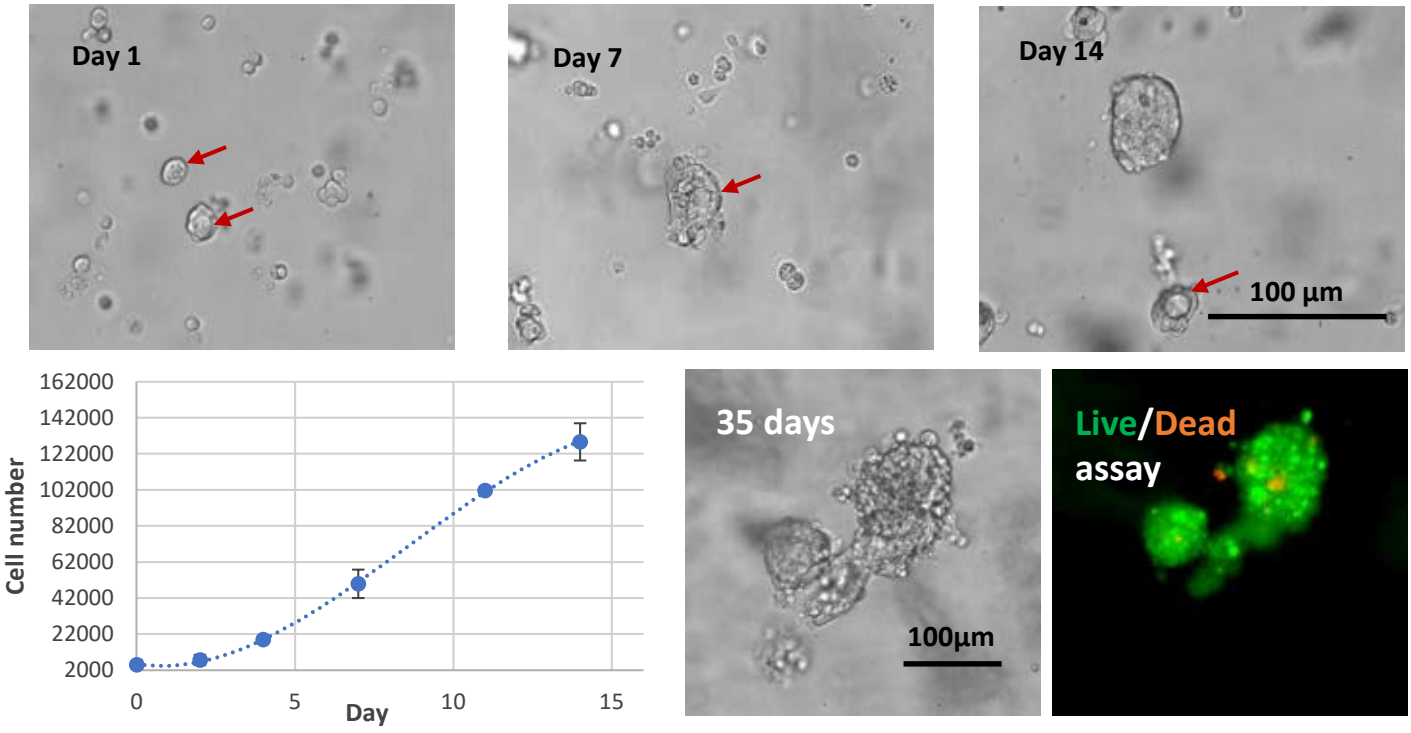
Bone marrow cells 3D cultured in VitroGel Hydrogel Matrix and Matrigel

The fibroblast-like mouse bone marrow stromal cells (OP9-GFP) were 3D cultured in VitroGel Hydrogel Matrix and Matrigel. Single cells were homogenously suspended within each hydrogel, with each forming stretched fibroblast-like structure on day 1. The images above shows a clear 3D cellular networking structure formed in both hydrogels on day 7. Compared to Matrigel, the multiple functional ligands in the VitroGel Hydrogel Matrix promote a stronger cell-matrix interaction, which helps accelerate the cell proliferation and cell-cell communication during the 3D cell culture.



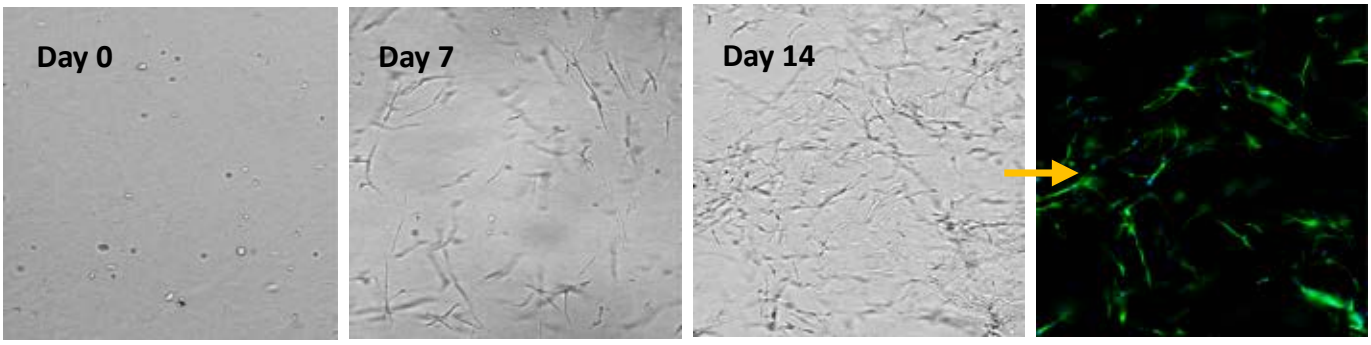
Human mammary breast cancer cells cultured in VitroGel Hydrogel Matrix and Matrigel

3D cell culture of human mammary breast cancer cells (MCF-7) at day 7 in VitroGel Hydrogel Matrix and Matrigel. The cells were prepared as single cell suspensions and encapsulated within each hydrogel respectively. The grape-shaped like cell colonies appeared on day 1 for both hydrogels. However, cells displayed 3D luminal structures (see arrows) only within the VitroGel Hydrogel Matrix. (Z-stack imaging system with 2D image projection was used. Blue: DAPI; Green: ActinGreen™).



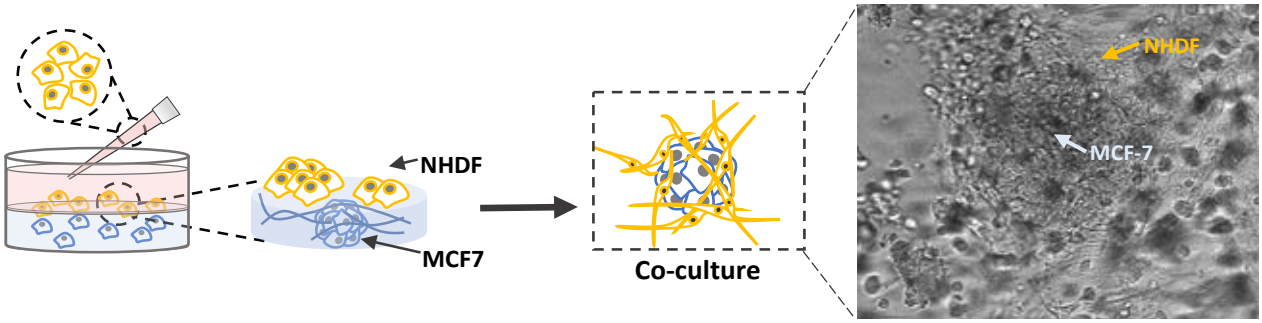
Long term 3D culture of MCF7 breast cancer cells in VitroGel Hydrogel Matrix (SKU: VHM01)

The images above show the cells at different stages of the long-term culture on days 1, 7, 14, and 35. The formation of the lumen structures were observed by day 7. By day 14, cellular polarity loss gave rise to spheroid structures. The malignant stage of the spheroid continued to produce the heterogenous mass of cells observed on day 35. The live/dead assay shows disorganized metastatic organization of cells within the tumor while the viability image shows a small zone of dead cell (red) at the center of the spheroid as well as surrounding the sphere.



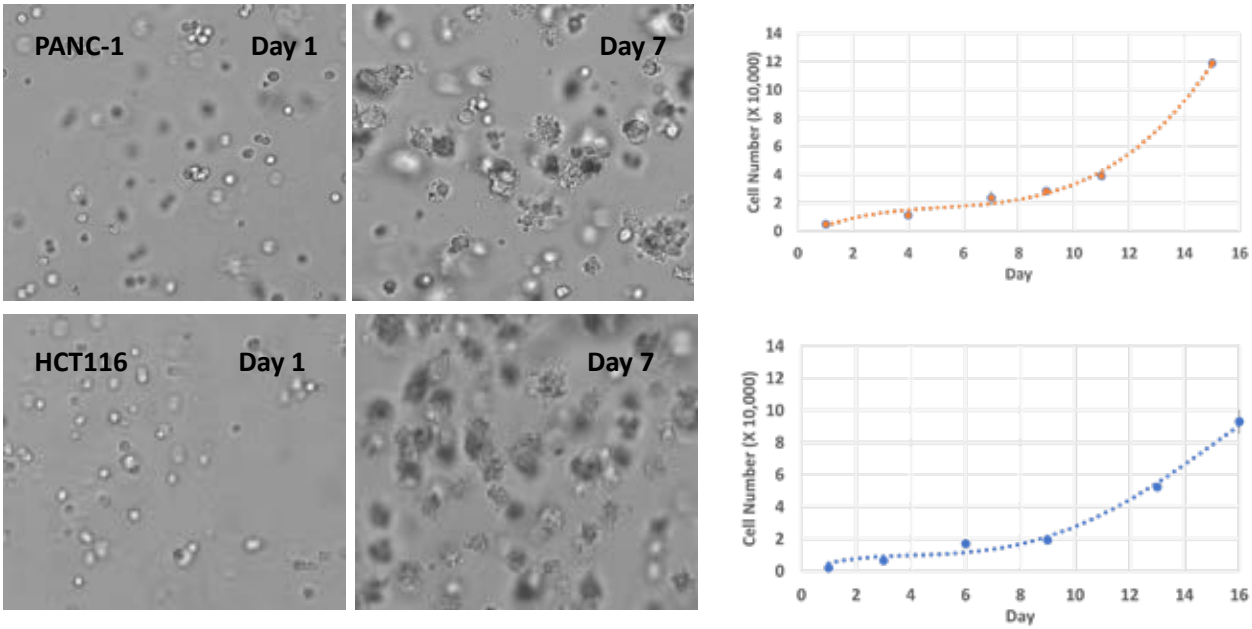
3D cell culture of normal Human Dermal Fibroblast (NHDF) cells in VitroGel Hydrogel Matrix

Human Dermal Fibroblast (NHDF) cells were encapsulated within the VitroGel Hydrogel Matrix and cultured for 14 days. The images above show the 3D networking of the fibroblast structures, indicating a strong matrix-cell interactions.



Co-culture of human mammary breast cancer cells (MCF-7) and normal Human Dermal Fibroblast (NHDF) cells in VitroGel Hydrogel Matrix

MCF-7 cells were encapsulated in a hydrogel matrix by mixing the cell suspension with VitroGel Hydrogel Matrix. After allowing the mixture to stabilize at room temperature for 10 min, NHDF cells were added on top of the hydrogel for 2D hydrogel coating culture. The NHDF cells attached and moved inside the hydrogel matrix after 48 hours culturing. The NHDF cells grew surrounding the MCF-7 spheroids and supported the fast growth of MCF-7 for large tumor structure formation.



3D cell culture of Pancreatic Cancer cells (PANC-1) and colon cancer cells (HCT116) in VitroGel Hydrogel Matrix

PANC-1 and HCT116 cells were seeded within VitroGel Hydrogel Matrix as single cells. The images above show both cell type's rapid growth and tumor spheroid formations in the VitroGel Hydrogel Matrix. The hydrogel system is suitable for long-term cell culture for more than 21 days.

VITROGEL® ORGANOID

Xeno-free (animal origin-free) hydrogel for organoid culture.

VitroGel® ORGANOID are xeno-free (animal origin-free) hydrogels that support the growth of patient-derived organoids or organoids developed from pluripotent stem cells (PSCs), co-culture, and PDX model.

VitroGel ORGANOID hydrogels are ready-to-use at room temperature and have a neutral pH, transparent, permeable, and compatible with different imaging systems. The solution transforms into a hydrogel matrix by simply mixing with the cell culture medium. VitroGel ORGANOID hydrogels are good for both 3D cell culture and 2D hydrogel coating applications

The organoid hydrogels can work in conjunction with VitroGel STEM (a xeno-free hydrogel for 3D static suspension cultures and scale-up of human pluripotent stem cells) by transferring stem cell spheroids cultured in VitroGel STEM to VitroGel ORGANOID hydrogels for organoid differentiation. Key growth factors and molecules can be mixed directly with the hydrogel matrix or by adding on the top of the hydrogel. Organoids cultured in this system can be easily harvested out with our VitroGel Cell Recovery Solution. VitroGel ORGANOID hydrogels provide a well-defined 3D microenvironment for the future of personalized medicine.

The VitroGel ORGANOID Discovery Kit (Cat# VHM04-K) includes all four organoid hydrogels (VitroGel ORGANOID-1, VitroGel ORGANOID-2, VitroGel ORGANOID-3, VitroGel ORGANOID-4), which were formulated with various bio-functional ligands, mechanical strengths, and degradability to fulfill the needs of different organoid culture conditions. Use the Discovery Kit to screen which organoid hydrogel version works best for your organoid culture.

Product	Size	SKU #
VitroGel ORGANOID Discovery Kit	4 X 2 mL	VHM04-K
VitroGel ORGANOID-1	10 mL	VHM04-1
VitroGel ORGANOID-2	10 mL	VHM04-2
VitroGel ORGANOID-3	10 mL	VHM04-3
VitroGel ORGANOID-4	10 mL	VHM04-4

Why VitroGel ORGANOID?

XENO-FREE: Without undesired proteins for pre-clinical/clinical applications

MULTIPLE APPLICATIONS: Supports organoid formation from a wide range of resource including patient-derived samples and hPSCs

READY-TO-USE & EASY CELL RECOVERY: Room temperature stable to mix with cells medium directly; harvest cells from the hydrogel without enzyme solution

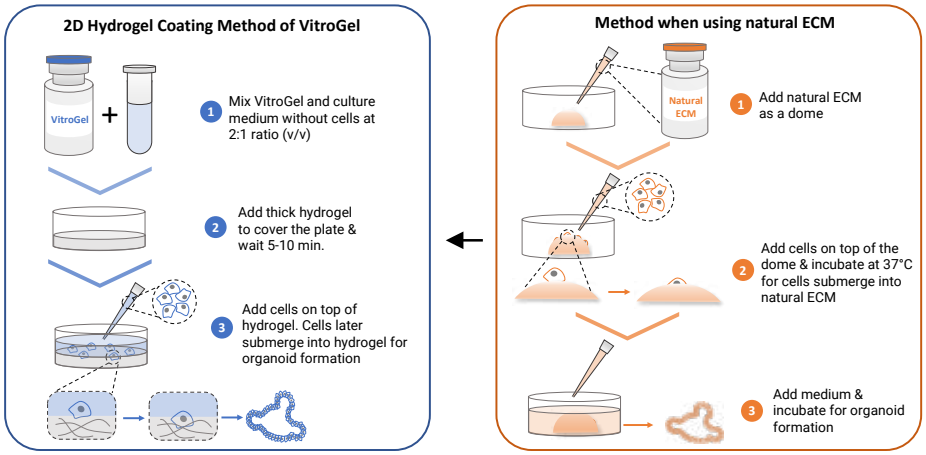
BATCH-TO-BATCH CONSISTENT

Features	Specifications
Formulation	Xeno-free, functional hydrogel
Use	Organoid culture
Operation	Ready-to-use at room temperature
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	Easy cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Storage	Store at 2-8°C. Ships at ambient temperature
Sizes	Single Vial: 10 mL Discovery Kit: (2 mL) each of ORGANOID-1, ORGANOID-2, ORGANOID-3, ORGANOID-4
Number of Uses	(10 mL) 300 uses at 50 µL/test (2 mL) 60 uses at 50 µL/test

VitroGel Organoid Methods vs Natural ECM Methods

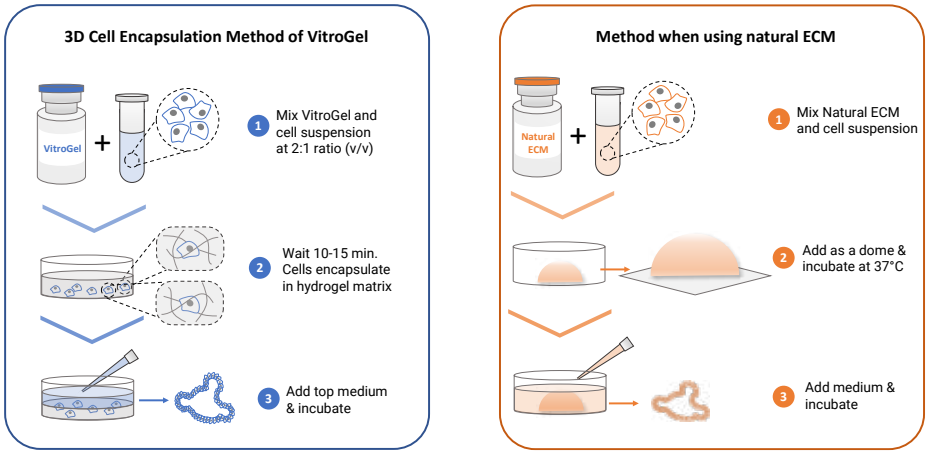
Method 1
2D Hydrogel Coating

Add cells on top of hydrogel for optimal interactions among cells, hydrogel, and medium.



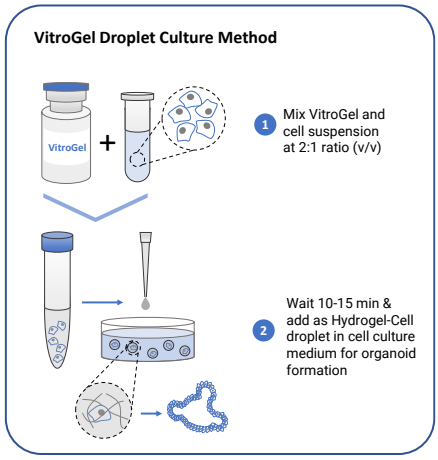
Method 2
3D Cell Culture Encapsulation

Encapsulate cells within the hydrogel for excellent mechanical support and the cell-matrix interactions.



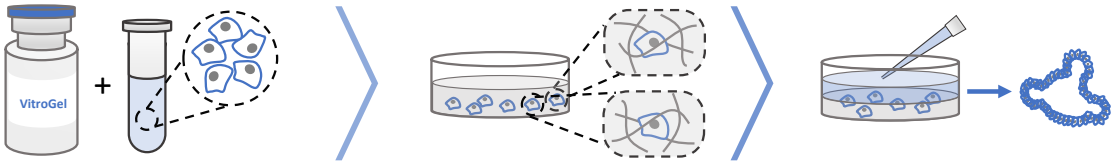
Method 3
2D Hydrogel Coating

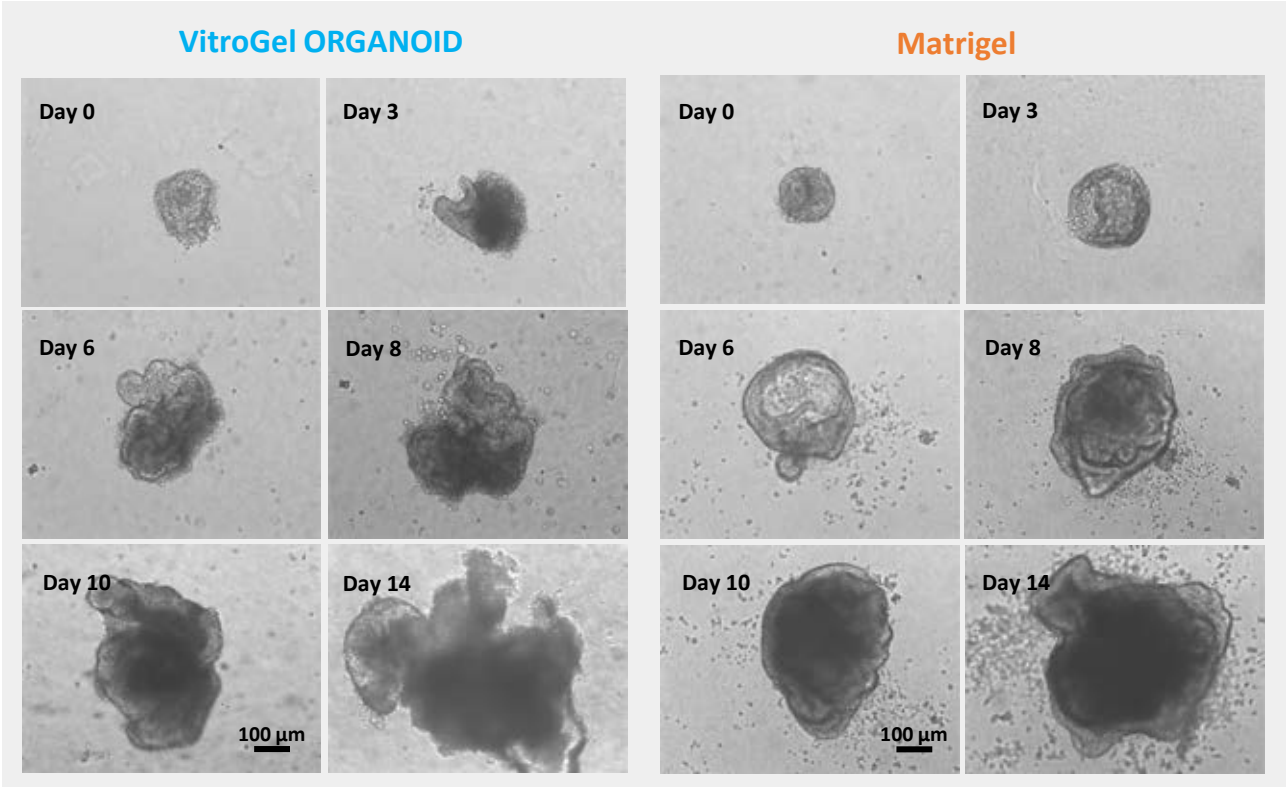
Create a VitroGel-Cell droplet. This is a unique culture method only to the VitroGel system for generating great cell-matrix interactions and excellent medium penetration for organoid formation and scale-up.



Xeno-free 3D Organoid Workflow

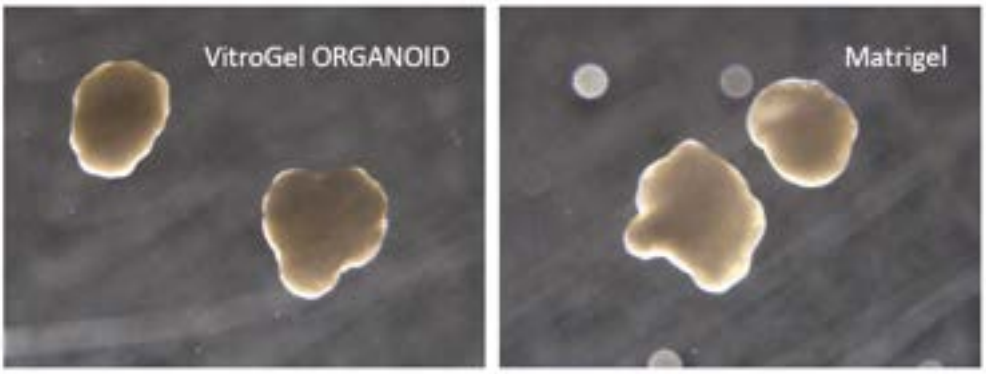
Use VitroGel ORGANOID for organoid culture and maturation.



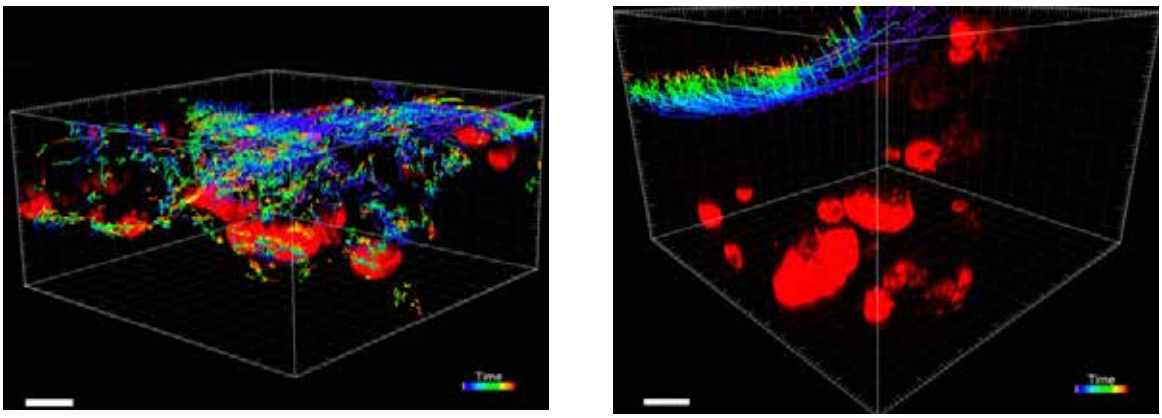


Mouse intestinal organoid culture on VitroGel ORGANOID and Matrigel

Small organoids recovered from liquid nitrogen were directly seeded with VitroGel and Matrigel, respectively. Images show the growth of mouse intestinal organoid from day 0 to day 14.



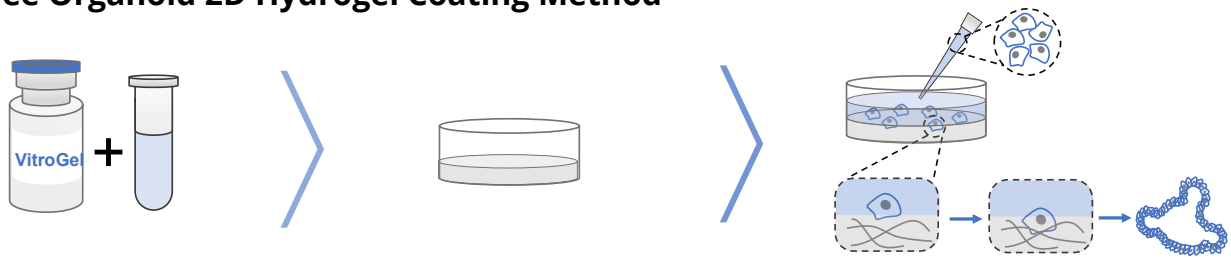
Cerebral organoid culture with VitroGel ORGANOID and Matrigel comparison



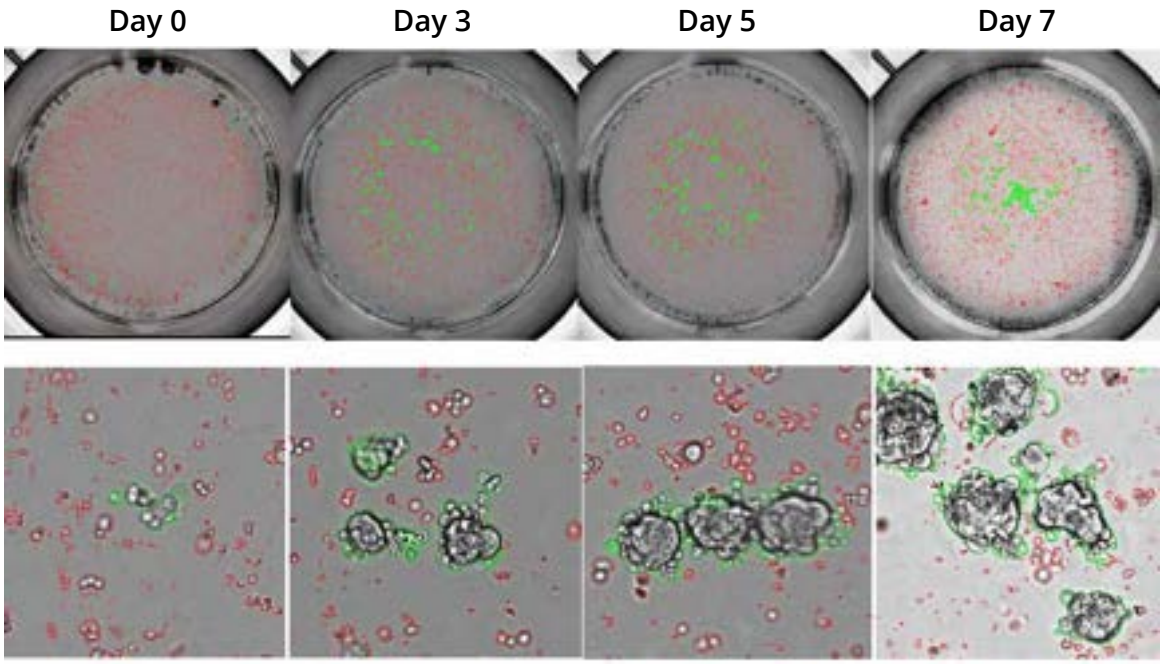
VitroGel ORGANOID improves immune cell-epithelial interactions in a co-culture model of Human Gastric Organoids (HGO) and Dendritic Cells.

The images of mCherry-expressing human gastric organoids co-cultured with CellTracker Green-labeled Monocyte-derived dendritic cells for 20 h. Organoids are embedded in VitoGel ORGANOID-3 (left) and Matrigel(right). Poor movement of MoDCs (green) when co-cultured with and HGOs (red) embedded in Matrigel. Improved migration of MoDCs (green) towards HGOs (red) embedded in VitroGel ORGANOID-3. ref: doi.org/10.3389/fphar.2021.707891

Xeno-free Organoid 2D Hydrogel Coating Method



1. Mix VitroGel and culture medium without cells at 2:1 ratio (v/v)
2. Add thick hydrogel to cover the plate & wait 5-10 min.
3. Add cells on top of hydrogel. Cells later submerge into hydrogel for organoid formation



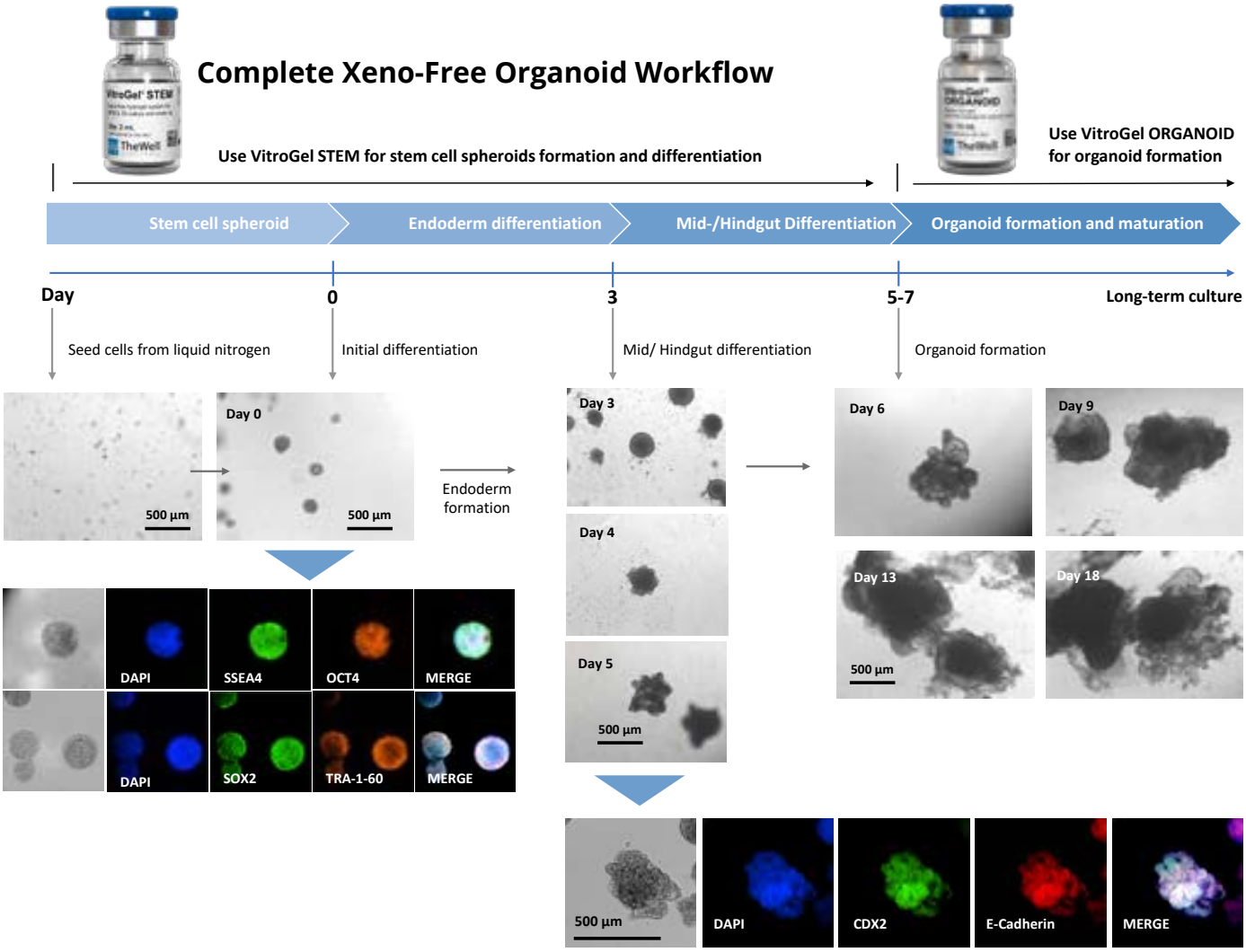
- Lower limit of object size, 50 µm
- Green, live organoids; Red, others

Organoids from breast cancer PDX cultured on VitroGel ORGANOID

Cells were cultured on top of 2D hydrogel coating surface for 7 days.

Start from iPSC spheroids for stem cell differentiation and organoid formation

Diagram below shows culturing human intestinal organoid from stem cell spheroids.



Culture human intestinal organoid from stem cell spheroids.

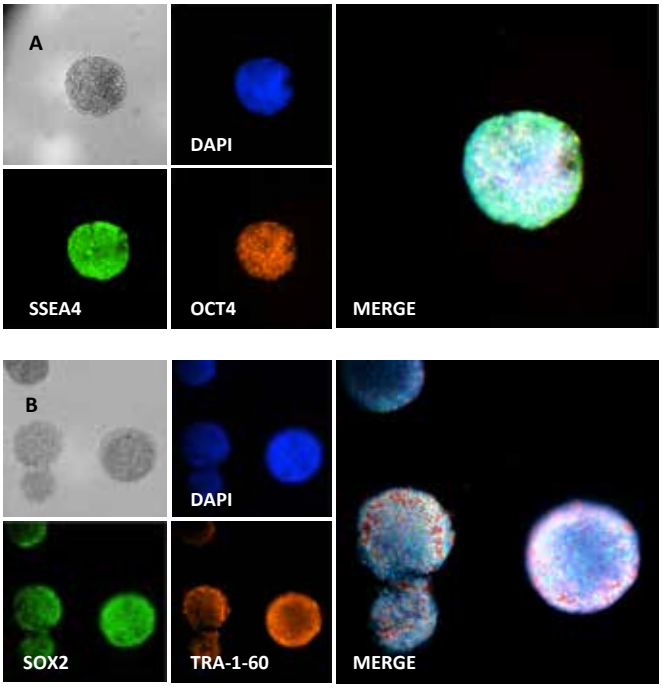
Human iPSCs recovered from liquid nitrogen were seeded with VitroGel STEM for static suspension culture (Refer to protocol of VitroGel STEM, Cat# VHM02). The high-quality stem cell spheroids formed within 3-5 days with full pluripotent properties (showing the positive markers of SSEA4, OCT4, SOX2, and TRA-1-60). The spheroids were harvested by centrifuging (100 x *g*, 3 min), and resuspended with VitroGel STEM in endoderm differentiation medium for 3 days. The endoderm cell spheroids were then harvested by centrifuging (100 x *g*, 3 min), and resuspended with VitroGel STEM in mid/hindgut differentiation medium for 3-4 days. The mid/hindguts were collected by centrifuging (100 x *g*, 3 min), and characterized with CDX2 and E-Cadherin. Resuspended the mid/hindgut with organoid formation medium and mixed with VitroGel ORGANOID, following the protocol of VitroGel ORGANOID, for organoid formation and long-term maturating culture.

VITROGEL® STEM

Xeno-free (animal origin-free) hydrogel for hPSCs 3D culture and scale-up.

VitroGel® STEM is a xeno-free (animal origin-free) hydrogel system developed to improve the performance of three-dimensional (3D) static suspension cultures and scale-up of human pluripotent stem cells (hPSCs) to create a high-throughput system to model various tissue and disease states.

This hydrogel system is ready to use with an optimized formulation that fully supports the rapid expansion of high-quality 3D stem cell spheroids with pluripotent properties. hPSCs directly thawed from liquid nitrogen or passaged from 2D matrix coated culture vessels can be immediately mixed with the hydrogel solution for static suspension cultures. Moreover, the optimization protocol is ideal for time-sensitive experiments, as it does not require excessive medium exchanges, which can ultimately save on time and materials. This hydrogel system is compatible with most hPSC culture media and tissue culture vessels. Due to the unique static suspension culture procedure, cell harvesting is simple and effective. The 3D stem cell spheroids that are developed using this system can be used for further sub-cultures, patterned differentiations, organoid development, or re-establishing 2D culture morphologies.



Immunofluorescence images of hPSC spheroids with key pluripotent stem cell markers.

A) images of hPSC spheroids with the SSEA4 and OCT4 expression,
B) images of hPSC spheroids with the SOX2 and TRA-1-60 expression.

Why VitroGel STEM?

XENO-FREE: Without undesired proteins for pre-clinical/clinical applications

UNIQUE: Ability to seed stem cells directly from liquid nitrogen (LN_2) or 2D culture systems and efficient cell harvesting or sub culturing

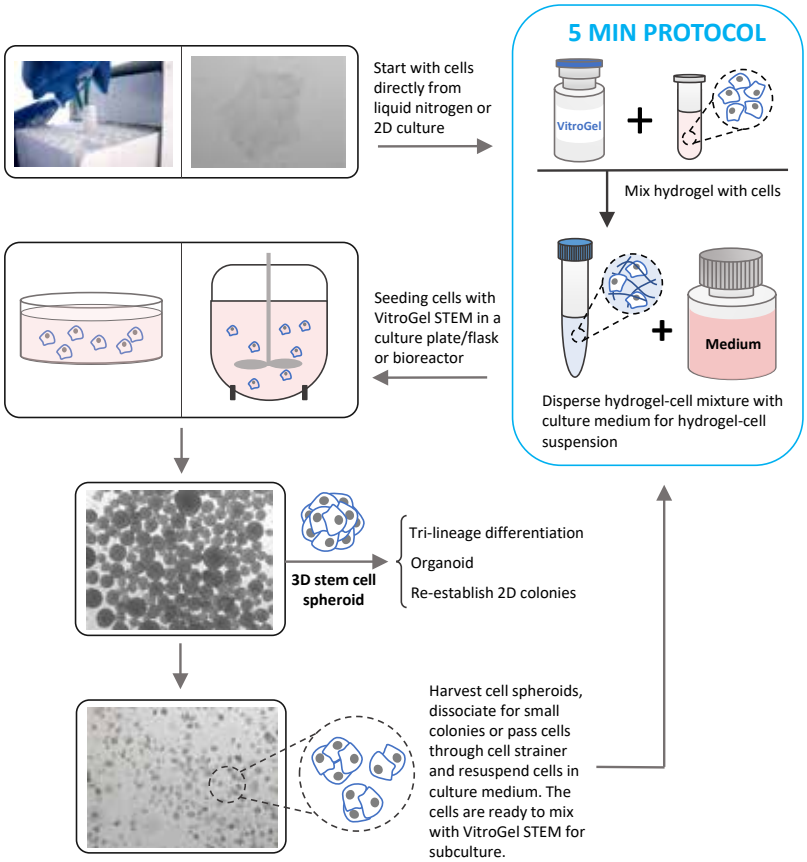
HIGH PERFORMANCE: Yields high-quality 3D stem cells with high cell viability and excellent cell growth rates

FLEXIBLE: Compatible with most culture vessels and stem cell culture media

COST-EFFECTIVE: Eliminates the need for matrix coating and reduce the medium change

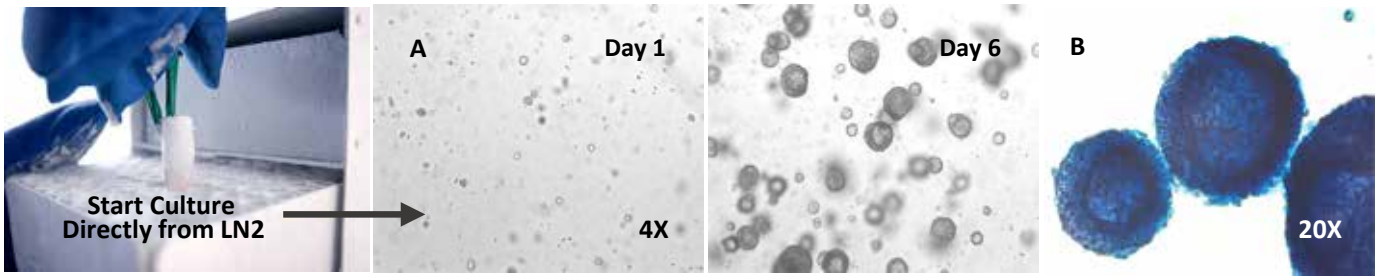
Features	Specifications
Formulation	Xeno-free, functional hydrogel
Use	3D static suspension culture for hPSCs
Operation	Ready-to-use at room temperature
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	20 min cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Storage	Store at 2-8°C. Ships at ambient temperature
Sizes	10 mL and 2 mL
Number of Uses	(10 mL) 90-180 mL suspension culture (2 mL) 15-30 mL suspension culture

Product	Size	SKU #
VitroGel STEM	10 mL	VHM02
	2 mL	VHM02S



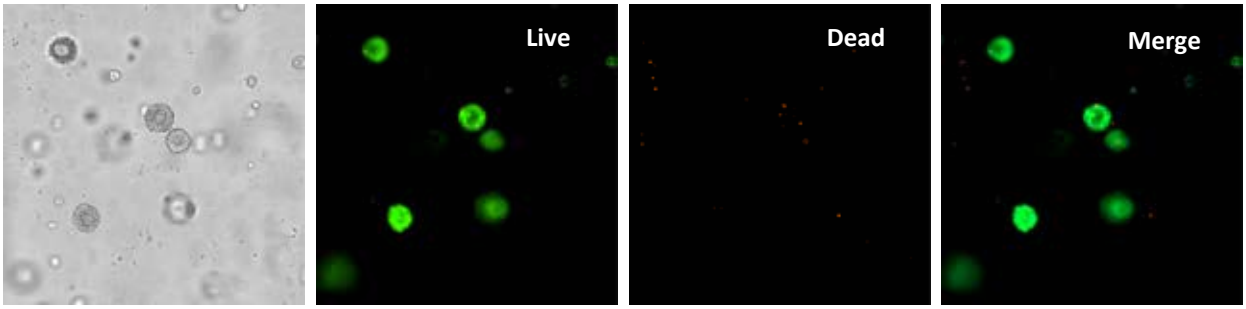
Benefits Comparison

	VitroGel STEM	Natural ECM
Culture Method	3D Suspension	2D Matrix Coating
Xeno-free	Yes	No
3D Spheroid Formation	Yes	No
3D Differentiation (Directly)	Yes	No
Easy to Scale-up	Yes	No
Preparation Time	< 10 min	2 hr
Cell Viability after Seeding	●●●●●	●●○○○
Cell Proliferation	●●●●●	●●●○○
Easy Cell Harvesting	●●●●●	●●○○○
Cell Quality for Differentiation	●●●●●	●●○○○
Easy for Sub-culture	●●●●●	●●●○○



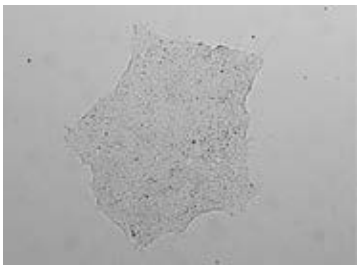
3D static suspension culture of hPSC directly from Liquid Nitrogen (LN2)

Start the suspension culture by using the healthy and high-quality cells directly from LN2. hPSC-hydrogel aggregates successfully to form healthy spheroids after 1 day in culture. The hPSC spheroids continue to expand from day 1 to 6 (Figure A). The resulting hPSC spheroids also show hallmark features of healthy and high-quality stem cell spheroids, i.e., shallow craters or pockmarks. Figure B shows that hPSC static suspension cultures from liquid nitrogen are positive for Alkaline Phosphatase, indicating successful expansion of healthy stem cell populations.

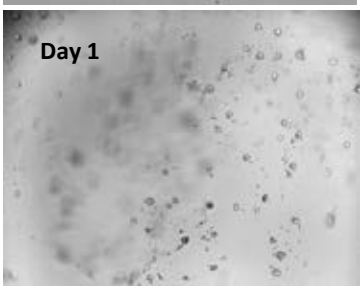


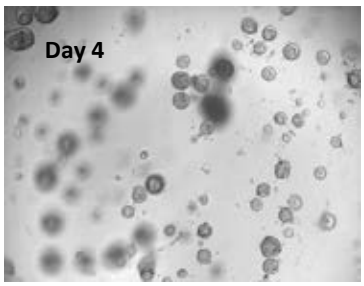
Live/Dead assay of hPSC spheroids.

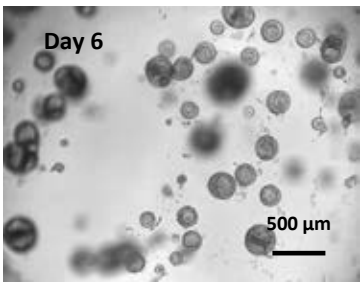
The health and live cell spheroids show in the green color. The dead cells shows as small clumps or individual cells surrounding the big cell spheroids.



Start with healthy and high-quality 2D cultured stem cells

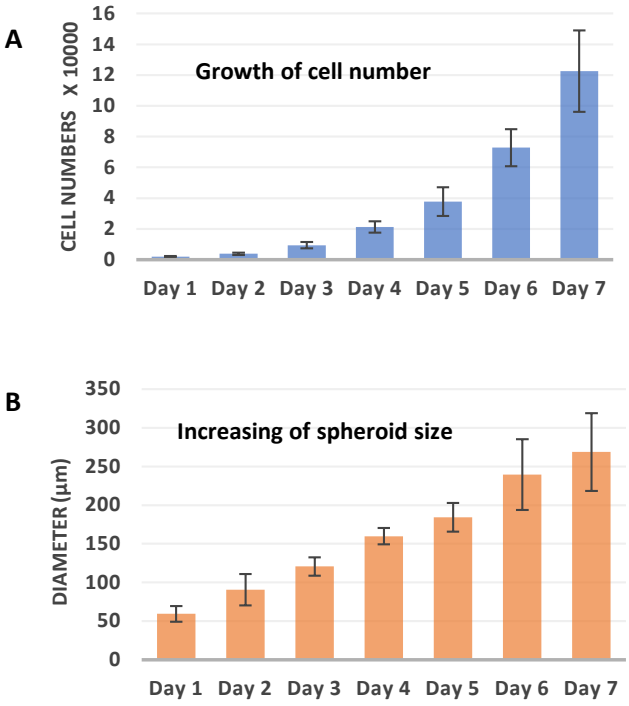






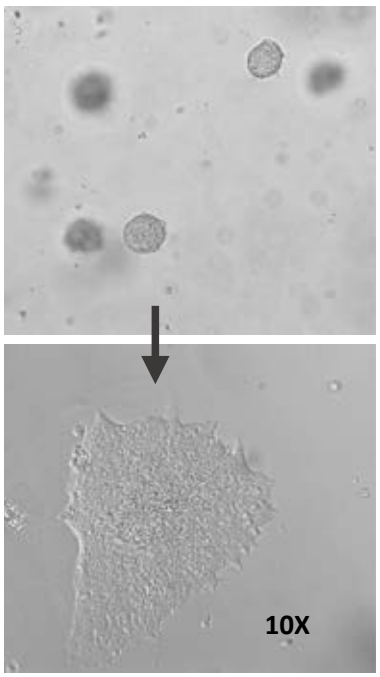
3D static suspension culture of hPSC from 2D matrix culture

After 24 hours, small hPSC spheroids start to form. From day 1 to 6, cells in the suspension cultures quickly grew, leading to the generation of healthy and high-quality stem cell spheroids. After day 3, cell number grew exponentially (Figure A below) and spheroid size steadily increases (Figure B below). The hPSC spheroids display characteristics of shallow craters or pockmarks, indicating expression of hPSC markers and successful expansion of healthy and high-quality stem cell spheroids. The resulting spheroids provide researchers with large numbers of healthy hPSCs for further experiments.



The growth of cell number and spheroid size of hPSC in VitroGel static suspension culture

A) The chart shows the growth of the cell number from day 1 to day 7 after seeded for 3D static suspension culture (The cell proliferation assay was tested by CCK8 assay). B) Increasing hPSC spheroid sizes from around 60 µm at day 1 to over 250 µm at day 7.



Re-establish 2D colonies from 3D hPSC spheroids

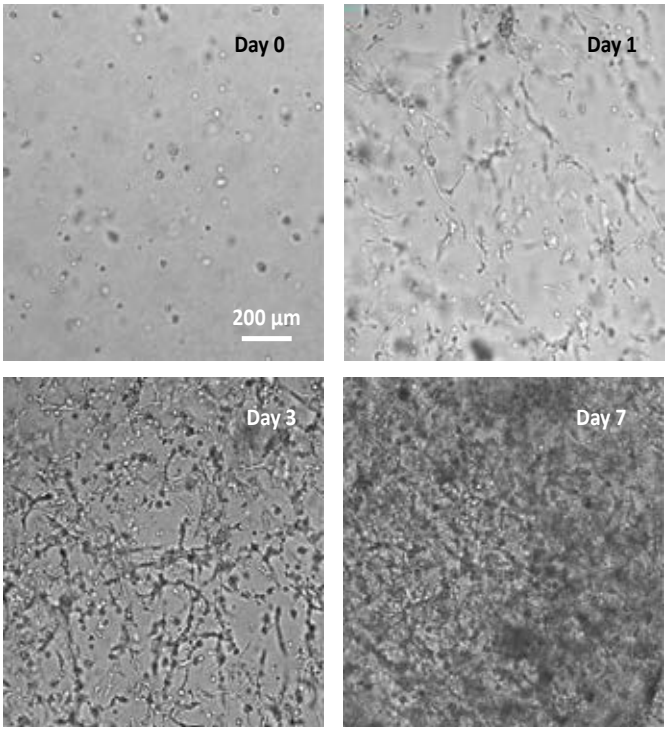
The hPSC spheroids cultured in 3D static suspension can be harvested and seeded to 2D matrix coating surface. The 2D cell colonies formed within 24 hours after attached back to the matrix coating surface.

VITROGEL® MSC

Xeno-free hydrogel for mesenchymal stem cell 3D culture and scale-up.

VitroGel® MSC is a xeno-free (animal origin-free) hydrogel system developed to support three-dimensional (3D) cultures of mesenchymal stem cells (MSCs). This hydrogel system can be used to make hydrogel cell beads for MSC scale-up. Microcarriers are not required for MSC scale-up.

VitroGel MSC is ready-to-use with an optimized formulation that fully supports the rapid expansion of MSCs. Cells directly thawed from liquid nitrogen or passaged from 2D culture vessels can be immediately mixed with the hydrogel solution for 3D culture or hydrogel-cell bead generation. This hydrogel system is compatible with most MSC culture media and tissue culture vessels. Cell harvesting after 3D culture is simple and efficient using the VitroGel Cell Recovery Solution.



3D culture of MSC in VitroGel MSC

MSC cells were suspended in cell medium at 8 x 10^5 cells/mL and mixed with VitroGel MSC for 3D culture (according to the 3D cell culture protocols of VHM03). The images show the growth and expansion of cells inside of 3D hydrogel from day 0 to day 7.

Why VitroGel MSC?

NO MORE MICROCARRIERS: Innovative hydrogel allows 3D MSC scale-up without using microcarriers

HIGH PERFORMANCE: Yields high-quality 3D MSCs with high cell viability and excellent cell growth rates

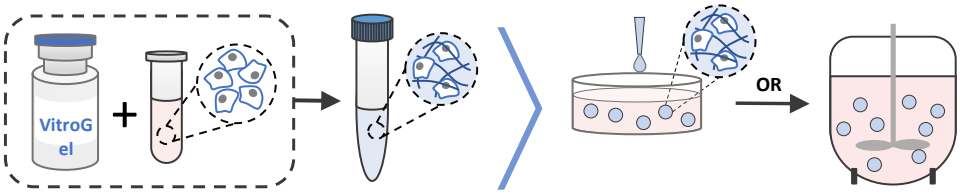
EASY CELL HARVESTING: Harvest cells from the hydrogel without enzyme solution

LONG TERM CULTURE: Supports MSC 3D culture for more than 30 days, maintaining great cell performance at low passage number

INJECTABLE HYDROGEL: Supports MSC injection as an injectable carrier for excellent cell retention and viability

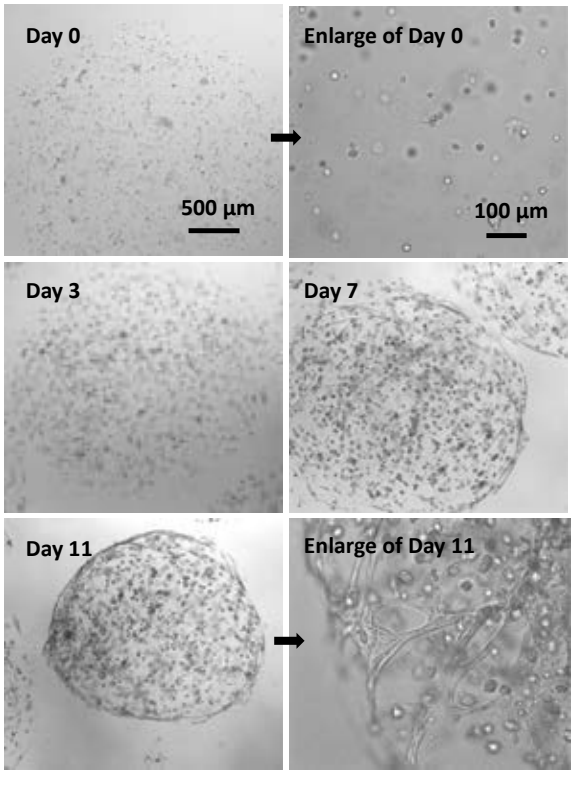
Features	Specifications
Formulation	Xeno-free, functional hydrogel
Use	3D cell culture, 2D hydrogel coating, hydrogel-cell bead formation
Operation	Ready-to-use at room temperature
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	Easy cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Storage	Store at 2-8°C. Ships at ambient temperature
Sizes	10 mL and 2 mL
Number of Uses	(10 mL) 300 uses & (2 mL) 60 uses

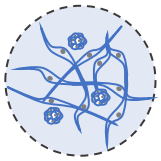
Product	Size	SKU #
VitroGel MSC	10 mL	VHM03
	2 mL	VHM03S



1 **Mix hydrogel with cells & wait 10-15 min**

2 **Add mixture as droplet into culture medium & incubate**





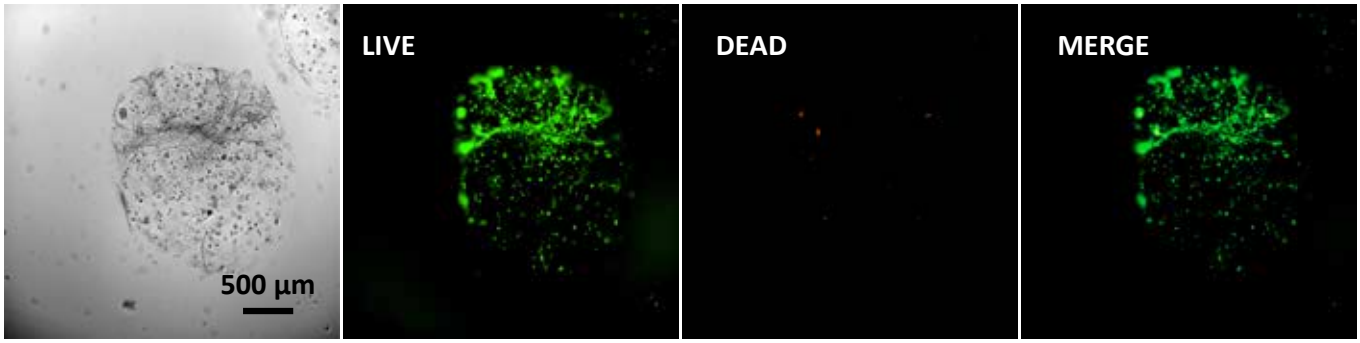
3D cell growth within the hydrogel bead

3D culture of MSC in hydrogel beads.

MSCs were mixed with VitroGel MSC and add to the cell culture medium as droplet for hydrogel-cell bead formation (according to the hydrogel-cell bead protocols of VHM03). The size of the hydrogel beads can be controlled by the volume of the droplets. MSC cells can grow within the hydrogel beads for long term-culture (>3 weeks). The images show the growth and expansion of cells inside of hydrogel beads from day 0 to day 11. The enlarged images show the cells grew from single cells to cell spheroid and matrix structure from day 0 to day 11.

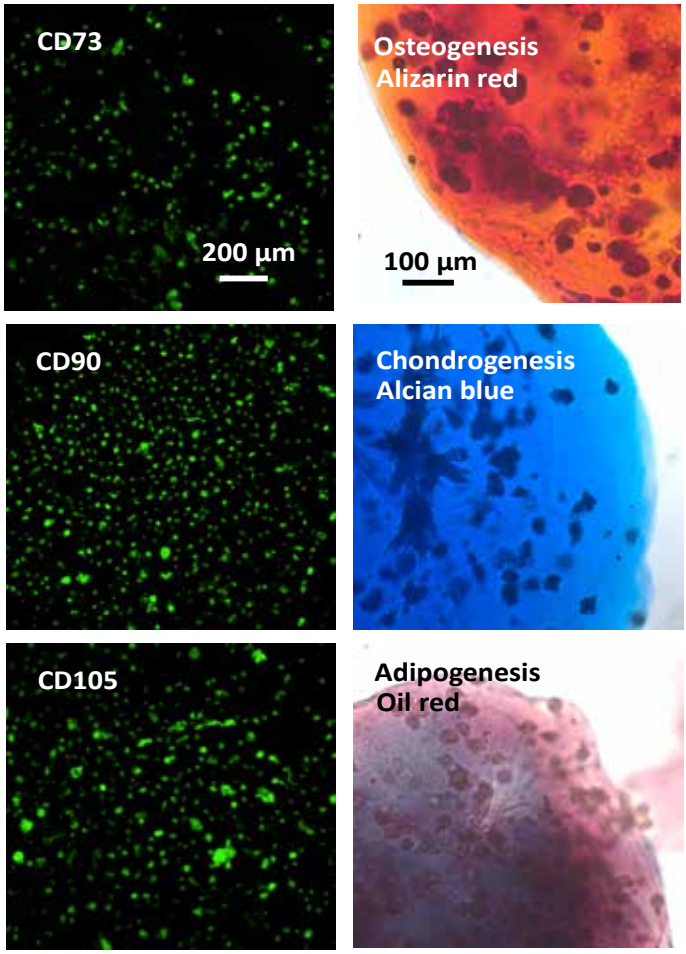
Benefits Comparison

	VitroGel MSC	Multi-layer Flask	Microcarriers
Preparation Time	<30 min	<30 min	>4 hr
Cell Proliferation	5-100X	5-30X	5-30X
Culture Scale	Small to Large	Small to Medium	Medium to Large
Culture Vessel	Well/Plate/Flask Bioreactor	Flask	Bioreactor
Scale-up with Low Passage Cycle	Yes	No	No
Long-term Culture Capable (>30 days)	Yes	No	No
Easy Cell Harvesting without Trypsin	Yes	No	No
Cell Viability	●●●●●	●●●○○	●●●○○
Cell Quality	●●●●●	●●●○○	●●●○○
Easy for Sub-culture	●●●●●	●●●○○	●●●○○



Live/dead assay of MSCs cultured in VitroGel MSC hydrogel beads.

MSCs cultured in hydrogel beads for 11 days were stained with Cyto3DTM live/dead assay kit (Cat# BM01). The live cells are shown in green color and dead cells are shown in orange color. The images show that cells cultured in VitorGel MSC hydrogel beads have high-cell viability performance.



Immunofluorescent images of MSCs after harvesting from VitroGel MSC hydrogel beads (Left).

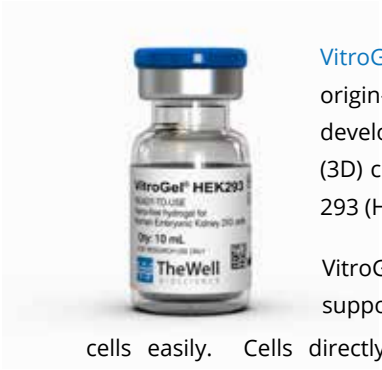
The images show that cells recovered from VitroGel MSC hydrogel beads present all three biomarkers (CD73, CD90 and CD105), which indicate the full characters of mesenchymal stem cells in 3D hydrogel-MSC beads.

Differentiations of MSCs cultured in VitroGel MSC hydrogel beads (Right).

MSCs were cultured in hydrogel beads for 7 days and then differentiate in osteogenesis, chondrogenesis and adipogenesis differentiation media for three week respectively. The images show that cells cultured in VitroGel MSC hydrogel beads can be successfully differentiated into osteocytes, chondrocytes, and adipocytes.

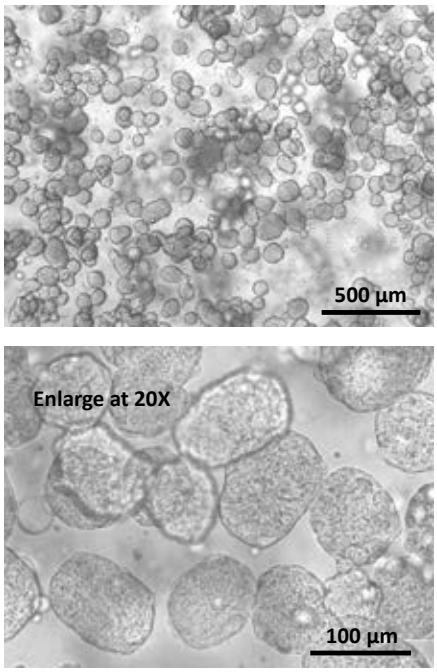
VITROGEL® HEK293

Xeno-free (animal origin-free) hydrogel for HEK293 cells 3D culture and scale-up.



VitroGel® HEK293 is a xeno-free (animal origin-free) functional hydrogel system developed to support three-dimensional (3D) cultures of human embryonic kidney 293 (HEK293) cells.

VitroGel HEK293 is a unique system to support the rapid 3D growth of HEK293 cells easily. Cells directly thawed from liquid nitrogen or passaged from 2D culture vessels can be immediately mixed with the hydrogel solution for 3D static suspension cultures. Both our standard 3D cell culture protocol and the 3D static suspension culture protocols can be used for rapid cell expansion. The high-quality 3D spheroids enhance the cell performance for protein expression and downstream applications. HEK293 cells cultured in VitroGel HEK293 can easily be scale-up for large-scale bioreactors or spin flasks. By using the VitroGel Cell Recovery Solution, the cell harvesting after 3D culture is simple and efficient.



3D static suspension culture of HEK293 cells with high cell density seeding (24 hours).

For protein production purpose, cell suspension can be prepared at high cell density (107 cells/mL) to reach the peak of protein expression within 48 to 72 hours. The images show the fast formation of cell spheroids with over 100 µm size in diameter at 24 hours after cell seeded inVitroGel HEK293 hydrogel for static suspension culture.

Why VitroGel STEM?

XENO-FREE: Without undesired proteins for pre-clinical/clinical applications

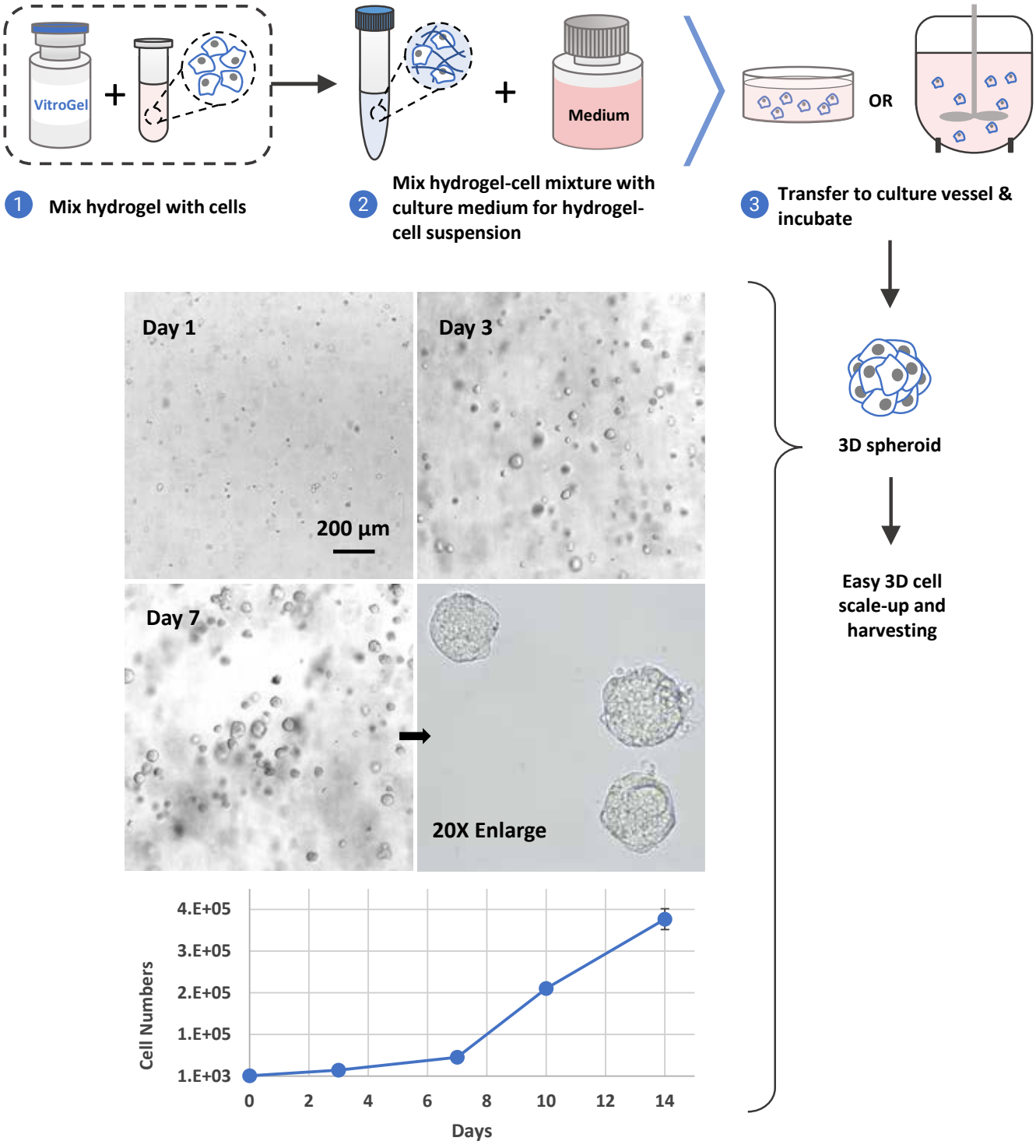
HIGH PERFORMANCE: Yields high-quality 3D cell spheroids for high yield protein production

FLEXIBLE & EASY SCALE-UP: Compatible with most culture vessels and cell culture media; Easy scale-up for a spin flask or a bioreactor.

EASY-TO-USE & EASY CELL RECOVERY: Seed cells directly from liquid nitrogen (LN_2) or 2D culture systems and efficient cell harvesting without using enzyme solution

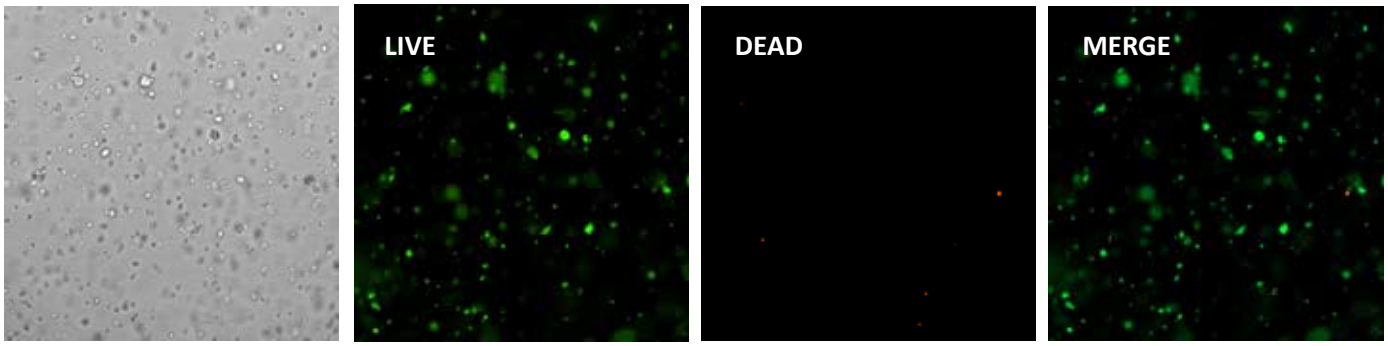
Features	Specifications
Formulation	Xeno-free, functional hydrogel
Use	3D cell culture, 2D hydrogel coating, hydrogel-cell bead formation
Operation	Ready-to-use at room temperature
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	Easy cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Storage	Store at 2-8°C. Ships at ambient temperature
Sizes	10 mL and 2 mL
Number of Uses	(10 mL) 300 uses & (2 mL) 60 uses

Product	Size	SKU #
VitroGel HEK293	10 mL	VHM05
	2 mL	VHM05S



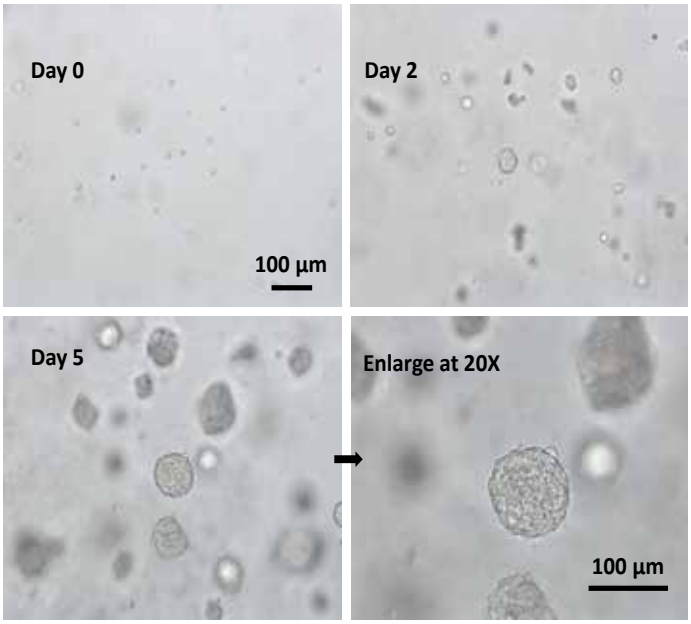
3D static suspension culture of HEK293 cells in VitroGel HEK293

Cells were mixed with VitroGel HEK293 at (2:1 gel/cells v/v ratio) and then mixed with cell culture medium at 1:3 ratio (cell-gel mixture: culture medium at 1:3 v/v). HEK293 cells form cell spheroids in the hydrogel. The images show the growth and expansion from day 0 to day 7. The enlarged images show the cell spheroids after 7 days of culture. The cell proliferation was tested by CellCounting Kit-8 (CCK-8) assay. The curve shows the increase of cell number in
14 days culture.



Cell viability of HEK293 cells in 3D suspension culture in VitroGel HEK293.

3D static suspension cultures of HEK293 cells in VitroGel HEK293 were stained with Cyto3D™ Live/Dead Assay Kit (Cat# BM01). The live cells are shown in green color and dead cells are shown in orange color. The images show cells cultured in VitroGel HEK293 hydrogel perform with high cell viability.



Subculture of HEK293 cell spheroids with VitroGel.

The cell spheroid culture with VitroGel can be collected by centrifuging (100 x *g*, 3 min). (Refer to cell harvesting protocol of VitroGel Cell Recovery Solution, CAT# MS03-100, for details). The collected cell spheroid can be dissociated into single cells by trypsin. After that, the cells can be resuspended with culture medium and mixed with VitroGel HEK293 for subculture. The images show the formation of cell spheroids from day 0 to day 5 after subculture.

VITROGEL® ANGIOGENESIS ASSAY KIT

Xeno-free hydrogel system for 2D gel coating and 3D culture of angiogenesis tube formation, invasion, and animal injection.

VitroGel Angiogenesis Assay Kit is a revolutionary tool for researchers to study the effect of both hydrogel properties and culture medium on angiogenesis process. The kit can be used to study the angiogenesis tube formation and invasion on both 2D hydrogel coating method and 3D cell culture method. The VitroGel system is also good for animal injection for *in vivo* study.

There are two versions of VitroGel Angiogenesis Assay Kits: 1) VitroGel Angiogenesis Assay Kit (Ready-To-Use): Assay kit with fixed hydrogel mechanical strength to support the angiogenesis assay with adjustable supplements. 2) VitroGel Angiogenesis Assay HC Kit (Cat No. TWG011-K): Assay kit with a tunable high concentration hydrogel to allow full control of the hydrogel's mechanical strength with adjustable supplements.

The ready-to-use VitroGel Angiogenesis Assay Kit contains:
- **VitroGel AAK**, a xeno-free ready-to-use hydrogel.
- **AAK Supplement 1**, a hydrogel growth supplement without vascular endothelial growth factors (VEGFs) for cell attachment and growth.
- **AAK Supplement 2**, a hydrogel tube formation supplement with VEGFs as a positive control for tube formation.

The VitroGel AAK hydrogel is room temperature stable and can be directly mixed with each supplement at 2:1 (v/v) ratio for hydrogel formation. Researchers can adjust the hydrogel's molecular cues by adding the growth factors/inhibitors directly to the supplements before mixing with the VitroGel AAK hydrogel. Cells cultured in this system can be harvested easily with the VitroGel Cell Recovery Solution.

PRODCUCT	TYPE/SIZE	SKU #
VitroGel Angiogenesis Assay Kit	TYPE 1	VHM06-K1
	TYPE 2	VHM06-K2
	TYPE 3	VHM06-K3
VitroGel AAK Hydrogel	2 mL	VHM06S
AAK Supplement 1	500 µL	AAKS-1
AAK Supplement 2	500 µL	AAKS-2

Why VitroGel Angiogenesis Assay Kit?

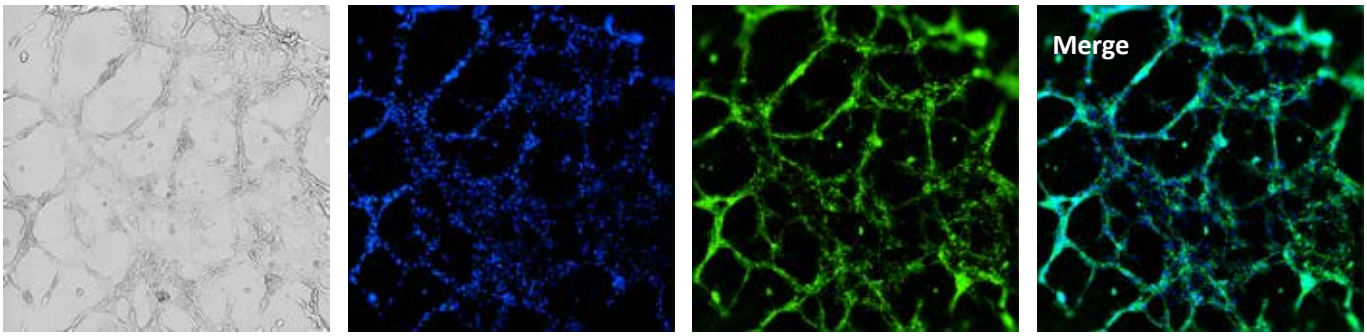
Xeno-free functional hydrogel supporting angiogenesis process

MULTIPLE APPLICATIONS IN ONE KIT: Tube formation, invasion, and animal injection

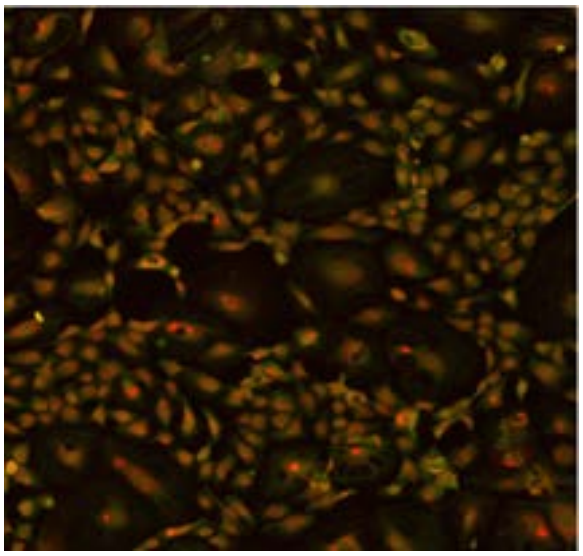
CONTROL HYDROGEL PROPERTIES: Add your own growth factors and compare with positive control

EASY CELL HARVESTING: Harvest cells from the hydrogel within 20 min at 37 °C without enzyme solution

Features	Specifications
Type 1 Kit Contents	VitroGel AAK (2 mL) AAK Supplement 1 (1 x 500 µL) AAK Supplement 2 (1 x 500 µL)
Type 2 Kit Contents	VitroGel AAK (2 mL) AAK Supplement 1 (2 x 500 µL)
Type 3 Kit Contents	VitroGel AAK (2 mL) AAK Supplement 2 (2 x 500 µL)
Formulation	Ready-to-use, xeno-free functional hydrogel AAK Supplement 1: Without VEGFs AAK Supplement 2: With VEGFs
Use	Angiogenesis Assay, tube formation, invasion, animal injection
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	Easy cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Shipping	Supplements require dry ice shipment
Storage	VitroGel AAK hydrogel: 2-8°C AAK Supplement 1: -20°C AAK Supplement 2: -20°C
Number of Uses	60 tests per kit

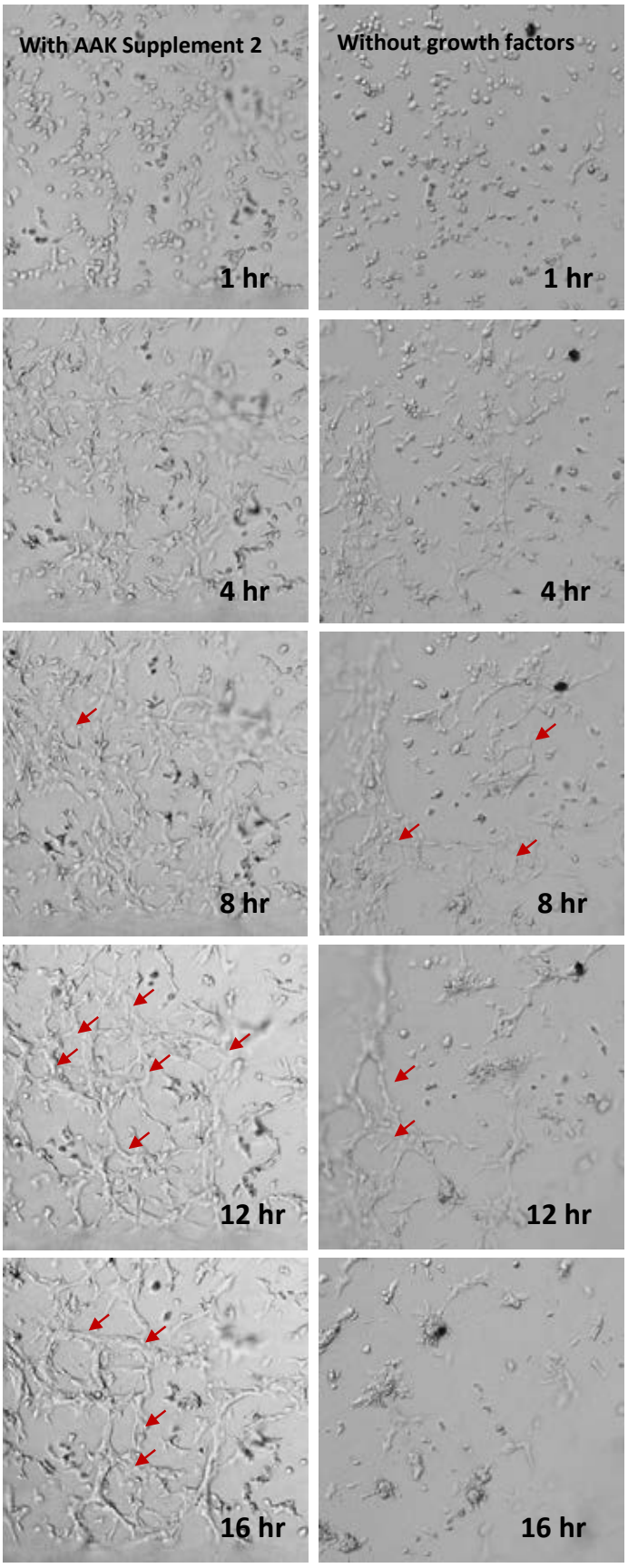


Tube formation of endothelial cells on top of VitroGel AAK hydrogel with tube formation supplement, AAK Supplement 2.
The image above shows the tube morphology of HUVEC cells on top of VitroGel AAK hydrogel. The cells were fixed and stained with DAPI (blue) and ActinGreen™ (green).



HUVEC cell growth on top of VitroGel AAK hydrogel with cell growth supplement, AAK Supplement 1.
The image show HUVEC cells attached and growing on the surface of VitroGel AAK hydrogel with cell growth supplement, AAK Supplement 1. The cells were fixed and stained with DRAQ5™ (red) and ActinGreen™ (green).

3D tube structure of HUVEC cells cultured within VitroGel Angiogenesis Assay Kit.
The image shows HUVEC cells mixed with VitroGel AAK hydrogel supplement with tube formation growth factors (AAK Supplement 2) and cultured for 7 days.



Comparison of endothelial cells growth on top of VitroGel AAK hydrogel with and without growth factor supplement.
The images on the left column show cells attached on the surface of the hydrogel and forming luminal structures after 8 hours, which further developed to a tube structures (red arrows). The images on the right column show cells attached on the surface of the hydrogel and form less tube structure (red arrows) compared to the hydrogel with full growth factor supplement.

VITROGEL® HIGH CONCENTRATION HYDROGEL

3D CELL CULTURE YOUR WAY!

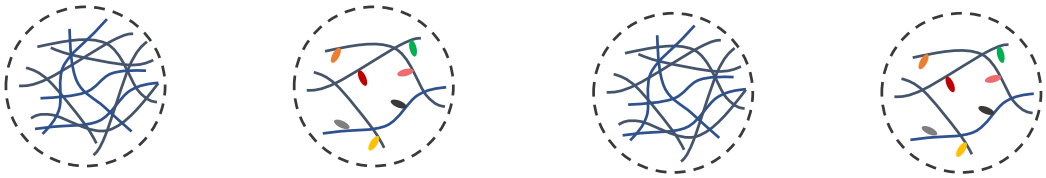
Building blocks for unlimited creativity and maximum flexibility

VitroGel High Concentration Hydrogels offer a set of building blocks to create a functional micro-environment that closely mimics the natural extracellular matrix (ECM) for cells to feel at home.

These high concentration formulations allow the maximum flexibility to manipulate the mechanical strength of hydrogel from 10 to 4000 Pa. The hydrogels come with several types of functional ligand modifications such as RGD (VitroGel RGD), collagen (VitroGel COL), laminin (VitroGel IKVAV & VitroGel YIGSR), and matrix metalloproteinase (VitroGel MMP). This system allows scientists to investigate the cell behaviors in response to an individual functional ligand or create multi-functional hydrogel combinations by blending different versions of VitroGel.

Features	Specifications
Operation	Room temperature
Hydrogel Strength	10 to 4,000 Pa of G' depending on dilution ratio. Dilute with VitroGel Dilution Solution (TYPE 1 or TYPE 2) for different concentrations
Injection	Injectable hydrogel
Cell Harvesting	20 min cell recovery using VitroGel Cell Recovery Solution
pH	Neutral
Storage	Store at 2-8°C. Ships at ambient temperature
Number of Uses	Dilution ratio: 1:2 = 225 uses at 50 µL per well 1:3 = 300 uses at 50 µL per well 1:5 = 450 uses at 50 µL per well

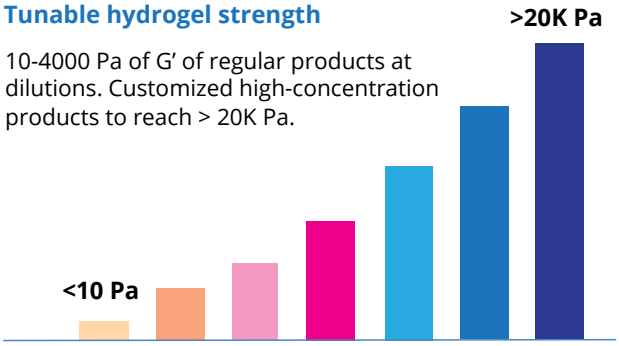
EASY MANIPULATION OF HYDROGEL PROPERTIES FOR DIFFERENT APPLICATIONS



Mechanical Strength | **Functional Ligands** | **Degradation** | **Serum/Growth Factors/ Cytokine/Chemokine**

Tunable hydrogel strength

10-4000 Pa of G' of regular products at dilutions. Customized high-concentration products to reach > 20K Pa.



Simply diluting the hydrogel controls the strength. The hydrogel strength above is Elastic Modulus (G') which is up to 60K Pa when converted to stiffness (Young's Modulus).

mix & match

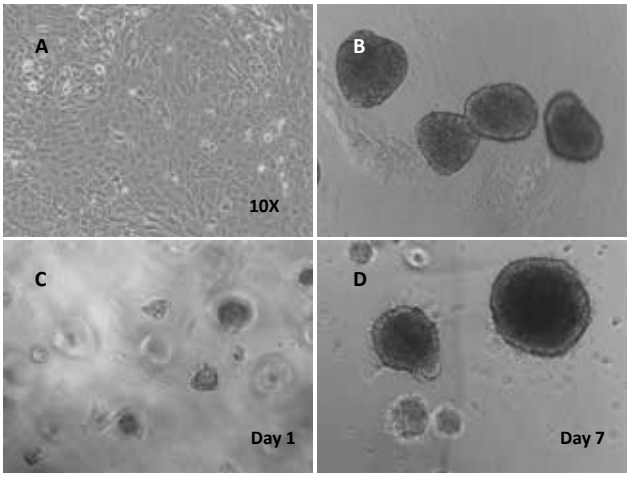
The VitroGel system can be "mixed and matched" with each other. Scientists can create tailor-made customized 3D culture micro-environment by blending different VitroGel system for a wide variety of functional ligands and degradability. This feature permits examination of cellular responses in a more physiologically relevant context while still giving experimenters full control.

VITROGEL® 3D HIGH CONCENTRATION

Tunable, xeno-free hydrogel matrix.

VitroGel® 3D High Concentration is a tunable, xeno-free (animal origin-free) hydrogel system. This pure hydrogel matrix allows the maximum flexibility to manipulate the 3D cell culture environment for different needs.

VitroGel 3D High Concentration comes with VitroGel Dilution Solution to adjust the final hydrogel strength from 10 to 4000 Pa (G'). The tunability of the hydrogel gives researchers the ability to create an optimized environment for cell growth. The VitroGel 3D High Concentration hydrogel matrix structure is good for cell spheroid formation, suspension cells, or cells requiring low cell-matrix interactions.



Beta Lox 5 (BL5) cells 3D culture in VitroGel 3D system.

A. BL5 cells culture on the surface of regular tissue culture treated well plate (control); B. Normal human islets grew in suspension culture (comparison); C. 3D culture of BL5 cells in VitroGel 3D at Day 1; D. 3D culture of BL5 cells in VitroGel 3D at Day 7. Under 3D culture of VitroGel 3D, BL5 cells form islet-like structures very similar to normal human islets. The hydrogel is prepared at 1:3 dilution. The images were taken at 10X magnification.

Why VitroGel 3D High Concentration?

PURE XENO-FREE HYDROGEL MATRIX: Provides excellent 3D matrix support for 3D cell spheroid formation

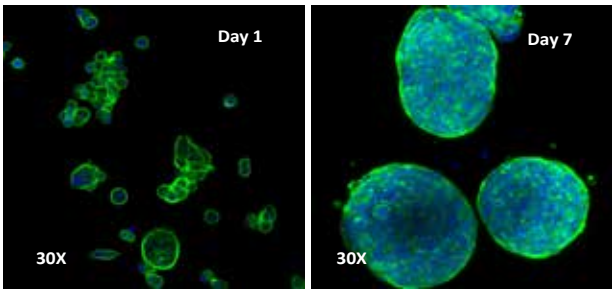
TUNABLE HYDROGEL STRENGTH: Covers a wide range of applications with great flexibility

MIX & MATCH: Adjust the functional ligand concentrations of other hydrogels without sacrificing the hydrogel strength

EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution

Features	Specifications
Contents	VitroGel 3D High Concentration, 3mL VitroGel Dilution Solution, 50 mL
Formulation	Xeno-free tunable hydrogel, pure and unmodified. HIGH CONCENTRATION
Use	Good for cell spheroid formation, suspension cells or cells require low cell-matrix interactions

Product	Size	SKU #
VitroGel 3D High Concentration Kit (Dilution Solution TYPE 1 or TYPE 2)	3 mL	TWG001



Human colon cancer cells (HCT 116) cells cultured on top of VitroGel 3D hydrogel.

Cells were added on top of a thick hydrogel coating plate. Cell spheroids formed within 24 hours and continued to increase in size out to 7 days.

VITROGEL® RGD HIGH CONCENTRATION

RGD Modified. Tunable, xeno-free hydrogel matrix.

VitroGel® RGD High Concentration is a tunable, xeno-free (animal origin-free) hydrogel system modified with cell adhesive peptide RGD to promote cell attachment and cell-matrix interactions during the 3D cell culture. VitroGel RGD High Concentration comes with VitroGel Dilution Solution to adjust the final hydrogel strength from 10 to 4000 Pa (G').

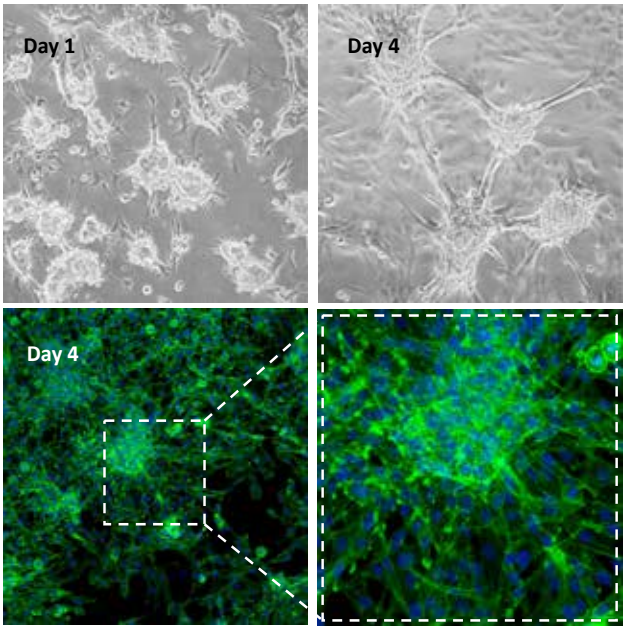
Why VitroGel RGD High Concentration?

POPULAR FOR MANY APPLICATIONS: A widely used RGD modified hydrogel that is versatile for many different uses

ROBUST AND FLEXIBLE: Excellent cell-matrix interaction in all different ranges of hydrogel strengths

MIX & MATCH: Create a multiple-functional hydrogel by mixing with other versions of VitroGel

EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution

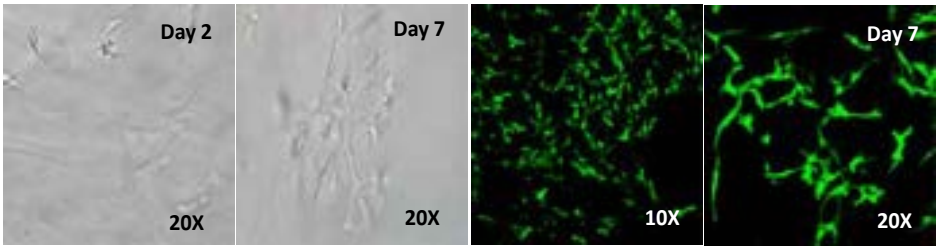


Glioblastoma cells (SNB 75) cultured on top of VitroGel RGD

The hydrogel coating surface was prepared by mixing VitroGel RGD with cell culture medium at 4:1 (v/v) ratio. The gelation process was stable at room temperature for 20 min before adding cells on top. Cells attached and formed the colony structure on the surface of the hydrogel (day 1). The attached cells expanded and connected colonies for a cell-networking structure (day 4).

Features	Specifications
Contents	VitroGel RGD High Concentration, 3mL VitroGel Dilution Solution, 50 mL
Formulation	Xeno-free tunable hydrogel modified with RGD peptide HIGH CONCENTRATION
Use	Good for adhesion cells or cells requiring stronger cell-matrix interactions.
Mix & Match	Can be blended with other versions of VitroGel to create a multi-functional hydrogel

Product	Size	SKU #
VitroGel RGD High Concentration Kit (Dilution Solution TYPE 1 or TYPE 2)	3 mL	TWG003



3D culture of Mouse bone marrow cells (OP9) in VitroGel RGD

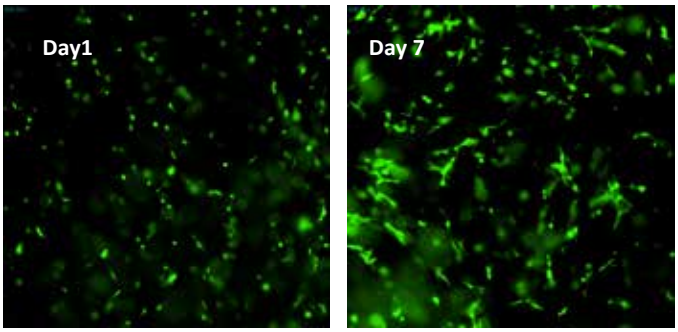
Hydrogel was prepared at 1:3 dilution with VitroGel Dilution Solution (Type 1). VitroGel RGD shows support for OP9 cell proliferation and cell-cell communication. The stronger cell-matrix interactions help the cells to form the cell-networking structure.

VITROGEL® COL HIGH CONCENTRATION

Collagen-mimetic peptide modified. Tunable, xeno-free hydrogel matrix.

VitroGel® COL High Concentration is a tunable, xeno-free hydrogel system that mimics the functions of native collagen. The hydrogel can promote osteoblastic differentiation in vitro and enhancing osteoblastic activity *in vivo*, which shows great potential for tissue engineering and regeneration medicine applications.

VitroGel COL High Concentration comes with VitroGel Dilution Solution to adjust the final hydrogel strength from 10 to 4000 Pa (G').



3D culture of mouse bone marrow stromal cells (OP9) in the mixture of VitroGel COL.

Cells were cultured with 1:3 diluted VitroGel COL. The single cells were suspended in hydrogel matrix (Day 1) and extended to form fibroblast-like cell matrix structure (Day 7).

Why VitroGel COL High Concentration?

ROOM TEMPERATURE STABLE HYDROGEL THAT CAN MIMIC FUNCTIONS OF COLLAGEN

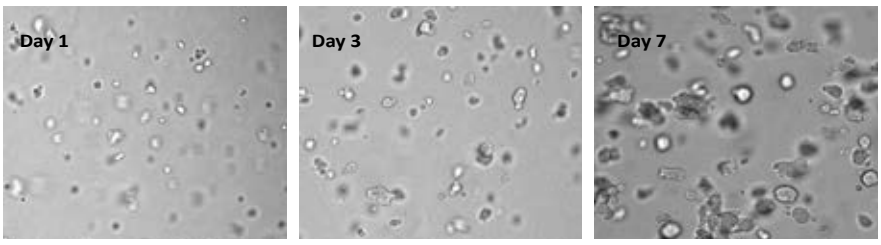
TUNABLE HYDROGEL STRENGTH: Cover a wide range of applications with great flexibility

MIX & MATCH: Create a multi-functional hydrogel by mixing with other versions of VitroGel

EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution

Features	Specifications
Contents	VitroGel COL High Concentration, 3mL VitroGel Dilution Solution, 50 mL
Formulation	Xeno-free tunable collagen mimetic functional hydrogel. HIGH CONCENTRATION
Use	Support integrin binding to promote osteoblastic differentiation in vitro and enhancing osteoblastic activity *in vivo*
Mix & Match	Can be blended with other versions of VitroGel to create a multi-functional hydrogel

Product	Size	SKU #
VitroGel COL High Concentration Kit (Dilution Solution TYPE 1 or TYPE 2)	3 mL	TWG009



3D culture of glioblastoma cells (SNB-75) in VitroGel COL.

Cells were cultured with 1:5 diluted VitroGel COL. Single cells were suspended in the hydrogel matrix on Day 1 and grew into 3D colonies within 7 days.

VITROGEL® MMP HIGH CONCENTRATION

Matrix metalloproteinases (MMP) sensitive biodegradable hydrogel.
Tunable, xeno-free hydrogel matrix.

VitroGel® MMP High Concentration is a tunable, xeno-free (animal origin-free) hydrogel system modified with matrix metalloproteinasesensitive peptides. The enzyme sensitive hydrogel can be degraded by several MMPs (MMP1, MMP2, MMP3, MMP9 and MMP13) and can support different biological activities such as cell proliferation, migration (adhesion/dispersion), differentiation, angiogenesis, apoptosis, etc.

VitroGel MMP High Concentration comes with VitroGel Dilution Solution to adjust the final hydrogel strength from 10 to 4000 Pa.

Why VitroGel MMP High Concentration?

RAPID DEGRADATION: Enzyme sensitive biodegradable hydrogel

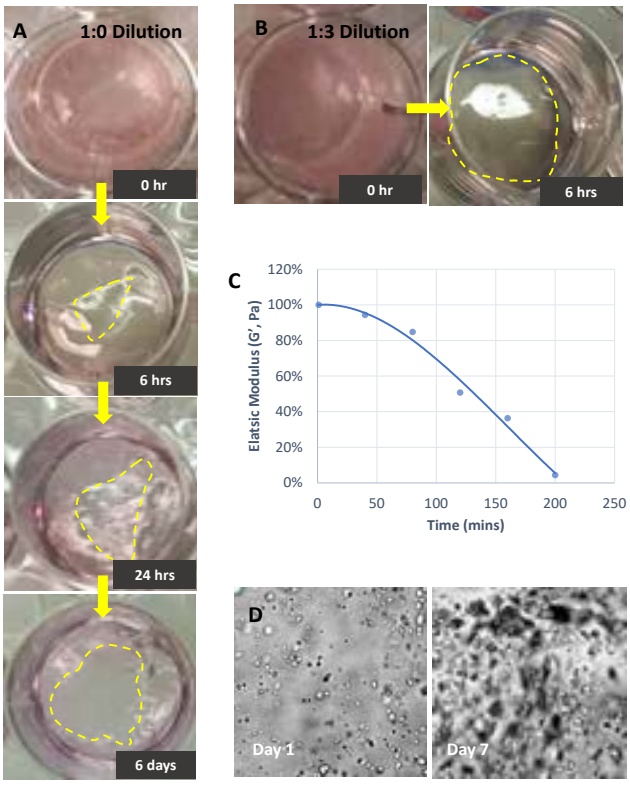
TUNABLE HYDROGEL STRENGTH: Cover a wide range of applications with great flexibility

MIX & MATCH FOR ADJUSTABLE DEGRADATION: Create a biodegradable hydrogel by mixing with other versions of VitroGel

EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution

Features	Specifications
Contents	VitroGel MMP High Concentration, 3mL VitroGel Dilution Solution, 50 mL
Formulation	Xeno-free tunable hydrogel modified with matrix metalloproteinases sensitive peptide. HIGH CONCENTRATION
Use	MMP sensitive biodegradable hydrogel.
Mix & Match	Can be blended with other versions of VitroGel to create a multi-functional hydrogel

Product	Size	SKU #
VitroGel MMP High Concentration Kit (Dilution Solution TYPE 1 or TYPE 2)	3 mL	TWG010



Degradation of VitroGel MMP gel with MMP2 enzyme.

A) Hydrogel was prepared without dilution (1:0 dilution) and incubated for 24 hours before adding MMP2 (1 µg/mL) on the top of the hydrogel. The plate was incubated in a 5% CO_2 incubator at 37°C and was shaken using an orbital shaker at 40 rpm. The hydrogel obtains a heterogenous consistency after 24 hours and by day 6, the entire middle section appears degraded. B) The 1:3 diluted hydrogel was prepared with VitroGel Dilution Solution and incubated as 1:0 diluted hydrogel. The hydrogel appears to have completely dissolved after 6 hours after exposed to MMP2. C) The rheological data shows a rapid decline in the elastic modulus of the 1:3 diluted hydrogel over time after adding MMP2. D) 3D culture of glioblastoma cells (SNB 75) in VitroGel MMP for day 1 and day 7.

VITROGEL® YIGSR HIGH CONCENTRATION

Laminin-derived functional peptide (YIGSR) modified.
Tunable, xeno-free hydrogel matrix.

VitroGel® YIGSR High Concentration is a tunable, xeno-free (animal origin-free) hydrogel system modified with laminin-derived functional peptide (YIGSR). YIGSR sequence resides on the laminin β1 chain, which involves endothelial cell adhesion, cell proliferation and motility/migration.

VitroGel YIGSR High Concentration comes with VitroGel Dilution Solution to adjust the final hydrogel strength from 10 to 4000 Pa.

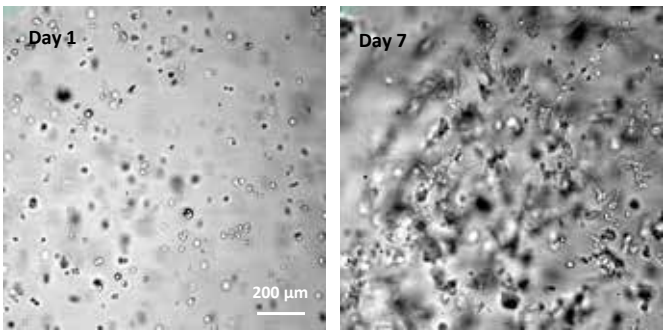
Why VitroGel YIGSR High Concentration?

LAMININ FUNCTIONAL HYDROGEL

TUNABLE HYDROGEL STRENGTH: Cover a wide range of applications with great flexibility

MIX & MATCH: Create a multi-functional hydrogel by mixing with other versions of VitroGel

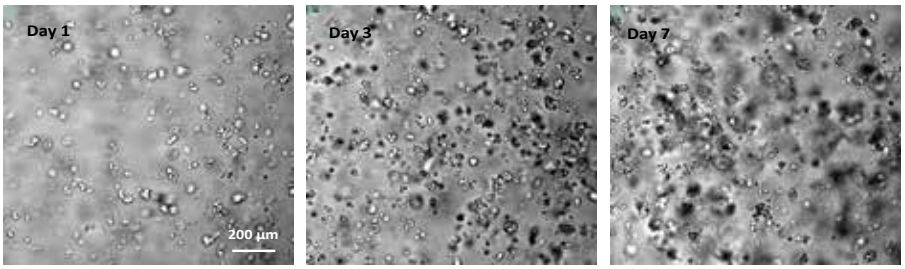
EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution



3D culture of glioblastoma cells (U-87 MG) in VitroGel YIGSR.
Cells were cultured with 1:3 diluted VitroGel YIGSR according to the user handbook (50% FBS was used to prepare cell suspension to achieve hydrogel with a final 10% FBS concentration).

Features	Specifications
Contents	VitroGel YIGSR High Concentration, 3mL VitroGel Dilution Solution, 50 mL
Formulation	Xeno-free tunable hydrogel modified with YIGSR peptide. HIGH CONCENTRATION
Use	Support endothelial cell adhesion, cell proliferation and motility/migration
Mix & Match	Can be blended with other versions of VitroGel to create a multi-functional hydrogel

Product	Size	SKU #
VitroGel YIGSR High Concentration Kit (Dilution Solution TYPE 1 or TYPE 2)	3 mL	TWG008



3D culture of breast cancer cells (MCF-7) in VitroGel YIGSR
Cells were cultured with 1:3 diluted VitroGel YIGSR according to the user handbook (50% FBS was used to prepare cell suspension to achieve hydrogel with a final 10% FBS concentration).

VITROGEL® IKVAV HIGH CONCENTRATION

Laminin-derived functional peptide (IKVAV) modified.
Tunable, xeno-free hydrogel matrix.

VitroGel® IKVAV High Concentration is a tunable, xeno-free (animal origin-free) hydrogel system modified with laminin-derived functional peptide (IKVAV). IKVAV is the bioactive sequence located on the C-terminal end of the long arm of the α-1 chain of laminin, which is actively involved in different biological activities such as neuronal progenitor cell differentiation, promoting cell adhesion, neurite outgrowth, angiogenesis, and tumor growth.

VitroGel IKVAV High Concentration comes with VitroGel Dilution Solution to adjust the final hydrogel strength from 10 to 4000 Pa.

Why VitroGel IKVAV High Concentration?

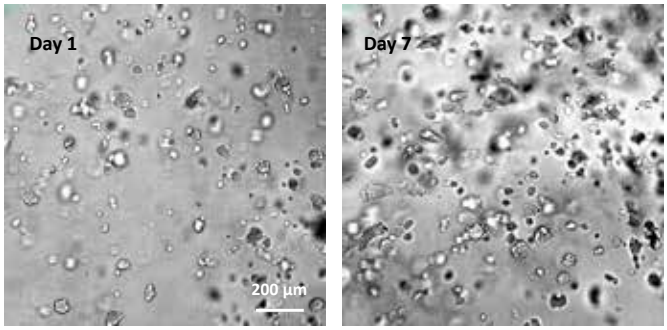
LAMININ FUNCTIONAL HYDROGEL

TUNABLE HYDROGEL STRENGTH: Cover a wide range of applications with great flexibility

MIX & MATCH: Create a multi-functional hydrogel by mixing with other versions of VitroGel

EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution

Features	Specifications
Contents	VitroGel IKVAV High Concentration, 3mL VitroGel Dilution Solution, 50 mL
Formulation	Xeno-free tunable hydrogel modified with IKVAV peptide. HIGH CONCENTRATION
Use	Support neuronal progenitor cells differentiation, promoting cell adhesion, neurite outgrowth, angiogenesis, and tumor growth
Mix & Match	Can be blended with other versions of VitroGel to create a multi-functional hydrogel



3D culture of glioblastoma cells (SNB 75) in VitroGel IKVAV.
Cells were cultured with 1:3 diluted VitroGel IKVAV according to the user handbook (50% FBS was used to prepare cell suspension to achieve hydrogel with a final 10% FBS concentration).

Product	Size	SKU #
VitroGel IKVAV High Concentration Kit (Dilution Solution TYPE 1 or TYPE 2)	3 mL	TWG007

VITROGEL® ANGIOGENESIS ASSAY HC KIT

Xeno-free, tunable hydrogel system for 2D gel coating and 3D culture of angiogenesis tube formation, invasion, and animal injection.

VitroGel Angiogenesis Assay Kit is a revolutionary tool for researchers to study the effect of both hydrogel properties and culture medium on angiogenesis process. The kit can be used to study the angiogenesis tube formation and invasion on both 2D hydrogel coating and 3D cell culture methods. The VitroGel system is also good for animal injection for *in vivo* studies.

There are two versions of VitroGel Angiogenesis Assay Kits:
1) VitroGel Angiogenesis Assay Kit (Ready-To-Use): Assay kit with a fixed hydrogel mechanical strength to support the angiogenesis assay with adjustable supplements.
2) VitroGel Angiogenesis Assay HC Kit (Cat No. TWG011-K): Assay kit with a tunable high concentration hydrogel to allow full control of the hydrogel's mechanical strength with adjustable supplements.

Besides molecular cues, the VitroGel Angiogenesis Assay Kit allows researchers to explore the effects of hydrogel mechanical properties on angiogenesis. The high concentration VitroGel AAK-HC hydrogel is room temperature stable and can be adjusted by simply mixing the hydrogel solution and dilution solution at different rations (recommend 1:1 to 1:5 v/v) to achieve different mechanical strengths. The diluted hydrogel solution can be directly mixed with supplement at 2:1 (v/v) ratio for hydrogel formation. Researchers can adjust the molecular cues of the hydrogel by adding the growth factors/inhibitors directly to the supplement before mixing with VitroGel AAK-HC. Cells cultured in this system can be harvested easily with the VitroGel Cell Recovery Solution.

PRODUCT	TYPE/SIZE	SKU #
VitroGel Angiogenesis Assay HC Kit	TYPE 1	TWG011-K1
	TYPE 2	TWG011-K2
	TYPE 3	TWG011-K3
VitroGel AAK-HC Hydrogel (inlcudes AAK Dilution Solution 10 mL)	1 mL	TWG011S
AAK Supplement 1	500 µL	AAKS-1
AAK Supplement 2	500 µL	AAKS-2

Why VitroGel Angiogenesis Assay HC KIt?

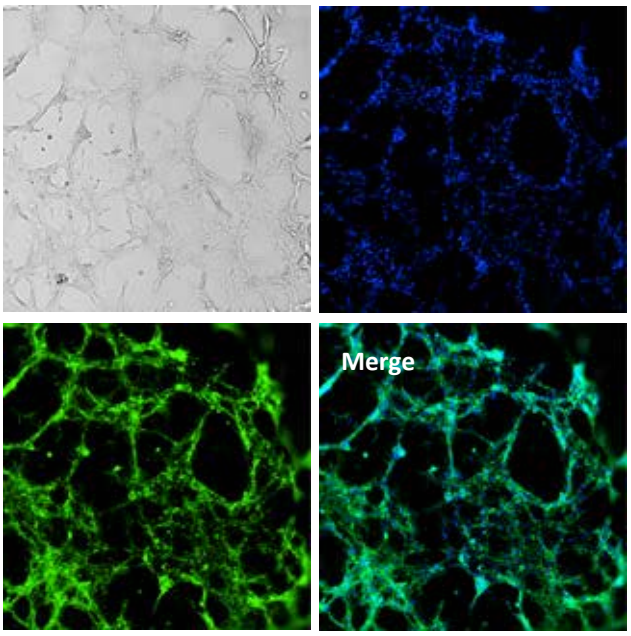
XENO-FREE FUNCTIONAL HYDROGEL SUPPORTING ANGIOGENESIS

CONTROL AND STUDY THE EFFECT OF THE HYDROGEL MECHANICAL PROPERTIES ON ANGIOGENESIS

MULTIPLE APPLICATIONS IN ONE KIT: Tube formation, invasion, and animal injection

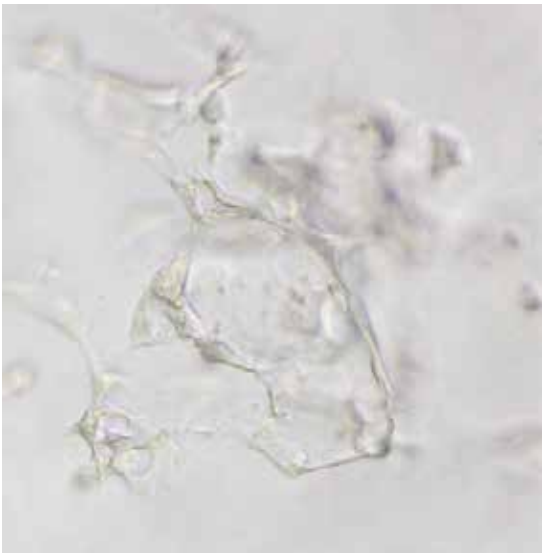
EASY CELL HARVESTING: Efficient cell harvesting with the enzyme-free VitroGel Cell Recovery Solution

Features	Specifications
TYPE 1 Kit Contents	VitroGel AAK-HC (1 mL) AAK Dilution Solution (10 mL) AAK Supplement 1 (3 x 500 µL) AAK Supplement 2 (3 x 500 µL)
TYPE 2 Kit Contents	VitroGel AAK-HC (1 mL) AAK Dilution Solution (10 mL) AAK Supplement 1 (6 x 500 µL)
TYPE 3 Kit Contents	VitroGel AAK-HC (1 mL) AAK Dilution Solution (10 mL) AAK Supplement 2 (6 x 500 µL)
Formulation	Tunable, xeno-free functional hydrogel AAK Supplement 1: Without VEGFs AAK Supplement 2: With VEGFs
Use	Angiogenesis Assay, tube formation, invasion, animal injection
Biocompatibility	Biocompatible, safe for animal studies
Injection	Injectable hydrogel for *in vivo* studies and lab automation
Cell Harvesting	20 min cell harvesting using VitroGel Cell Recovery Solution
pH	Neutral
Shipping	Supplements require dry ice shipment
Storage	VitroGel AAK-HC hydrogel:2-8°C AAK Supplement 1: -20°C AAK Supplement 2: -20°C
Number of Uses	30-180 tests per kit



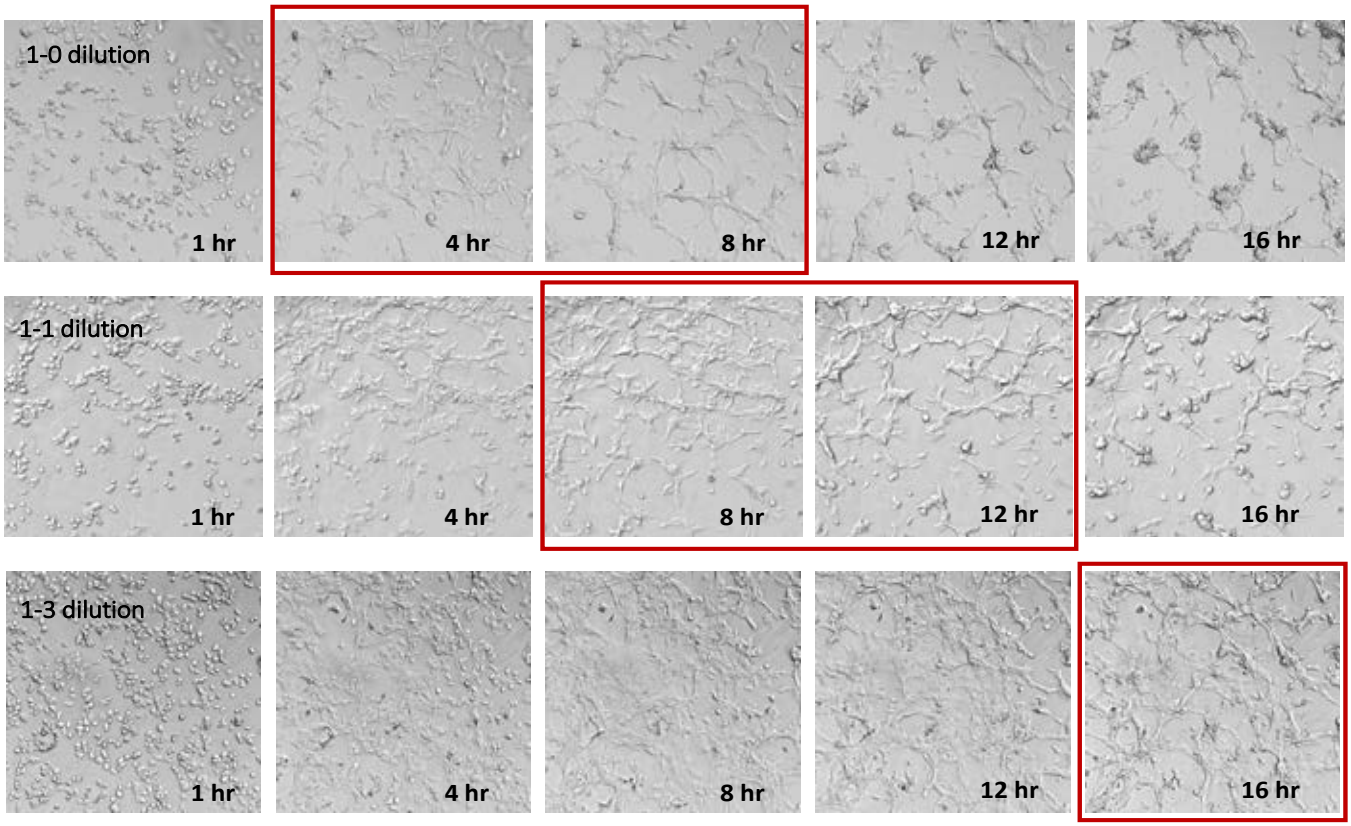
Tube formation of endothelial cells on top of VitroGel AAK-HC hydrogel with tube formation supplement, AAK Supplement 2

The image above shows the tube morphology of HUVEC cells on top of VitroGel AAK-HC hydrogel. The cells were fixed and stained with DAPI (blue) and ActinGreen™ (green).



3D tube structure of HUVEC cells cultured with the VitroGel Angiogenesis Assay HC Kit

The concentration of VitroGel AAK-HC hydrogel was adjusted by diluting with the AAK-HC Dilution Solution. HUVEC cells were prepared in hydrogel supplement before mixing with diluted hydrogel solution for 3D culture. The image above shows the tube networking structure inside of VitroGel AAK-HC hydrogel.



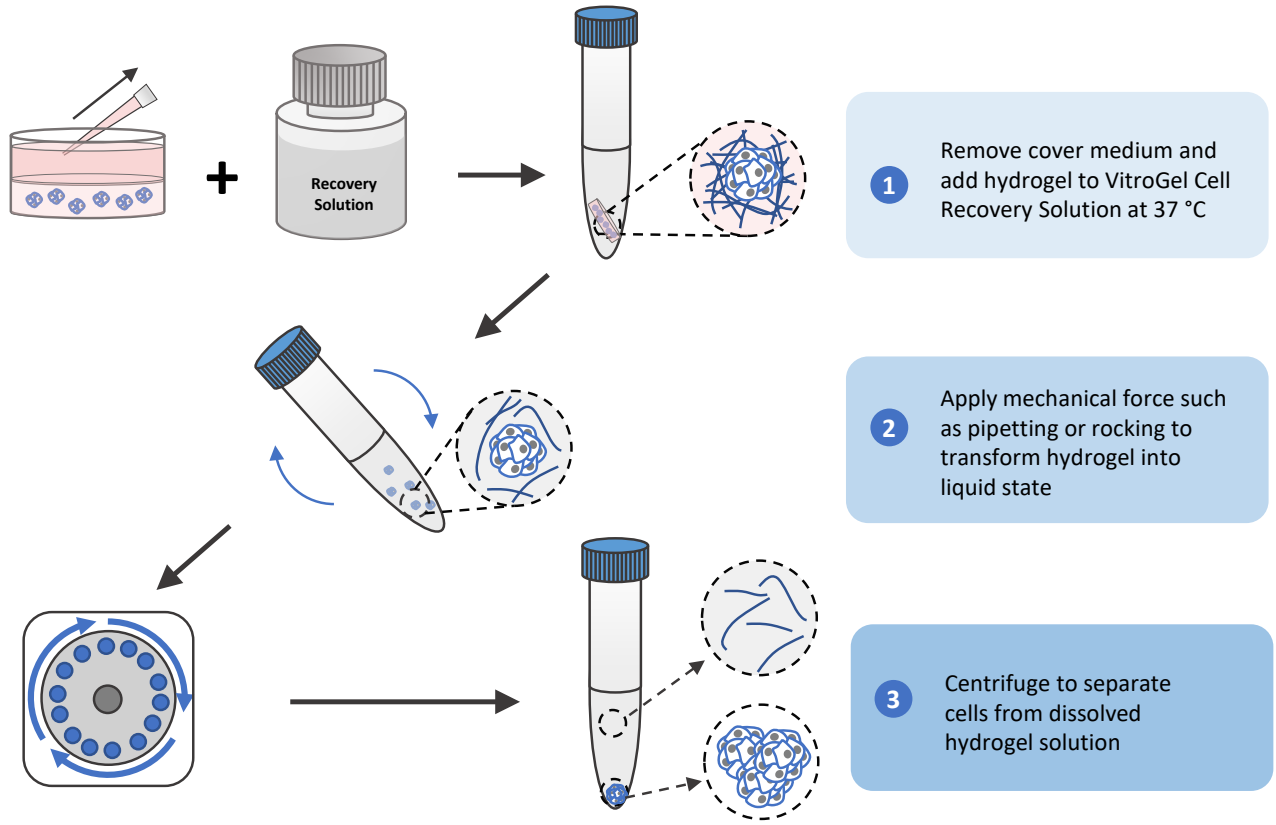
Effects of hydrogel mechanical strength on HUVEC tube formation.

Different concentrations of VitroGel AAK-HC hydrogels were prepared by diluting the high concentration VitroGel AAK-HC with AAK-HC Dilution Solution at 1:0, 1:1, and 1:3 (v/v) ratios. The hydrogels were then mixed with AAK Supplement 2 (with VEGFs for tube formation) and incubated in the 96-well plate for 15 minutes. HUVECs cell were added on top of the hydrogel and observed under a live cell imaging system. The images indicate stronger hydrogel mechanical strength provided earlier cell tube structure formation (4-8 hours) than softer hydrogel (8-12 hours for 1:1 dilution and around 16 hours for 1:3 dilution). On the other hand, after tube formation, cells on the surface of 1:0 dilution hydrogel started to aggregate and form cell spheroids (around 12 hours). A similar aggregation happened to the cells on the surface of 1:1 diluted hydrogel (around 16 hours). For the soft hydrogel (1:3 dilution), the cells can attach well on the surface of the hydrogel and gradually form the tube structure within 18 hours. The results show the strong effect of the hydrogel mechanical strength on endothelial cell tube formation.

HOW DOES CELL HARVESTING WORKS IN VITROGEL?

Harvesting cells from most hydrogel matrices is not an easy task. Using harsh chemical solutions, strong enzymes, or changing the temperature may damage your cells. The yield rate of cell recovery is low with these methods. With the VitroGel system, harvesting cells from the hydrogel matrix is as easy as 3D cell culture. Using our enzyme-free VitroGel® Cell Recovery Solution, scientists can recover cells at neutral pH and 37°C for the operating temperature. The solution can maintain high cell viability during the recovery process. Cells can be sub-culture in both 2D and 3D cultures after recovery.

The VitroGel Cell Recovery Solution helps to release the ionic molecules from the hydrogel matrix, converting the solid hydrogel back to the soft hydrogel state. At this state, the hydrogel maintains the unique shear-thinning properties; it can further transform into a liquid state with a little mechanical disruption (such as rocking or shaking the tube) and dilution. Once the hydrogel dissolves as a liquid form, cells can be harvested by centrifuging.



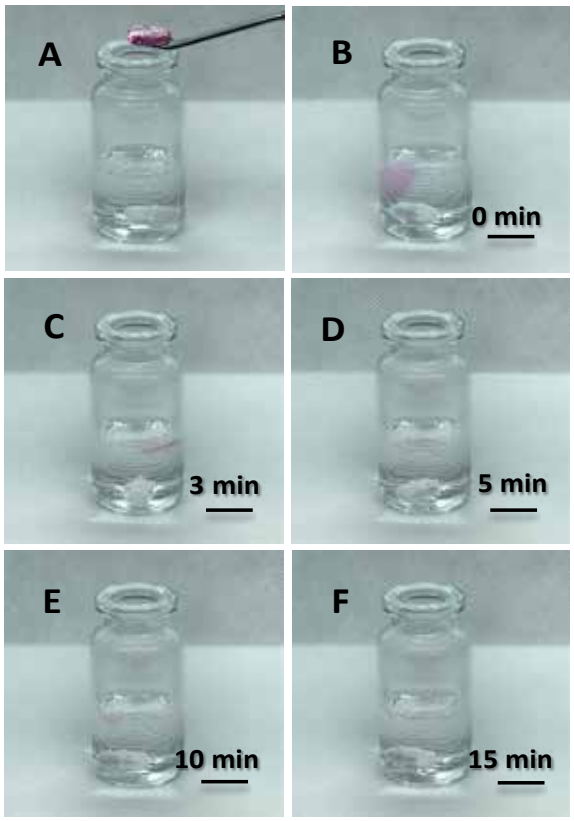
VITROGEL® CELL RECOVERY SOLUTION

Enzyme-free formulation for recovering cells from hydrogel system in 20 minutes.

VitroGel® Cell Recovery Solution is an enzyme-free, ready-to-use solution to harvest 2D or 3D cultured cells from VitroGel hydrogel fast and safely. The solution can recover cells from VitroGel hydrogels in 20 minutes.

VitroGel Cell Recovery Solution is room temperature stable, has a neutral pH and works at 37°C operating temperature. The solution can maintain high cell viability during the recovery process. Harvested cells can be sub-culture in both 2D and 3D culture.

The VitroGel Cell Recovery Solution can be used before or after fixation/staining preparation for further high-quality downstream analysis.



Hydrogel dissolved in cell recovery solution

A) hydrogel before adding to recovery solution, B-F) Time 0 to 15 min after adding hydrogel to recovery solution (at 37 °C, 20 rpm).

Why VitroGel Cell Recovery Solution?

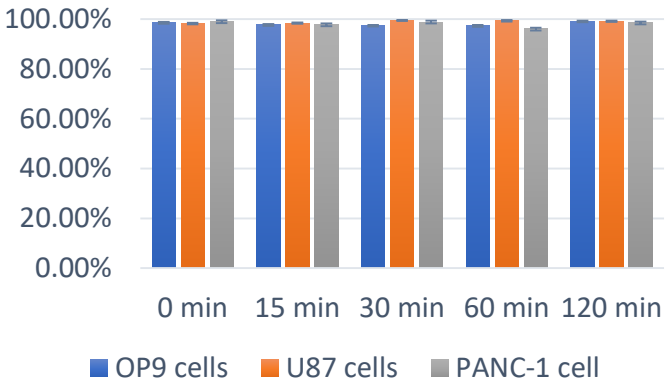
ENZYME-FREE: Maintain the 3D cell structure after cell harvesting

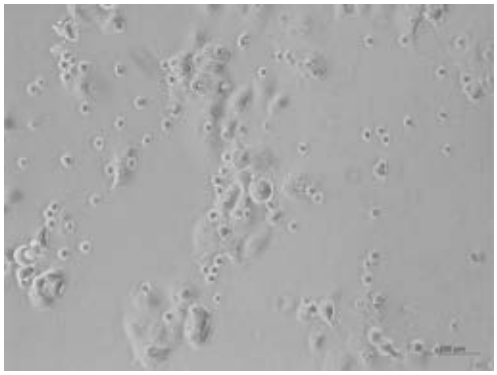
WORKS AT 37 °C: Work at physiological temperature to keep high cell viability

20 MIN PROCESS: Rapid cell harvesting process with simple mixing steps

Features	Specifications
Formulation	Enzyme-free
Use	Harvest cells from VitroGel hydrogel while maintaining high cell viability. Use before or after sample fixation and stained preparation for imaging or downstream data analysis
Processing Time	15-20 min
Downstream	Recovered cells can be further sub-culture for both 2D and 3D
pH	Neutral
Number of Uses	30-180 tests per kit

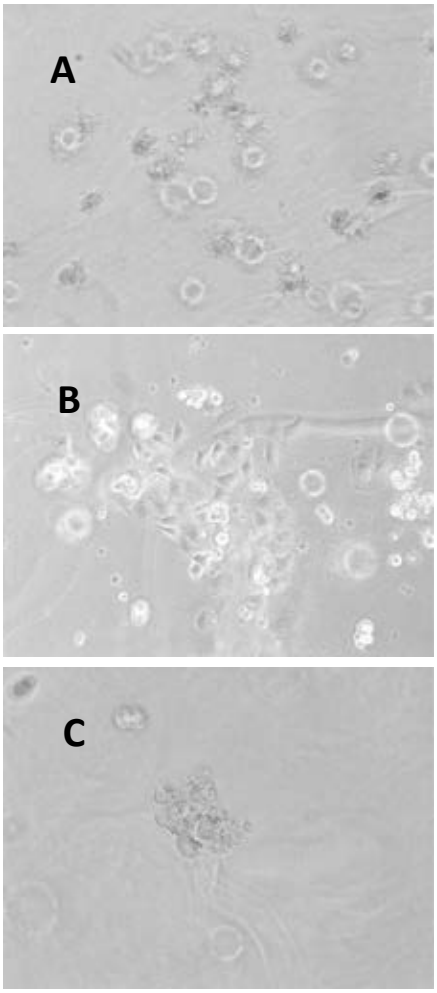
Product	Size	SKU #
VitroGel Cell Recovery Solution	100 mL	MS03-100





The VitroGel Cell Recovery Solution maintains high cell viability

Cell viability of OP9, U87-MG and PANC-1 cells after adding to the cell harvesting solution at time 0, 15, 30, 60 and 120 min. Cells maintain over 95% cell viability after being suspended in VitroGel Cell Recovery Solution for 2 hours. PANC-1 cells grown on 2D well plate before transfer to the cell harvesting solution.



Cells can be sub-culture in both 2D and 3D culture after harvesting

A) PANC-1 cells growth on 3D hydrogel before being harvested with VitroGel Cell Recovery Solution; B) PANC-1 cells harvested from 3D hydrogel with VitroGel Cell Recovery Solution, and then subcultured on the surface of hydrogel (day 2); C) PANC-1 cells harvested from 3D hydrogel using the cell harvesting solution and 3D subcultured in the hydrogel system again (day 2).

CYTO3D™ LIVE-DEAD ASSAY KIT

Live dead cell viability analysis for 3D and 2D cell culture.

The Cyto3D™ Live-Dead Assay Kit is used to determine the live/dead nucleated cells by using a fast one-step staining procedure for analysis on a dual-fluorescence system. This kit is recommended for viability analysis of cells cultured in 3D, 2D coating, and on monolayer.

Acridine orange (AO) and propidium iodide (PI), both nuclear staining (nucleic acid binding) dyes, are used in this kit. AO is permeable to both live and dead cells and stains all nucleated cells to generate green fluorescence. PI only penetrates the membranes of nucleated cells with compromised membranes and stains the dead cells to generate red fluorescence. Due to the quenching, when cells are stained with both AO and PI, all live nucleated cells fluoresce green, and all dead nucleated cells fluoresce red (the PI reduces the fluorescence intensity of the AO by fluorescence resonance energy transfer (FRET)). Non-nucleated materials such as red blood cells, platelets, and debris have no fluorescence and are ignored by fluorescence microscopes.

Dual-Fluorescence Viability, using AO and PI, is the recommended viability analysis method for cell lines, primary cells, and stem cells.

Why Cyto3D Live-Dead Assay Kit?

READY-TO-USE: Single tube system for directly adding to cells without additional preparation

FAST AND SENSITIVE: 5-10 minutes incubation time and obtain accurate results

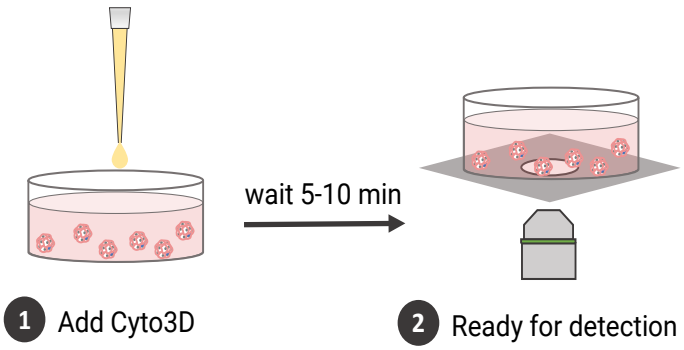
EXCELLENT FOR 3D CULTURE: Easy penetration for 3D cultured cells

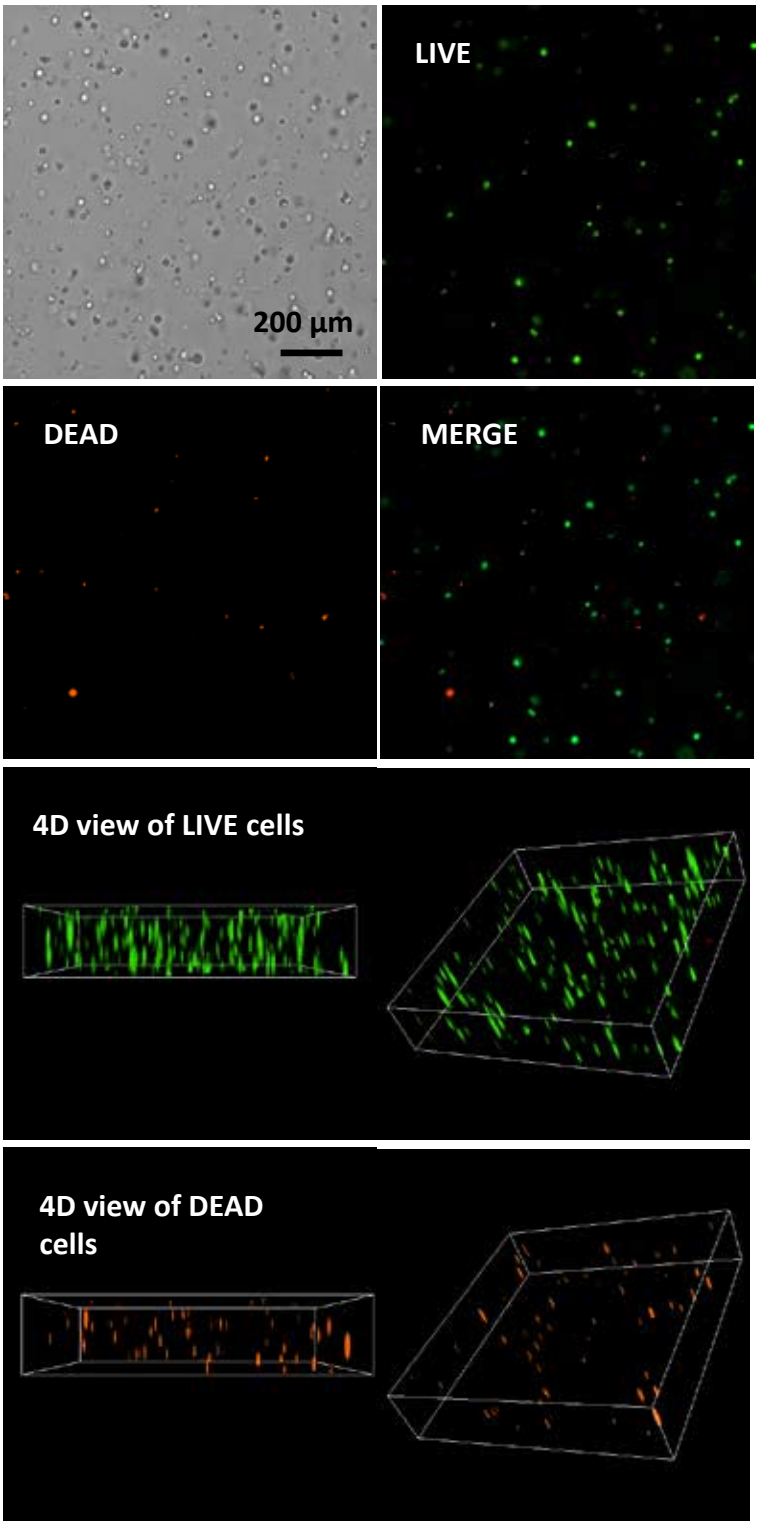
COST-EFFICIENT: Use only 2 µL for 100 µL sample

Features	Specifications
Formulation	Premixed acridine orange (AO) and propidium iodide (PI), nuclear staining dyes
Use	Live dead cell viability analysis for 3D and 2D cell culture
Detection Method	Fluorescent
Excitation/ Emission:	AO (494/517nm), PI (535/617nm)
For use with (Equipment):	Fluorescence microscope, flow cytometer, microplate reader, fluorescence cell counter.
Number of Uses	1 mL: 500 (at 2 µL per 100 µL)

Product	Size	SKU #
Cyto3D Live-Dead Assay Kit	1 mL	BM01

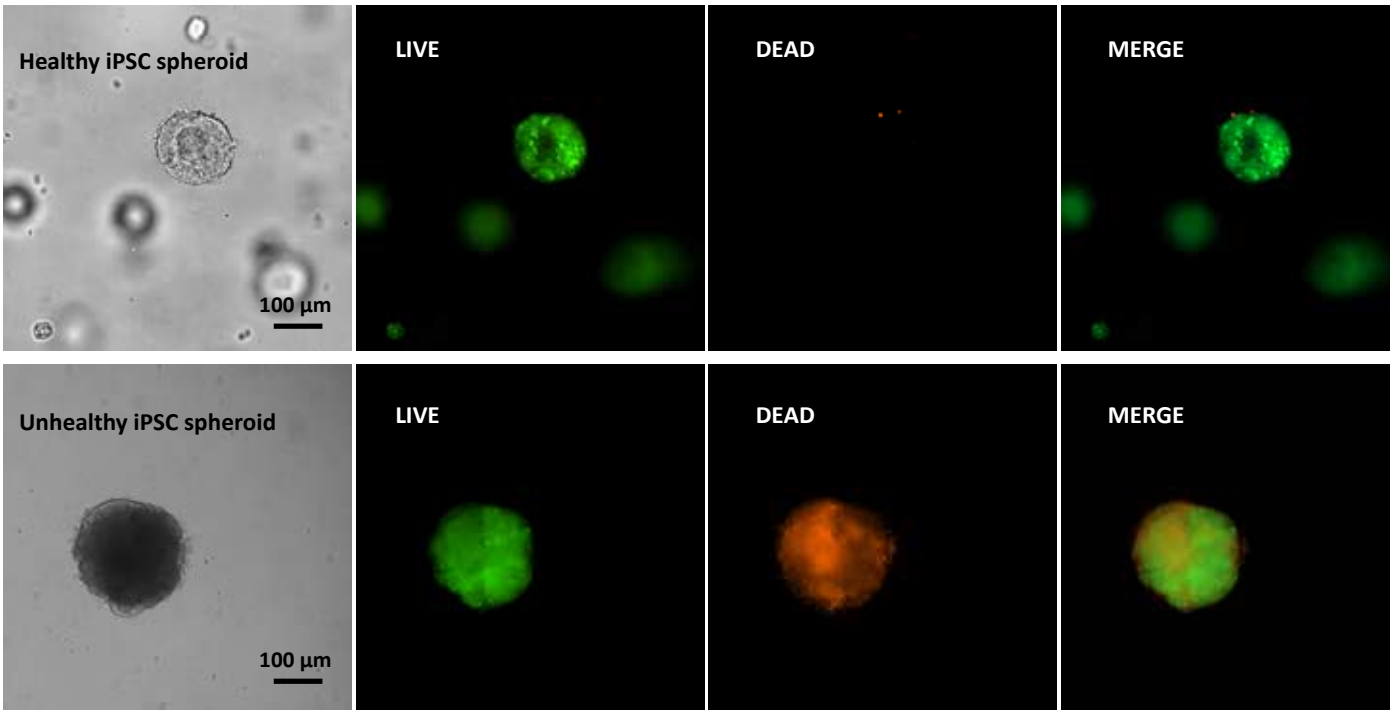
Easy setup and use





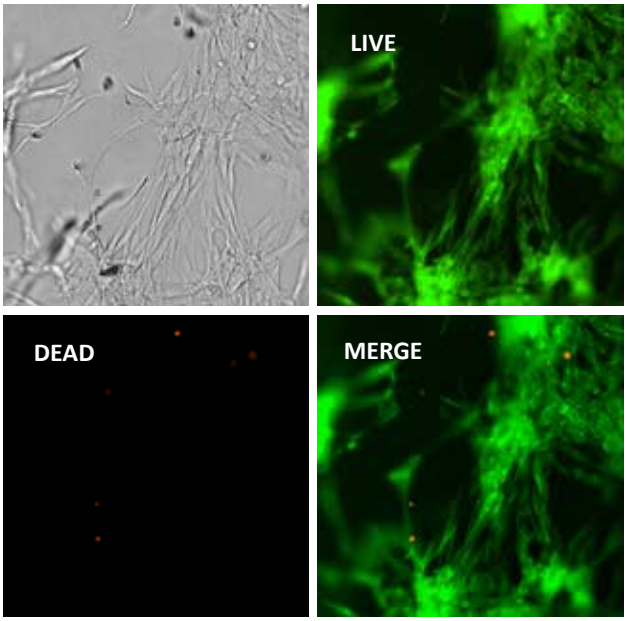
Live-dead cell viability analysis by using Cyto3D Live-Dead Assay Kit

Glioblastoma cells (SF 298, about 60% cell viability) were 3D cultured in VitroGel system for 2 days. 2 µL of Cyto3D reagent was added to each well containing 50 µL hydrogel and 50 µL cover medium. The mixture was incubated at 37 °C for 5-10 min. The cells were then observed under a fluorescent microscope. The images show the Live (green) and Dead (orange) cells within the 3D hydrogel matrix. The z-stack images of cells within hydrogel were then 3D reconstructed and showed in the 4D view images.



Live-dead cell viability images of stem cell spheroids

Stem cells were static suspension-cultured in VitroGel STEM (CAT# VHM02) for 5 days. 2 µL of Cyto3D reagent was added to each well containing 100 µL cell suspension. The mixture was incubated at 37 °C for 5-10 min. The cells were then observed under a fluorescent microscope. The images show the Live (green) and Dead (orange) stem cell spheroids cultured in a 3D hydrogel matrix. The live-dead dyes of Cyto3D Live-Dead Assay Kit can successfully penetrate large cell spheroids for cell viability analysis.



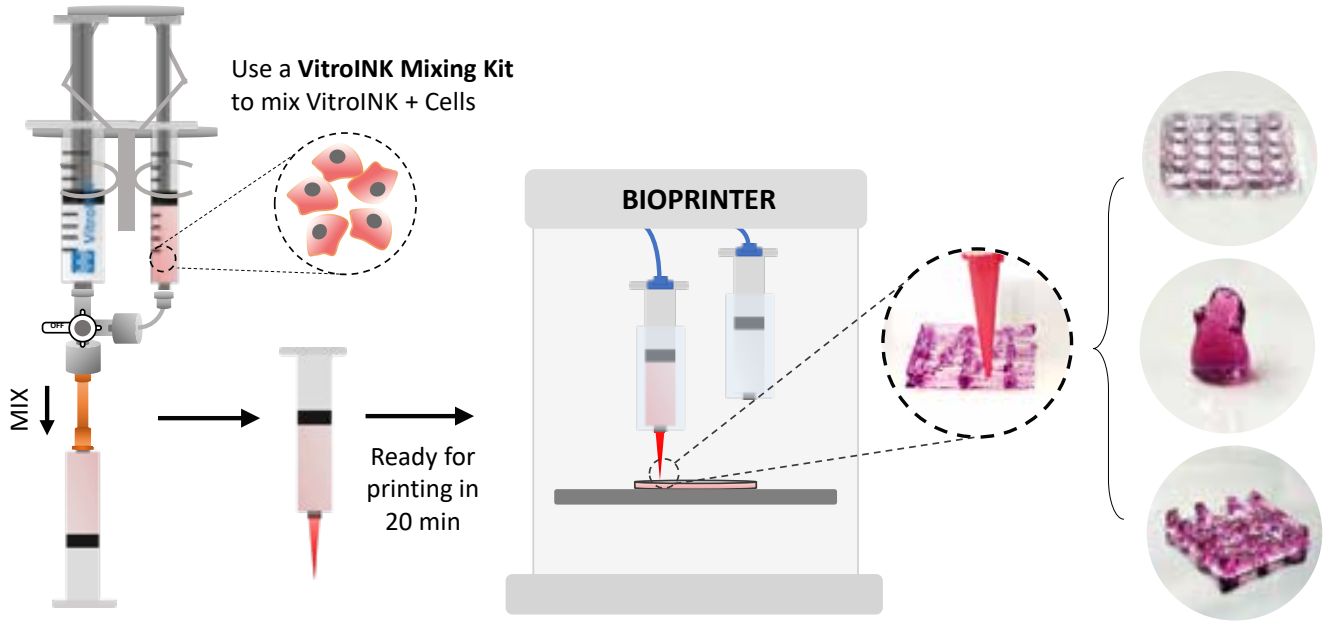
Live-dead cell viability images of normal Human Dermal Fibroblast (NHDF) culture on top of 2D hydrogel coating surface

NHDF cells were culture on the surface of VitroGel RGD at 1:3 dilution for 24 hours. 2 µL of Cyto3D reagent was added to each well containing 50 µl hydrogel and 50 µl cell medium. The mixture was incubated at 37 °C for 5-10 min and then observed under a fluorescent microscope.

VITROINK® | XENO-FREE FUNCTIONAL BIOINK FOR 3D BIOPRINTING

VitroINK is a family of the ready-to-use, xeno-free tunable bioink system that requires no UV, no temperature/pH curing, or chemical cross-linking. The system is ready-to-use at room temperature, neutral in pH, transparent, and has excellent visibility after printing and cell culture. Due to the unique shear-thinning and rapid recovery mechanical property, VitroINK can maintain the printed structure without UV or other special curing methods. Adding cell culture medium after printing can further stabilize the printed structure and support cell growth. Cells can be pre-mixed with VitroINK using our VitroINK Mixing Kit for mixing ratios at 3:1 or 10:1. Different versions of VItroINK may incorporate multiple biological functional ligands to promote cell attachment, cell-matrix interactions, cell proliferation, motility/ migration and differentiation for many various applications.

- **Ready-to-use**
- **No UV, temperature/pH curing, or chemical cross-linking**
- **Multiple functional versions**
- **Wide printing temperature range**
- **Directly add cell medium for long term culture**



VITROINK® 3D

VitroINK 3D is a ready-to-use tunable bioink for 3D bioprinting. The pure hydrogel matrix structure is good for cell spheroid formation and supporting the growth of cells requiring low cell-matrix interactions.

VitroINK 3D Bioink Starter Kit contains both bioink and the complete mixing kit to prepare the cell/bioink mixture for 3D bioprinting. The kit includes a 3 mL or 10 mL VitroINK 3D and a complete mixing kit that includes a dispenser, 1 mL syringe, 3 mL syringe, connectors, and mixing head to get you started.

Why VitroINK 3D?

READY -TO-USE: Ready to print at room temperature, directly mix with cells without additional preparation

XENO-FREE TUNABLE BIOINK

NO UV, TEMPERATURE/pH CURING OR CHEMICAL CROSS-LINKING REQUIRED

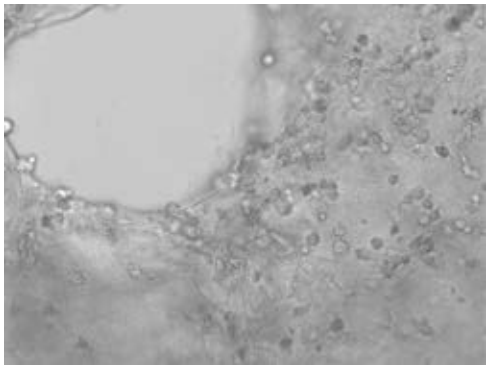
EXCELLENT VISIBILITY: After printing and cell culture

EXCELLENT FOR LONG TERM CULTURE

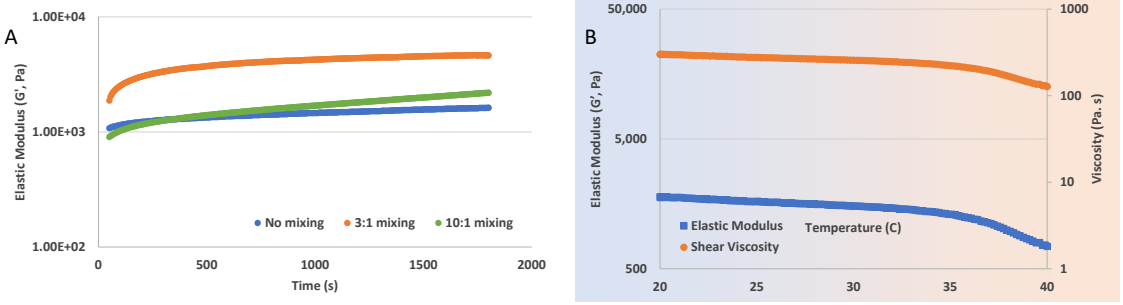
SPECIFICATIONS

- Xeno-free tunable bioink for 3D bioprinting
- Ready-to-use at room temperature
- No UV, temperature/pH curing or chemical cross-linking
- Neutral pH
- Transparent. Excellent visibility after printing and cell culture
- Pre-mix with cells using our VitroINK Mixing Kit

Product	Size	SKU #
VitroINK 3D	3 mL	INK01-3
	10 mL	INK01-10
VitroINK 3D - Bioink Starter Kit	3 mL	ISK01-3
	10 mL	ISK01-10



Glioblastoma cell line (SNB 75) cultured in VitroINK 3D (3:1 bioink: cells mixing) at day 4.



Rheological properties of VitroINK 3D under the time sweep and temperature sweep tests.

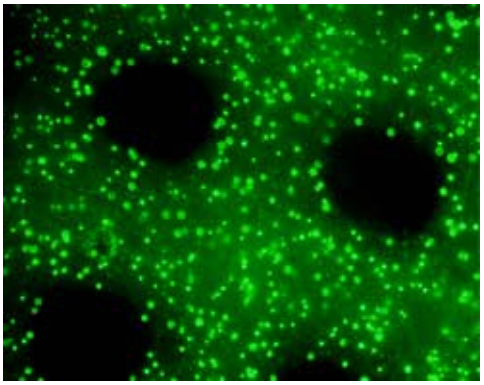
A) The time sweep test of VitroINK 3D without or with 3:1 and 10:1 (v/v) mixing with DMEM medium. The elastic modulus was tested at room temperature and showed a feasible range for extrusion printing before incubation with cell culture medium. B) the elastic modulus and viscosity properties of VitroINK 3D under the temperature sweep testing (20 to 40°C). The elastic modulus and viscosity are relatively stable at 20 to 36°C. When experiencing temperature higher than 36, the elastic modulus and viscosity decrease. The data indicates VitroINK has a wide range of working temperatures and can be easily used at room temperature or physiological temperature.

VITROINK® RGD

VitroINK® RGD ready-to-use, xeno-free (animal origin-free) bioink system modified with RGD cell adhesive peptide, promoting the cell attachment and cell-matrix interactions.

This RGD modified bioink can enhance cell adhesion, proliferation, motility/migration and differentiation in different applications.

VitroINK RGD Bioink Starter Kit contains both bioink and the complete mixing kit to prepare the cell/bioink mixture for 3D bioprinting. The kit includes a 3 mL or 10 mL VitroINK RGD and a complete mixing kit that includes a dispenser, 1 mL syringe, 3 mL syringe, connectors and mixing head to get you started.



Patient-derived Non-Small Cell Lung Cancer (NSCLC) cells in VitroINK RGD. Over 90% cell viability after printing.

Why VitroINK RGD?

READY -TO-USE: Ready to print at room temperature, directly mix with cells without additional preparation

POPULAR FOR MANY APPLICATIONS: Widely used RGD modified hydrogel that is versatile for many different uses

NO UV, TEMPERATURE/pH CURING OR CHEMICAL CROSS-LINKING REQUIRED

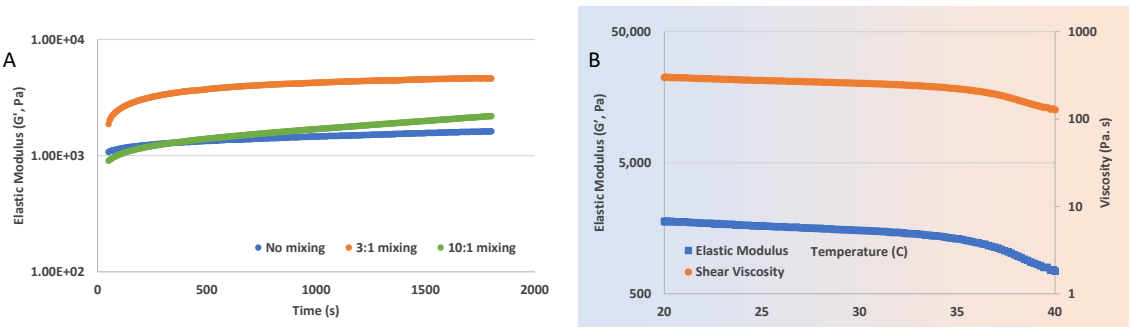
EXCELLENT VISIBILITY: After printing and cell culture

EXCELLENT FOR LONG TERM CULTURE

SPECIFICATIONS

- Xeno-free tunable bioink for 3D bioprinting
- Promote cell adhesion, proliferation, motility/migration and differentiation
- Ready-to-use at room temperature
- No UV, temperature/pH curing or chemical cross-linking
- Neutral pH
- Transparent. Excellent visibility after printing and cell culture
- Pre-mix with cells using our VitroINK Mixing Kit

Product	Size	SKU #
VitroINK RGD	3 mL	INK02-3
	10 mL	INK02-10
VitroINK RGD - Bioink Starter Kit	3 mL	ISK02-3
	10 mL	ISK02-10



Rheological properties of VitroINK RGD under the time sweep and temperature sweep tests.

A) The time sweep test of VitroINK RGD without or with 3:1 and 10:1 (v/v) mixing with DMEM medium. The elastic modulus was tested at room temperature and showed a feasible range for extrusion printing before incubation with cell culture medium. B) the elastic modulus and viscosity properties of VitroINK RGD under the temperature sweep testing (20 to 40°C). The elastic modulus and viscosity are relatively stable at 20 to 35°C. When experiencing temperatures higher than 36, the elastic modulus and viscosity decrease. The data indicates VitroINK has a wide range of working temperatures and can be easily used at room temperature or physiological temperature.

VITROINK® MIXING KIT

VitroINK Mixing Kit was designed to provide a robust mixing of the bioink and cells.

Mixing cells with the bioink is a critical step for 3D bioprinting. Because of the differences in viscosity of the cell suspension and bioink, the traditional manual mixing methods create a lot of air bubbles and non-uniform mixture which leads to the unstable printed structure, difficulty for cell observation, and affects cell viability.

With VitroINK Mixing Kit, cells can be prepared with VitroINK bionk for a 3:1 mixing ratio using the 3 mL syringe or a 10:1 mixing ratio using the 1 mL syringe. To prepare the bioprinter cartridge, the VitroINK and cell suspension are placed in the mixer and are dispensed through the the mixing head. Wait 10-20 minutes for the mixture to stabilize and the cartridge is ready for printing. There is no UV, no temperature/pH curing, or chemical cross-linking for the VitroINK system. Adding cell culture medium to cover the printed structure can further stabilize and support cell growth. The bioprinted cells are ready for incubation.

Why VitroINK Mixing Kit?

EASY-TO-USE: Simply connect the syringes of the bioink and cells for sample preparation

REDUCE AIR BUBBLES: Dramatically reduce air bubbles for smooth 3D bioprinting

ROBUST MIXING RESULTS: Achieve homogeneous mixture consistantly

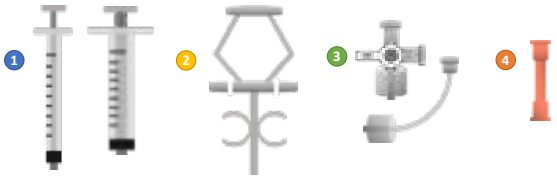
SPECIFICATIONS

- Disposable mixing kit components for VitroINK bioink:
- (1) Dispenser
- (1) 1 mL syringe
- (1) 3 mL syringe
- (1) connector and tubing
- (1) mixing head
- Sterile
- Use for 3:1 or 10:1 mixing ratio

Product	Size	SKU #
VitroINK Mixing Kit	Complete Pack	IMK00-1
	3:1 Mixing Component Pack	IMK03-1
	10:1 Mixing Component Pack	IMK01-1

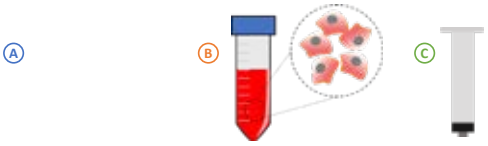
VitroINK Mixing Kit – Complete Pack comes with the following:

1. 3 mL syringe & 1 mL syringe
2. Dispenser
3. Connector and tubing
4. Mixing head



You need:

- (A) VitroINK
- (B) Cell suspension in a culture medium
- (C) Your bioprinter cartridge



Pioneering 3D biomicking platforms to drive advanced biomedicine and improve personalized medicine for every patient.

At TheWell Bioscience, we believe every person is unique and personalized medicine can improve the quality of life for every patient. We focus on driving advanced biomedicine with our 3D biomimicking platforms for precision medicine, cell therapy, and bioprocessing. As a pioneer of the xeno-free 3D cell platform, we mimic the human microenvironment for organoid formation, stem cell scale-up, and smart cell delivery system. By working with scientists from academia, hospitals, and pharma industries, we aim to improve biomedicine for patients worldwide.

Our xeno-free hydrogel system (VitroGel®) can closely mimic the natural extracellular matrix and open the door to clinical applications for 3D organoid models. Cells from different sources such as patient-derived cells can be cultured with our system with full lab automation potential for personalized 3D cell models, including highly complicated organoid models and co-culture systems.

Our technology can go beyond the 3D cell model by using it for 3D bioprinting of tissue-engineered medical products, injectable adjuvant to achieve better cell retention and higher cell viability for cell therapy, and 3D stem cell scale-up system for large-scale cell/bioproduct manufacturing.

Additional resources can be found on our website at www.thewellbio.com under the "Resources" menu.

- Frequently Asked Questions
- Protocols & Guidelines
- Video Protocol Demonstration
- Application Notes
- Research Highlights
- Publications/Citations

Customize 3D Cell Culture Services

- Organoid
- Drug Screening
- 3D Tissue Models
- Invasion Assay
- Co-Culturing
- Stem Cells and MSCs

Customized Functional Hydrogel/Bioink

- Customized hydrogel strength
- Customized functional hydrogel
- Customized functional bioinks
- Customized pre-mix ratios of VitroGel
- Fluorescent hydrogel
- Hydrogel property tests

Contact sales@thewellbio.com for more information.

TheWell BIOSCIENCE

Pioneering 3D biomicking platforms
to drive advanced biomedicine and improve
personalized medicine for every patient.

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