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MedChemExpress

Organoid Culture

High Purity | Superior Biological Activity | Excellent Lot-to-Lot Consistency
GMP-Grade Proteins | Low Endotoxin Levels

Organoid Culture

Organoids are three-dimensional microtissues cultured *in vitro* that can closely mimic the structures and functions of real organs. Different from traditional two-dimensional disease models, organoids simulate the *in-vivo* environment more accurately, making them invaluable for understanding disease progression, maintaining homeostasis, and elucidating pathogenic mechanisms. Therefore, they are widely used in various fields, such as basic research, disease modeling, drug screening, and regenerative medicine.

MedChemExpress (MCE) provides a wide range of high-quality products for organoid culture. Our offerings include **recombinant proteins, small-molecule inhibitors, peptides, matrix gels, culture media, as well as reagents essential for tissue preservation and digestion**. All our products ensure batch-to-batch stability and reliability, allowing you to select the most suitable ones according to your specific requirements.

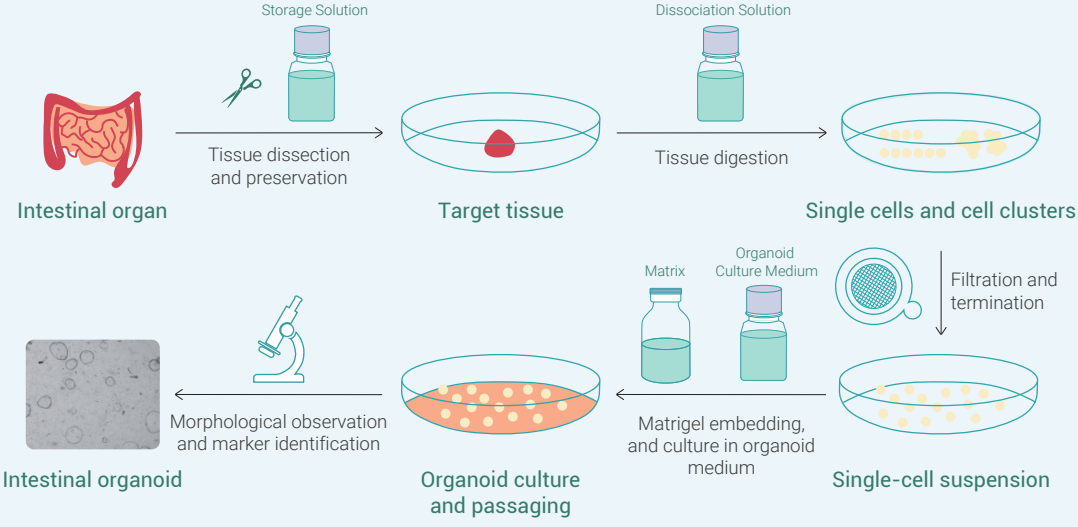

Figure 1. Organoid Culture Workflow.

Key Elements of Organoid Culture

01 Fresh Tissue Sample

Under the strict observance of laws, regulations, and ethical guidelines, **fresh tissue samples** are selected to ensure their biological activity. Depending on the research requirements, appropriate sampling methods (such as surgical excision or percutaneous biopsy) are utilized to procure tissue samples of optimal size. Subsequently, these samples are meticulously preserved and transported using specialized tissue preservation solutions, thereby safeguarding the viability of tissue cells throughout the process.

02 Culture Reagents and Operating Techniques

Within a sterile workspace, gently rinse the tissue sample with sterile PBS to eliminate surface contaminants. Subsequently, use sterile scissors to mince the tissue sample into small pieces. Then, introduce tissue digestion enzymes to initiate cell digestion. While the digestion is underway, closely observe its progress and **halt the reaction at the right moment** to avoid excessive digestion. Finally, transfer the isolated single cells into the suitable culture medium for propagation.

Proteins for Organoid Culture

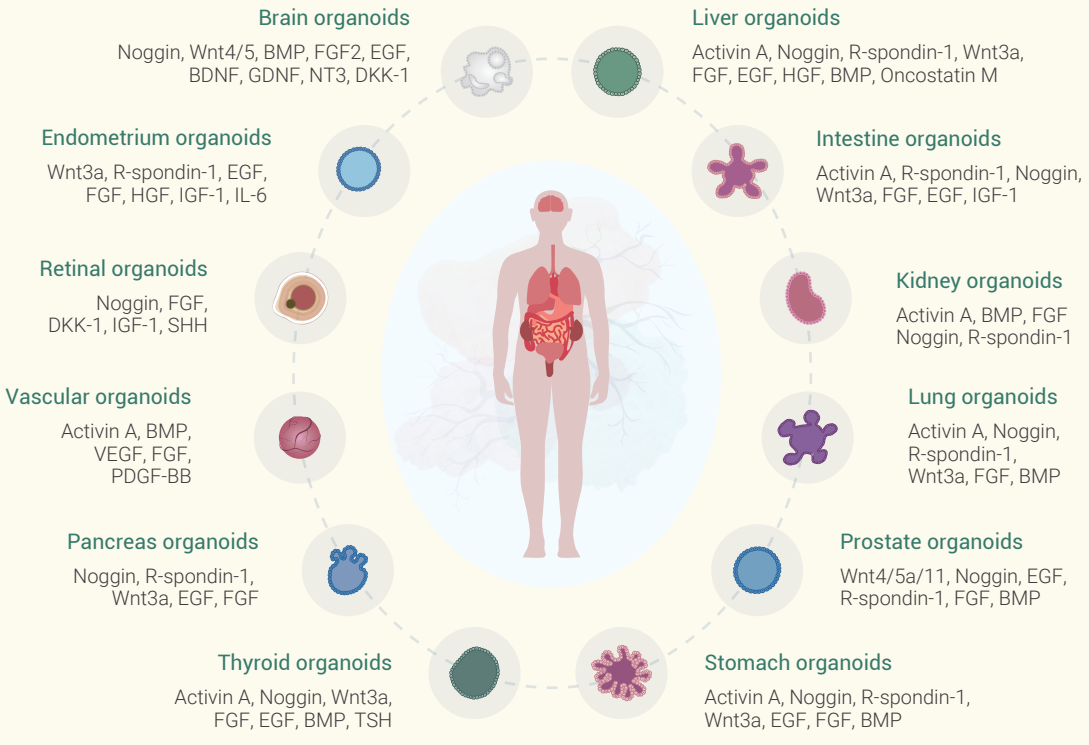

Figure 2. Recombinant proteins required for various organoid cultures.

Organoid Related Products

01 Small Molecules/ Peptides

Product Name	Cat. No.	Function
Gastrin	HY-P1097	A hormone with mitogenic effect on gastric cells, used in stomach organoids culture.
Laduviglusib	HY-10182	A selective GSK3 inhibitor that can be used for the generation of organoid.
Y-27632	HY-10583	A ROCK inhibitor, used to increase the proliferation and reduce apoptosis of progenitor cells.
A 83-01	HY-10432	An inhibitor for TGF-β type I receptor ALK5 and the Activin/Nodal receptor ALK4 and ALK7.
SB-431542	HY-10431	A selective TGF-β type I Receptor inhibitor, that can be used to prevent spontaneous differentiation of mouse embryonic stem cells when added to the culture medium.

02 Recombinant Proteins

Proteins Category	Function	Product Name	Cat. No.
Wnt	An essential niche component for maintaining the proliferation of Lgr5-positive stem cells in various organoids, such as the intestinal, gastric, pancreatic and liver organoids.	Human Wnt3a Surrogate	HY-P70453C
EGF	A growth factor for epithelial tissues that binds to EGF receptors, inducing hyperplasic changes. It is used for the generation of intestinal, liver, thyroid, and brain organoids.	Human EGF Mouse EGF	HY-P7109 HY-P70590
Noggin	An inhibitor of bone morphogenetic proteins that modulates cellular differentiation, proliferation, and apoptosis.	Human Noggin Mouse Noggin	HY-P7051A HY-P7086
R-spondin	The ligand of Lgr5 and a niche factor that is required for the self-renewal of stem cells and activates Wnt signaling. An essential additive of the organoid culture system.	Human R-spondin-1 Mouse R-spondin-1	HY-P7114 HY-P76012
FGF	FGFs play crucial roles in a wide variety of cellular functions, including cell proliferation, survival, metabolism, morphogenesis, and differentiation, as well as in tissue repair and regeneration. In a 3D extracellular matrix, FGF-2, FGF-7, FGF-9, and FGF-10 promote lung organoid formation.	Human FGF-4 Human FGF-7 Human FGF-9 Human FGF-10 Human FGF-19 Human FGF-basic/ FGF-2	HY-P7014 HY-P7047A HY-P7177 HY-P70695 HY-P7172 HY-P7004
BMP	BMPs play crucial roles in embryogenesis and development, as well as the maintenance of adult tissue homeostasis. BMP-2 and BMP-4 are widely used in in vitro generation of hepatic cells from iPSCs and ESCs.	Human BMP-4 Human BMP-7 Human/Mouse/ Rat BMP-2	HY-P7007 HY-P7008 HY-P7006
VEGF	VEGF-A is required during embryogenesis to regulate the proliferation, migration, and survival of endothelial cells. It is used in the generation of vascular organoids.	Human VEGF-A Mouse VEGF-A	HY-P7420 HY-P7312
PDGF	PDGF-BB induces vascular smooth muscle cells (VSMC) specification and cell differentiation in the vascular.	Mouse PDGF-BB	HY-P70699A
HGF	A known hepatocyte mitogen that can be used for the liver organoid culture.	Human HGF	HY-P7121
Activin A	A cytokine with multiple roles in cell development and homeostasis. In the case of intestinal organoids, it activates TGF-β signaling in PSCs to trigger endodermal differentiation.	Human/Mouse/ Rat Activin A	HY-P70311
DKK	A canonical WNT inhibitor that can induce self-organization of retinal progenitors.	Human DKK-1	HY-P7155A
IGF-I	IGF-I/IGF-1 coordinates proliferation, differentiation, and maturation of neuroepithelial precursor cells. IGF-1 facilitates the generation of retinal organoids that display the typical laminated structure and photoreceptor maturation.	Human IGF-I/IGF-1 Mouse IGF-I/IGF-1	HY-P7018 HY-P7070

03 Basement Membrane Matrix

Cat. No.	Product Name	Application
HY-K6001	Basement Membrane Matrix (Phenol Red)	*In vitro* angiogenesis, tumor cell migration or invasion.
HY-K6002	Basement Membrane Matrix	*In vitro* angiogenesis, tumor cell migration or invasion.
HY-K6003	Basement Membrane Matrix GFR (Phenol Red)	Organoid culture, *in vitro* angiogenesis.
HY-K6004	Basement Membrane Matrix GFR	Organoid culture, *in vitro* angiogenesis.
HY-K6005	Basement Membrane Matrix HC (Phenol Red)	Transplantation/induction of tumorigenic models such as PDX, CDX.
HY-K6006	Basement Membrane Matrix IPSC-qualified	Stem cell expansion and differentiation.
HY-K6007	Basement Membrane Matrix for Organoid Culture	Organoid culture.
HY-K6008	Basement Membrane Matrix HC	Animal models and 3D tumor models construction.
HY-K6009	Basement Membrane Matrix GFR&HC	Reduces growth factor-induced cell culture.

04 Organoid Culture Kits

	Cat. No.	Product Name	Cat. No.	Product Name
Tumor Organoid Medium	HY-K6101	Human Breast Cancer Organoid Kit	HY-K6107	Human Cervical Cancer Organoid Kit
	HY-K6102	Human Lung Adenocarcinoma Organoid Kit	HY-K6108	Human Esophageal Cancer Organoid Kit
	HY-K6103	Human Small Cell Lung Cancer Organoid Kit	HY-K6109	Human Endometrial Cancer Organoid Kit
	HY-K6104	Human Colorectal Cancer Organoid Kit	HY-K6110	Human Pancreatic Cancer Organoid Kit
	HY-K6105	Human Gastric Cancer Organoid Kit	HY-K6111	Human Head and Neck Squamous Cell Carcinoma Organoid Kit
	HY-K6106	Human Cholangiocarcinoma Organoid Kit	HY-K6124	Human Hepatocellular Carcinoma Organoid Kit
Normal Tissue Organoid Culture Medium	HY-K6112	Human Colonic Organoid Kit	HY-K6117	Human Liver Ductal Organoid
	HY-K6113	Human Intestinal Organoid Kit	HY-K6118	Mouse Liver Ductal Organoid
	HY-K6114	Human Gastric Epithelial Organoid Kit	HY-K6119	Mouse Intestinal Organoid Kit
	HY-K6115	Human Pancreatic Organoid Kit	HY-K6120	Mouse Colonic Organoid Kit
	HY-K6116	Human Kidney Tubular Organoid Kit		

05 Reagents for Organoid Research

Product Name	Cat. No.	Application
Tissue Storage Solution	HY-K6010	Used for the short-term storage or transportation of primary tissue samples, effectively prevents cell apoptosis, necrosis, and other detrimental processes during storage or transport.
Tissue Dissociation Solution	HY-K6012	Able to gently and efficiently dissociate tissue samples into cell suspensions or cell aggregates.
Organoid Dissociation Solution	HY-K6013	Widely used for routine dissociation and passaging of organoids derived from various mammals (including human, mice, pigs, cows, and more).
Organoid Cryopreservation Medium (Serum Free)	HY-K6014	A ready-to-use cryopreservation medium, widely applicable to organoids and cell lines derived from various mammals (such as human, mouse, pig, cow, etc.).
Organoid Recovery Solution	HY-K6015	A ready-to-use solution that isolates organoids from Matrigel, allowing for the collection of intact organoids.
Organoid Vitality Assay Kit	HY-K6016	The metabolic reductases in live cells of organoids reduce the weakly fluorescent blue dye in the kit to a strongly fluorescent red product. Detection wavelength: Ex/Em = 560 nm/590 nm.
3D Cell-ATP Viability Detection Kit	HY-K6017	The intensity of the luminescent signal is proportional to the ATP content within a certain range.
Bi-27 Serum-free Supplement (50×)	HY-K3013A	Used to support the low- or high-density growth and short- or long-term viability of embryonic cells, and to mitigate reactive oxidative damage in cells.

Experiment Validation

- **Biological activity of the recombinant protein**

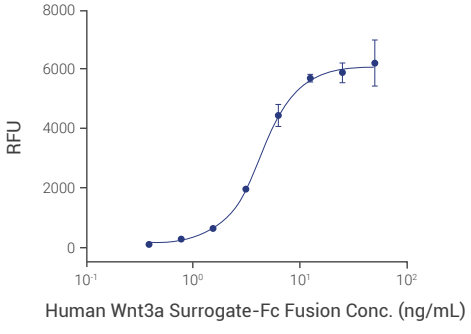

Figure 3. Human Wnt3a Surrogate (HY-P70453C) induces Topflash reporter activity in HEK293T cells with an ED_{50} of 5.2 ng/mL.

- **Basement Membrane Matrix IPSC-qualified (HY-K6006)**

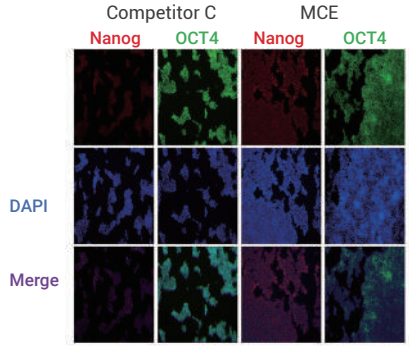

Figure 4. Embryonic stem cells are cultured under Basement Membrane Matrix IPSC-qualified (HY-K6006), and expresses the signature proteins OCT4 and Nanog (cellular immunofluorescence detection).

• Construction of 3D tumor models (HY-K6005)

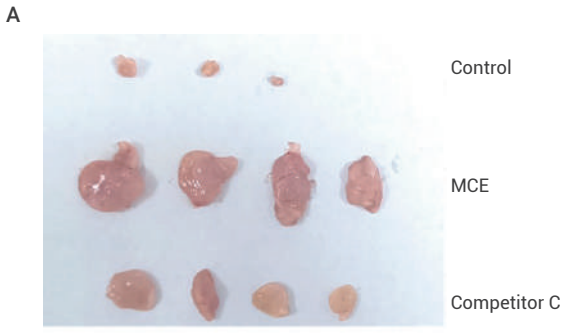

Figure 5A. Balb/c-nu mice were subcutaneously transplanted with MIA-PaCa-2 cells mixed 1:1 with HY-K6005 and the tumor formed at day 17.

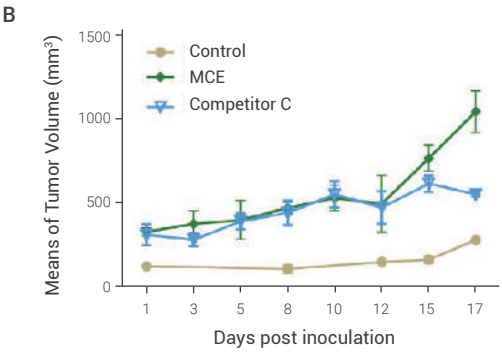

Figure 5B. The MIA-PaCa-2 tumor growth curves for 17 days.

• Organoid culture

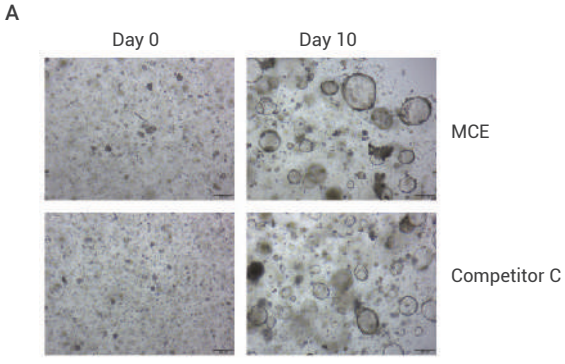

Figure 6A. Generation of human colorectal cancer organoid. (HY-K6004 Basement Membrane Matrix GFR with HY-K6104 Human Colorectal Cancer Organoid Kit)

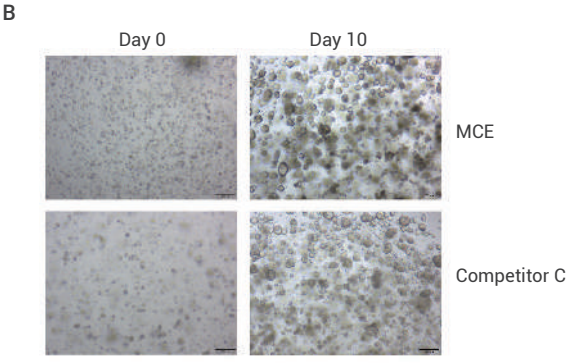

Figure 6B. Generation of human gastric cancer organoid. (HY-K6007 Basement Membrane Matrix for Organoid Culture with HY-K6105 Human Gastric Cancer Organoid Kit)

Customer Validation

• Tumor invasion assay (HY-K6001)

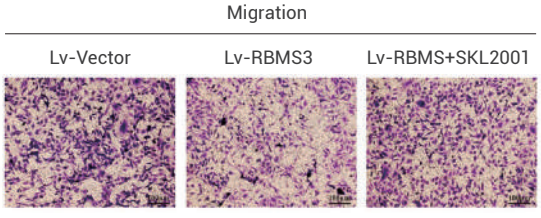

Figure 7. After overexpression of RBMS3 and activation of the Wnt/β-catenin signaling pathway, the migratory activity of ID8 cells was detected by transwell assay.
The ability of ID8 cells to penetrate the basement membrane matrix reflects the ability of the cells to invade.
(**Heliyon**. 2024 May 1;10(9):e30603.)

• Tube formation assay (HY-K6002)

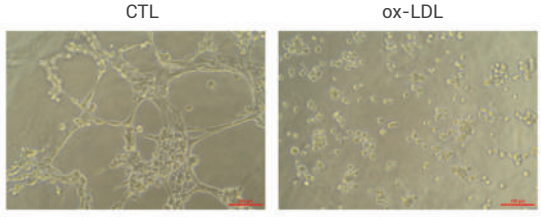

Figure 8. Tube formation capacity was assessed by tube formation assay after ox- LDL treatment.
On basement membrane matrix, endothelial cells can form capillary-like structures. The results showed that after 24 h of exposure to 35 μg/mL ox-LDL, tube formation capability markedly declined.
(**FASEB J.** 2024 Jul 15;38(13):e23806.)

• Organoid Drug Sensitivity Assay

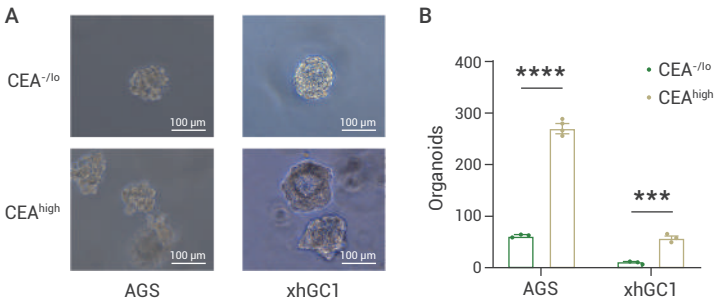

Figure 9. CEA^{high} GC cells exhibits increased Oxaliplatin chemoresistance.

AGS (human gastric adenocarcinoma cell line) and xhGC1 (patient-derived xenograft cells) cells were separately seeded into 24-well culture plates at a ratio of 1,000 cells per 30 μL of Basement Membrane Matrix GFR (HY-K6004). After polymerization of the matrix, the cells were cultured with human gastric cancer organoid culture medium (HY-K6105). The effect of Oxaliplatin (HY-17371) on the viability of organoids with different carcinoembryonic antigen (CEA) expression levels was evaluated. (**Drug Resist Updat.** 2025 Jan;78:101179.)

• Recombinant proteins for organoid culture

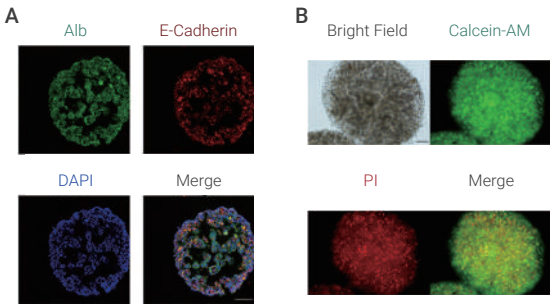

Figure 10. Droplet-engineered organoids (DEOs) were derived from mouse liver tissues (A) and human liver tumors (B). The organoids were cultured in the corresponding culture medium. (**Fundam Res.** 2022 Jun 3;4(6):1506-1514.)

For mouse liver DEOs

- Basal medium DMEM/F12 supplemented with 20% FBS
- Noggin (HY-P7086)
- R-spondin 1 (HY-P76012)
- SB431542 (HY-10431)
- FGF4 (HY-P72649)
- FGF-basic (HY-P7066)

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For human liver tumor DEOs

- Basal medium DMEM/F12 supplemented with 20% FBS
- Noggin (HY-P70558)
- R-spondin 1 (HY-P72784)
- FGF-basic (HY-P7004)

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Publications Citing Use of MCE Products

[1] **Fu ML, et al. Advanced Functional Materials.** 2024 Oct; 34(46)

[2] **Chen Y, et al. Drug Resist Updat.** 2025 Jan;78:101179.

[3] **Chen B, et al. Autophagy.** 2025 Mar 24:1-20.

[4] **Bai S, et al. Theranostics.** 2025 Jan 1;15(1):86-102.

[5] **Wang B, et al. J Transl Med.** 2025 Jan 13;23(1):48.

[6] **Wang X, et al. FASEB J.** 2024 Jul 15;38(13):e23806.

[7] **Song MK, et al. J Inflamm Res.** 2025 Mar 10;18:3469-3484.

[8] **Zhang Y, et al. Mol Cancer Res.** 2024 Dec 3;22(12):1102-1116.

[9] **Hu X, et al. Oncol Rep.** 2024 Dec;52(6):173.

[10] **Wang D, et al. ACS Omega.** 2024 Jan 16;9(4):4974-4985.

[11] **Yin T, et al. Heliyon.** 2024 May 1;10(9):e30603.

[12] **Cui X, et al. PLoS Negl Trop Dis.** 2024 Dec 12;18(12):e0012714.

[13] **Wang H. Discov Oncol.** 2025 Jan 9;16(1):27.

[14] **Zhang Y, et al. Cell Biochem Biophys.** 2025 Jan 11.

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