

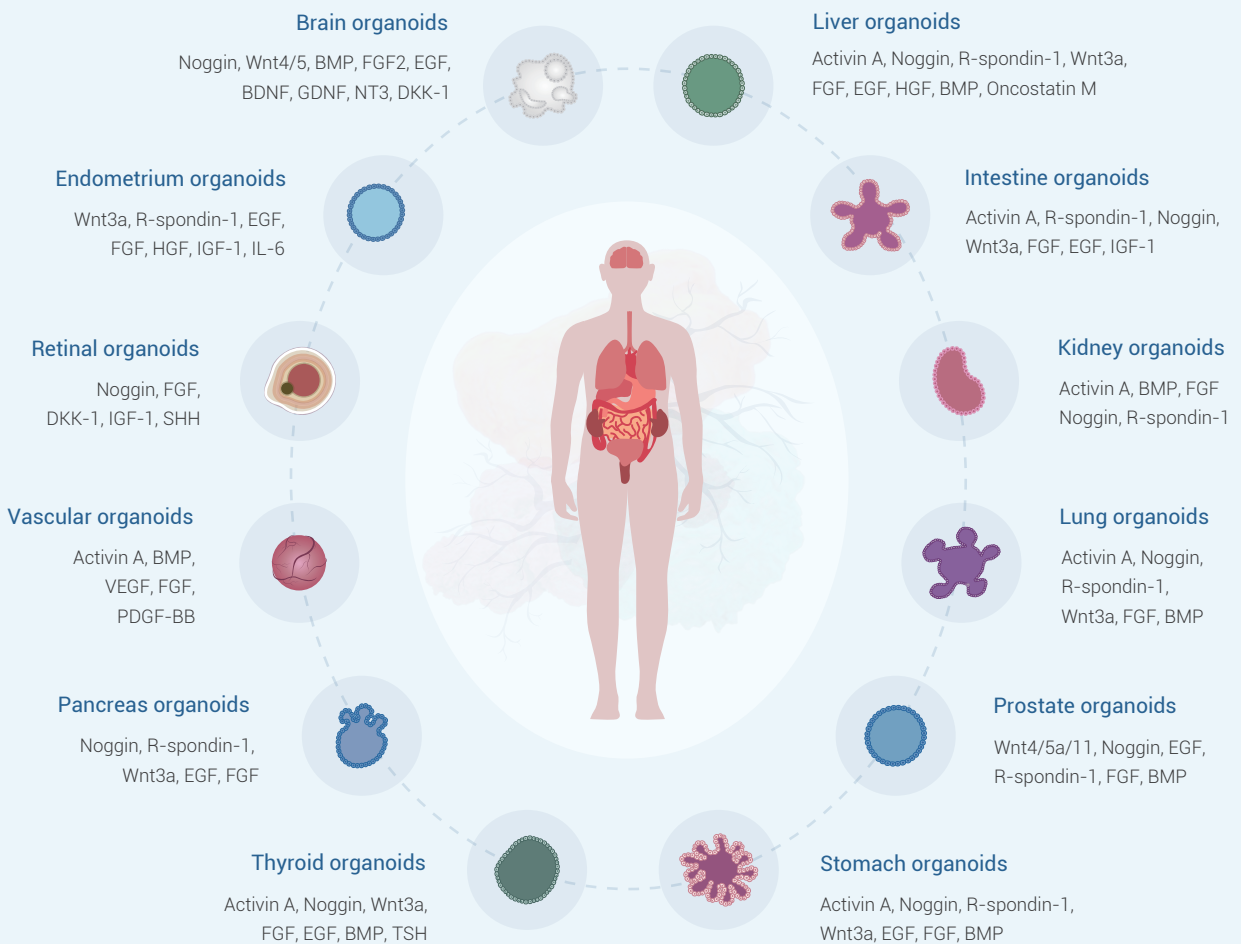
## Organoid Culture

An organoid is an *in vitro* 3D multicellular tissue construct that mimics the complex structure and functionality of the corresponding organ.

Organoids recapitulate multiple tissue-specific biological parameters including the spatial organization of heterogeneous tissue-specific cells, cell-cell interactions, cell-matrix interactions, and certain physiological functions. They are more physiologically relevant than monolayer culture models and are far more amenable to manipulation of niche components, signaling pathways and genome editing than *in vivo* models.

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

## Proteins for Organoid Culture



## Organoid Related Products

### Inhibitors/Agonists

Product Name	Cat. No	Function
<b>Gastrin</b>	HY-P1097	A hormone with mitogenic effect on gastric cells. Used in stomach organoids culture.
<b>Laduviglusib</b>	HY-10182	A selective GSK3 inhibitor that can be used for the generation of organoid.
<b>Y-27632</b>	HY-10583	A ROCK inhibitor; used to increase the proliferation and reduce apoptosis of progenitor cells.
<b>A 83-01</b>	HY-10432	An inhibitor of TGF- $\beta$ type I receptor ALK5, the Activin/Nodal receptor ALK4 and ALK7.
<b>SB-431542</b>	HY-10431	A selective TGF- $\beta$ type I Receptor inhibitor; the addition of SB431542 in the culture medium prevents spontaneous differentiation of mouse embryonic stem cells.

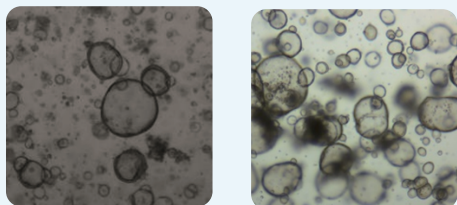
## Recombinant Proteins

Proteins Category	Function	Product Name	Cat. No
<b>Wnt</b>	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.	<b>Human Wnt3a Surrogate</b> <b>Human Wnt3a</b>	HY-P70453C HY-P70453A
<b>EGF</b>	A growth factor for epithelial tissues; binding to EGF receptors, induces hyperplastic changes. Used for the generation of intestinal, liver, thyroid, and brain organoids.	<b>Human EGF</b> <b>Mouse EGF</b>	HY-P7109 HY-P70590
<b>Noggin</b>	An inhibitor of bone morphogenetic proteins that modulates cellular differentiation, proliferation, and apoptosis.	<b>Human Noggin</b> <b>Mouse Noggin</b>	HY-P7051A HY-P7086
<b>R-spondin</b>	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.	<b>Human R-spondin-1</b> <b>Mouse R-spondin-1</b>	HY-P7114 HY-P76012
<b>FGF</b>	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.	<b>Human FGF-4</b> <b>Human FGF-7</b> <b>Human FGF-9</b> <b>Human FGF-10</b> <b>Human FGF-19</b> <b>Human FGF-basic/ FGF-2</b>	HY-P7014 HY-P7047A HY-P7177 HY-P70695 HY-P7172 HY-P7004
<b>BMP</b>	BMPs play crucial roles in embryogenesis and development, and also in maintenance of adult tissue homeostasis. BMP-2 and BMP-4 are widely used in in vitro generation of hepatic cells from iPSCs and ESCs.	<b>Human BMP-4</b> <b>Human BMP-7</b> <b>Human/Mouse/ Rat BMP-2</b>	HY-P7007 HY-P7008 HY-P7006
<b>VEGF</b>	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.	<b>Human VEGF-A</b> <b>Mouse VEGF-A</b>	HY-P7420 HY-P7312
<b>PDGF</b>	PDGF-BB induces vascular smooth muscle cells (VSMC) specification and cell differentiation in the vascular.	<b>Mouse PDGF-BB</b>	HY-P70699
<b>HGF</b>	A known hepatocyte mitogen that can be used for the liver organoid culture.	<b>Human HGF</b>	HY-P7121
<b>Activin A</b>	A cytokine with multiple roles in development and homeostasis. In the case of intestinal organoids, it activates TGF- $\beta$ signaling in PSCs to trigger endodermal differentiation.	<b>Human/Mouse/ Rat Activin A</b>	HY-P70311
<b>DKK</b>	A canonical WNT inhibitor that can induce retinal progenitors for self-organization.	<b>Human DKK-1</b>	HY-P7155A

**HY-K6004** Basement Membrane Matrix GFR (Left)

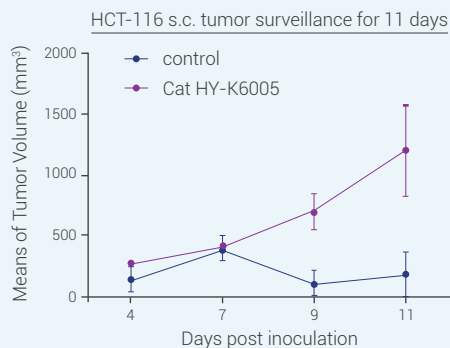
**HY-K6007** Basement Membrane Matrix for Organoid Culture (Right)

Culture of mouse intestinal organoid Day 9



**HY-K6005** Basement Membrane Matrix HC (Phenol Red)

Subcutaneous tumor formation in 4-5 week old BALB/c-nu mice Day 9

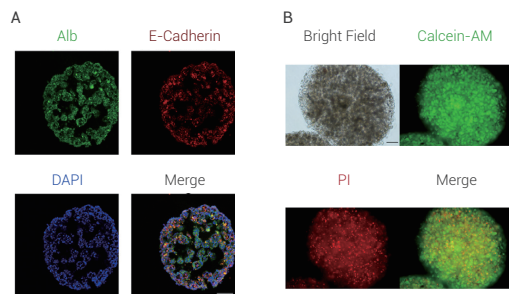


## Example — Generation of Reproducible Kidney Organoids.

### Experimental Details

Droplet-engineered organoids (DEOs) were derived from mouse liver tissues and human liver tumors. The organoids were cultured in the corresponding culture medium. For mouse liver DEOs: Basal medium DMEM/F12 supplemented with 20% fetal bovine serum (HY-T1000), 1% Penicillin-Streptomycin, 100 ng/mL Noggin (HY-P7086), R-spondin 1 (HY-P76012), EGF, SB431542 (HY-10431), CHIR99021, FGF4 (HY-P72649), FGF-basic (HY-P7066), Y-27632, etc.

For human liver tumor DEOs: basal medium DMEM/F12 supplemented with 20% FBS, 1% Penicillin-Streptomycin, Noggin (HY-P70558), R-spondin 1 (HY-P72784), EGF, FGF-basic (HY-P7004), Y-27632, etc.



MCE Products Cited in Haoran Zhao, et al. Fundamental Research. [m5GeSdc; June 8, 2022; 12:37]

### References:

- [1] *Exp Hematol Oncol.* 2018 Dec 5;7:30. [2] *Nat Rev Mol Cell Biol.* 2020 Oct;21(10):571-584. [3] *Development.* 2020 Dec 24;147(24):dev189746.  
[4] Haoran Zhao, et al. *Fundamental Research.* [m5GeSdc; June 8, 2022; 12:37]

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Proteins Category	Function	Product Name	Cat. No
IGF-I	IGF-I/IGF-1 coordinate 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	HY-P7018
		Mouse IGF-I/IGF-1	HY-P7070

### Basement Membrane Matrix

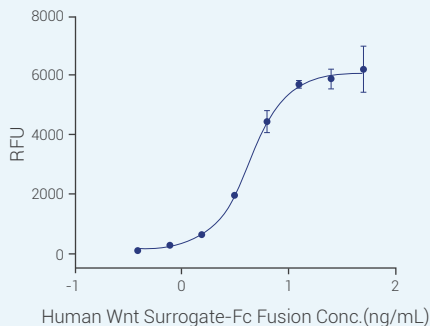
Cat. No	Product Name	Application
HY-K6001	Basement Membrane Matrix (Phenol Red)	In vitro angiogenesis, tumor cell migration or invasion
HY-K6002	Basement Membrane Matrix	In vitro angiogenesis, tumor cell migration or invasion
HY-K6003	Basement Membrane Matrix GFR (Phenol Red)	Organoid culture, in vitro 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

### Organoid Culture Kit

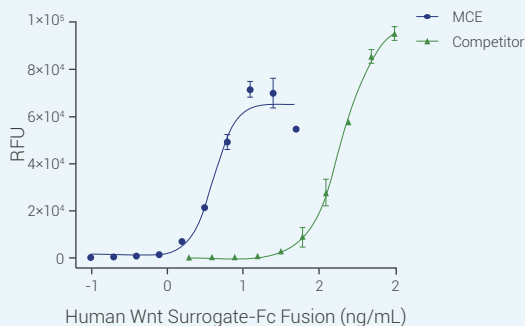
	Cat. No	Types of tissue	Cat. No	Types of tissue
Tumor Organoid Medium	HY-K6101	Human breast cancer	HY-K6106	Human Cholangiocarcinoma
	HY-K6102	Human Lung Adenocarcinoma	HY-K6107	Human Cervical Cancer
	HY-K6103	Human Small Cell Lung Cancer	HY-K6108	Human Esophageal Cancer
	HY-K6104	Human Colorectal Cancer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

## Experiment validation

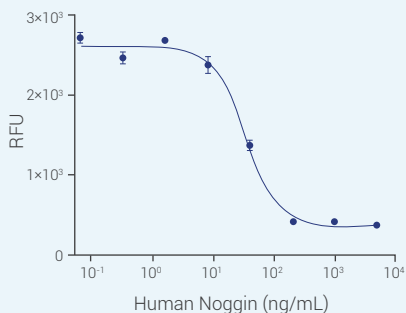
Measured by its ability to induce Topflash reporter activity in HEK293T human embryonic kidney cells. The ED<sub>50</sub> for this effect is 5.2 ng/mL.



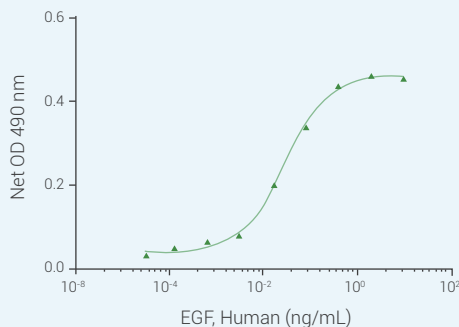
The ED<sub>50</sub> of human Wnt Surrogate from MCE's each Lot is lower than of Competitor P.



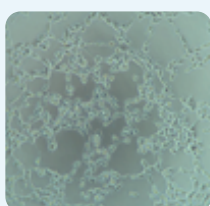
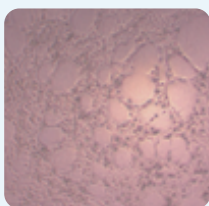
Measured by its ability to inhibit BMP-4-induced alkaline phosphatase production by ATDC5 mouse chondrogenic cells in the presence of Recombinant Human BMP-4 (40 ng/mL), with an ED<sub>50</sub> of 4 ng/mL.



The ED<sub>50</sub> is <0.2 ng/mL as measured by murine BALB/c 3T3 cells.



HY-K6001 Basement Membrane Matrix (Phenol Red) (Left)  
HY-K6002 Basement Membrane Matrix (Right)  
Angiogenesis in HUVEC cells 4 h



HY-K6004 Basement Membrane Matrix GFR (Left)  
HY-K6007 Basement Membrane Matrix for Organoid Culture (Right)  
Culture of mouse intestinal organoid Day 6

