

# FGF-Max (Recombinant human FGF-1/FGF-2 chimera)

Universal FGFR ligand as FGF-1 is a novel choice for organoid cultures

## What is FGF-Max?

The family of fibroblast growth factors (FGFs) are composed of the growth factors involved in a variety of vital phenomena, including development, differentiation, proliferation, and morphogenesis. FGF-1~FGF-10 transmits signals into cells by binding to the FGF receptor (FGFR). Previous publications have suggested the FGF/FGFR signaling pathway is deeply involved in many processes from embryonic development to adult homeostasis.

Activation of FGF/FGFR signaling pathway is also known to be important in organoid cultures. However, proper selection of different FGFR ligands for each organ type is necessary while organoid culture, complicating experimental set up and execution. Therefore, using the universal FGFR ligand "FGF-1", which shows highly affinity to all the type of FGFR, is expected to be a simple and convenient method for organoid culture. However, FGF-1 is known to be thermally unstable, and at 37 °C, which cell-culture is normally being held, the bio-activity is lost within 6 hours, including in the presence of heparin. These factors results in commercially available FGF1 being unable to be used in culture studies.

To solve the problem, MBL enhanced the thermal stability of universal FGFR ligand "FGF-1" by chimerizing FGF-1 and FGF-2 and developed FGF-Max, a recombinant chimeric protein with features of both FGF-1 and FGF-2.

- High bioactivity
- High cell viability
- High thermal stability

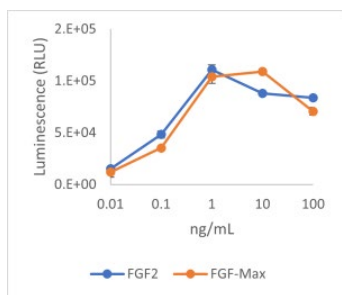
FGF subfamily	FGF	Cofactor	Receptor specificity
FGF1 subfamily	FGF1 FGF2	+ Heparin or Heparan sulfate	[ All FGFRs [ FGFR 1c, 3c > 2c, 1b, 4Δ
FGF4 subfamily	FGF4 FGF5 FGF6		[ FGFR 1c, 2c > 3c, 4Δ
FGF7 subfamily	FGF3 FGF7 FGF10 FGF22		[ FGFR 2b > 1b
FGF8 subfamily	FGF8 FGF17 FGF18		[ FGFR 3c > 4Δ > 2c > 1c >> 3b
FGF9 subfamily	FGF9 FGF16 FGF20		[ FGFR 3c > 2c > 1c, 3b >> 4Δ
FGF15/19 subfamily	FGF15/19 FGF21 FGF23	+βKlotho +αKlotho	[ FGFR 1c, 2c, 3c, 4Δ [ FGFR 1c, 3c [ FGFR 1c, 3c, 4

Product Code	Product Name	Formulation	Size
J2-003	FGF-Max (Recombinant human FGF-1/FGF-2 chimera)	Lyophilized from 20 mM Tris-HCl (pH7.4) containing 0.5 M NaCl and 1% Trehalose.	50 µg

\*For most up to date product information and protocols, please visit [mblintl.com](http://mblintl.com).

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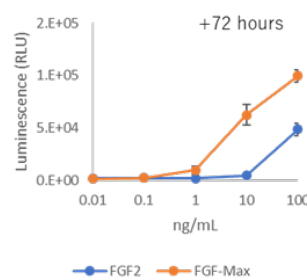
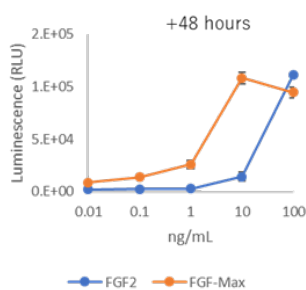
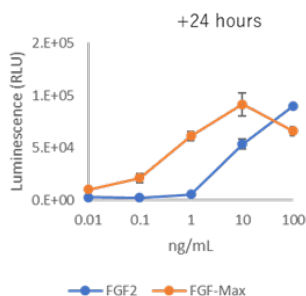
# Assay and organoid culture examples using FGF Max



FGF-Max and FGF-2 (commercially available products) were added to the cells at different concentration and cultured for 6 h. The result shows that FGF-Max has the bio-activity in the same level with FGF-2.

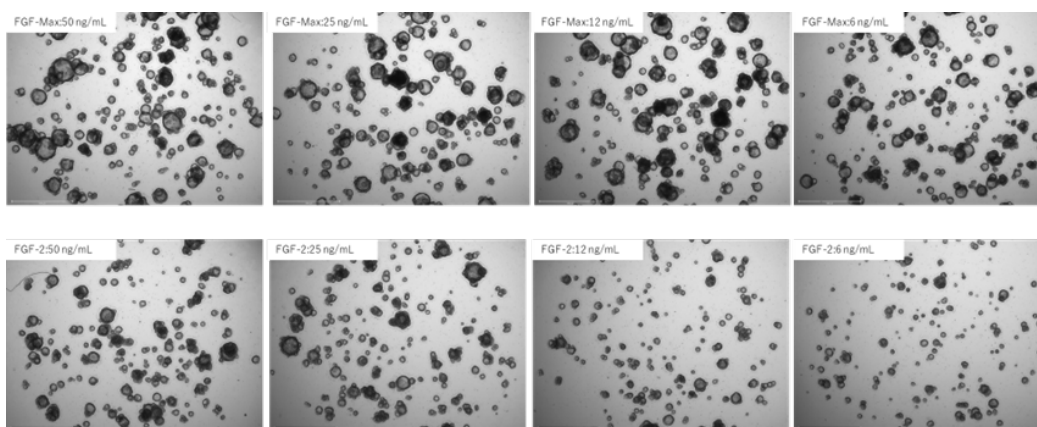
## Thermal stability evaluation

After pre-incubation of FGF-Max and FGF-2 (commercially available product) at 37°C for 24 h, 48 h, and 72 h, they were added to the cells for bio-activity assessment. The results suggested that FGF-Max retained higher bio-activity after pre-incubation compared to FGF-2 which also proves that FGF-Max has higher thermostability than FGF-2



## Human small intestinal organoid cultures

Human small intestinal organoids were cultured in the presence of FGF-Max and FGF-2 (commercially available product). It was suggested that proliferation of organoids is higher in the presence of FGF-Max than FGF-2.



Data available for:

- Human small intestinal organoid cultures
- Mouse gastric organoids
- Mouse pancreatic organoids

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