

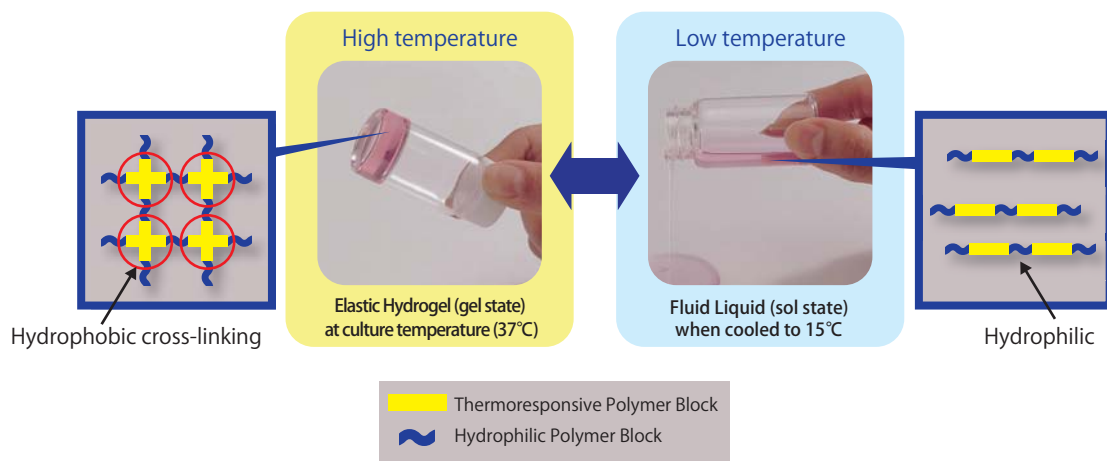
Mebiol® Gel

Thermoreversible Hydrogel

For 3D Cell Culture
And Other Applications

Thermoreversible Gelation Polymer (TGP)

Hydrogels are a diverse class of polymeric materials characterized by their network-like structure and high water content. Hydrogels of many kinds have found a wide variety of applications in medicine and life science research weighted towards, but not at all limited to three-dimensional cell culture, tissue engineering, and drug delivery. Properties highly favorable to cell culture and tissue engineering applications prompted the commercialization of Mebiol® Gel, a copolymer of poly (N-isopropylacrylamide) and poly (ethylene glycol) (PNIPAAm-PEG) for research purposes in the early 2000's.



Mebiol® Gel's defining feature, in contrast to other commercially available hydrogels, is its temperature reversible sol-gel transition. When cooled, Mebiol® Gel is a sol (handles like a liquid) but becomes a rigid hydrogel at higher temperatures. In practice, this means extremely easy cell handling. Cultures are seeded into cooled Mebiol® Gel and recovered conveniently by cooling the culture vessel and centrifugation. In the gel state, the highly lipophylic environment of the Mebiol® Gel presents an efficient niche for cell proliferation, cell communication, gas and mass exchange, and protection of cells and tissue from shear forces.

Mebiol® Gel Features

- Easy handling
- Non-toxic, biocompatible
- 100% synthetic, pathogen free
- High transparency for cell observation
- Proven performance



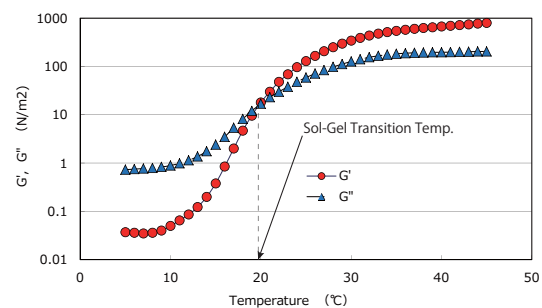
Mebiol® Gel is packaged as a dry powder in sterile culture flasks. Use Mebiol® Gel in the supplied flask or transfer to other vessels after rehydration.

Mebiol® Gel published applications include :

- Stem cells and pluripotent stem cell culture, expansion, and differentiation
- Spheroid culture
- Cell implantation
- Organ and tissue regeneration
- Drug delivery
- Non-cell culture applications
- Physical Properties



Dynamic Viscoelastic Property of Mebiol® Gel



Temperature dependence of the dynamic moduli of the aqueous solution of Mebiol® Gel at a concentration of 10 wt% in distilled water. Storage modulus (G' , solid lines) and loss modulus (G'' , broken lines) were measured on heating (closed symbols) and cooling (open symbols) at the oscillatory frequency of 1 Hz.

Concentration: 10 wt% in Distilled Water
Oscillatory Frequency: 1 Hz

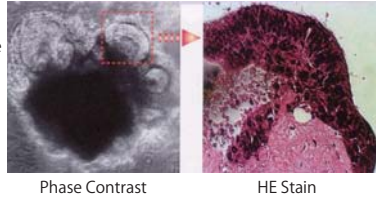
Application examples

1. Culture of primary cancer cells in Mebiol® Gel

In collagen and other 3D gel cultures, proliferation of primary cancer cells may be inhibited by fibroblast overgrowth. Importantly, fibroblasts do not readily grow in Mebiol® Gel, allowing selective proliferation of primary cancer cells for further analysis and characterization.

Figure 1

Cancerous human colon tissue cultured in Mebiol® Gel for 10 days. (Courtesy of Dr. S. Kubota, Dept. of General Surgery, St. Marianna University School of Medicine)

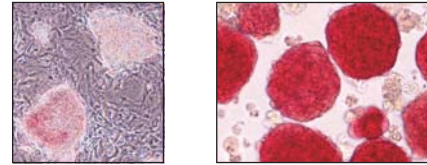


Phase Contrast

HE Stain

2. Stem Cell Culture

Macaca embryonic stem cells cultured on Mebiol® Gel without LIF (right panel) show morphology and alkaline phosphatase staining characteristic of undifferentiation compared to 2D feeder layer cultures (left panel).



2D culture on Feeder cells

3D Culture in Mebiol® Gel (Day 7)

Figure 2 Courtesy of Dr. K. Hishikawa, Dept of Clinical Renal Regeneration, University of Tokyo.

3. Spheroid Formation

Mebiol® Gel supports spheroid formation of cancer cell lines and iPS cells.

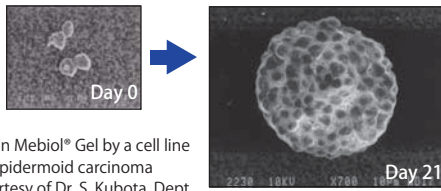


Figure 3

Spheroid formation in Mebiol® Gel by a cell line derived from mucoepidermoid carcinoma (cholangioma). (Courtesy of Dr. S. Kubota, Dept. of General Surgery, St. Marianna University School of Medicine)

4. Tissue Structure Preservation

Mebiol® Gel's protective environment helps to preserve tissue structure over long term culture.

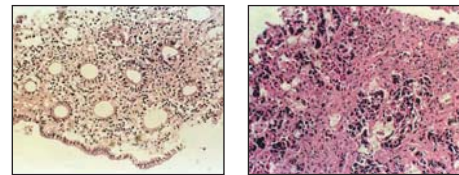


Figure 4 Left panel: Normal colonic mucosal tissue after culture on Mebiol® Gel for 7 days.

Right panel: Metastatic hepatic carcinoma tissue after culture in Mebiol® Gel for 21 days.

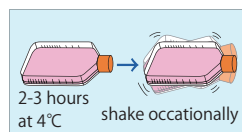
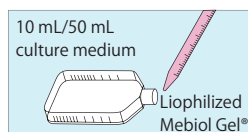
(Courtesy of Dr. S. Kubota, Dept. of General Surgery, St. Marianna University School of Medicine)

Preparation

Mebiol® Gel Usage (refer to package insert for details)

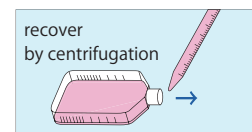
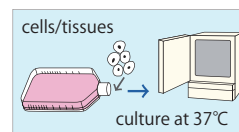
① Rehydration

Add 10 ml/50 ml of cold aqueous solution suitable to your application (e.g. culture medium, PBS). Insure all powder is wetted. Lay flask flat and stationary for several hours at 4°C, with occasional gentle shaking.



② Cell Culture and Recovery

Add cells or tissue to Mebiol Gel in the sol state (cold). Culture at 37°C. Recover cells or tissue by cooling culture vessel and diluting with 30-40 ml/150-200 ml cold fluid to prevent gelation. Centrifuge in cold.



Description	Cat. No.	Quantity	Storage
Mebiol® Gel	MBG-PMW20-1001-COS	1x10 mL	Room temperature
	MBG-PMW20-1005-COS	5x10 mL	
	MBG-PMW20-5001-COS	1x50 mL	
	MBG-PMW20-5005-COS	5x50 mL	

