

3D Stem Cell Culture in 5 minutes

Ready-to-use, xeno-free hydrogel to support both scale-up and 3D differentiation of hPSCs



High cell quality

Yields high-quality 3D stem cells with high success rate for downstream differentiation.



High expansion rate

Faster growth rate than traditional 2D culture with uniform spheroid sizes.



Easy cell harvesting

Simple and efficient cell harvesting by either centrifuge or the non-enzymatic VitroGel® Organoid Recovery solution.



Xeno-free

100% animal origin-free hydrogel system. Key for clinical applications.



5 minute protocol

Establishes 3D stem cell expansion **directly from liquid nitrogen with simple mixing steps**, no matrix coating required.



Compatible

Compatible with major stem cell culture media in the market.



VitroGel® STEM is a xeno-free (animal origin-free) hydrogel system developed to support both scale-up and 3D differentiation 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 a formulation that supports the rapid expansion of high-quality 3D stem cell spheroids with pluripotent properties. hPSCs thawed from liquid nitrogen or transferred from 2D matrix-coated culture vessels can be immediately mixed with the hydrogel for static suspension cultures. The optimized protocol is ideal for time-sensitive experiments, requiring minimal medium exchanges and saving time and resources. The resulting 3D stem cell spheroids can be used for sub-cultures, patterned differentiation, organoid development, or returning to 2D cultures.

Data and References

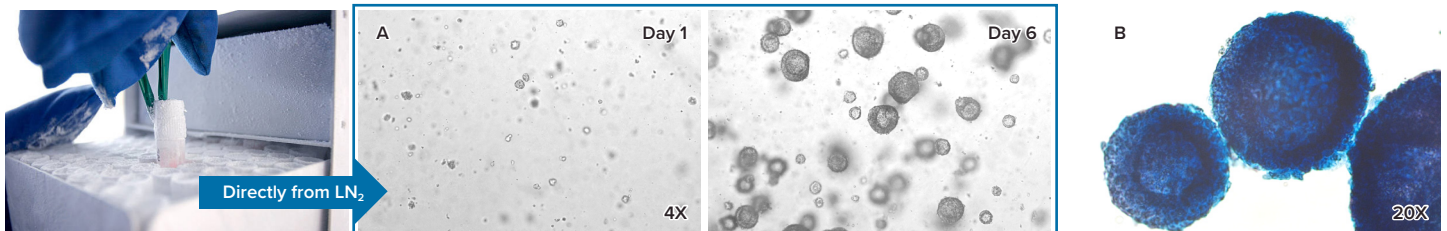


Figure 1. 3D static suspension culture of hPSC directly from Liquid Nitrogen (LN₂)

Start the suspension culture by using 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 1A). The resulting hPSC spheroids also show hallmark features of healthy and high-quality stem cell spheroids, i.e., shallow craters or pockmarks. Figure 1B shows that hPSC static suspension cultures from liquid nitrogen are positive for Alkaline Phosphatase, indicating successful expansion of healthy stem cell populations.

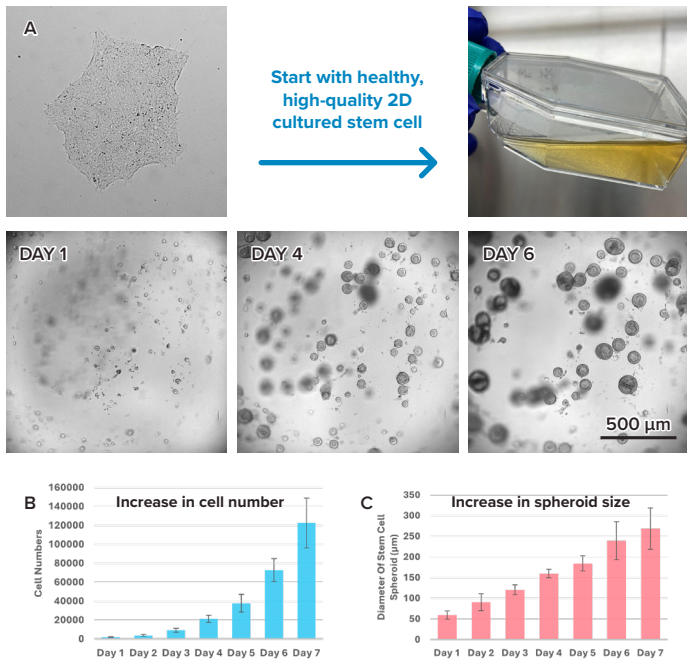


Figure 2. 3D static suspension culture of hPSC from 2D matrix culture

After 24 hours, small hPSC spheroids start to form. From day 1 to 6, cells in the suspension cultures quickly grow, leading to the generation of healthy and high-quality stem cell spheroids. After day 3, cell numbers grew exponentially (Figure 2B), and spheroid size steadily increases (Figure 2C). 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.

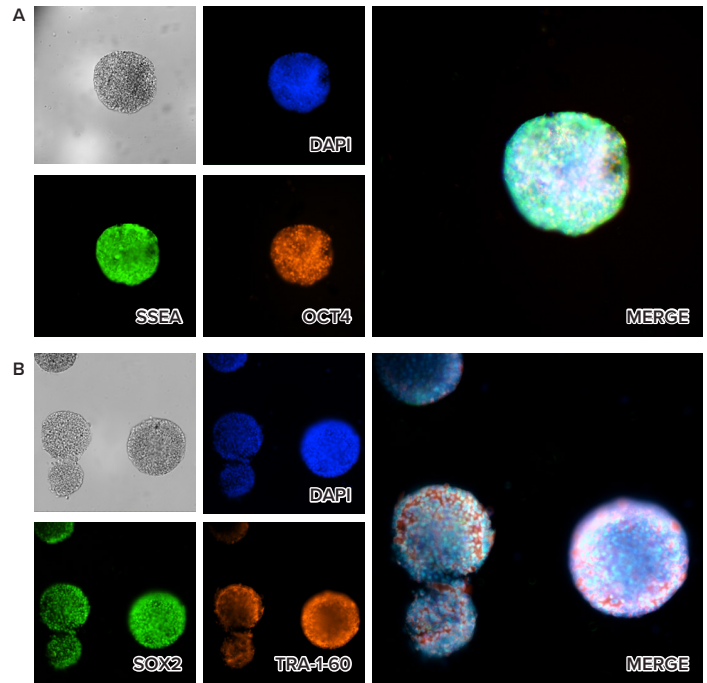
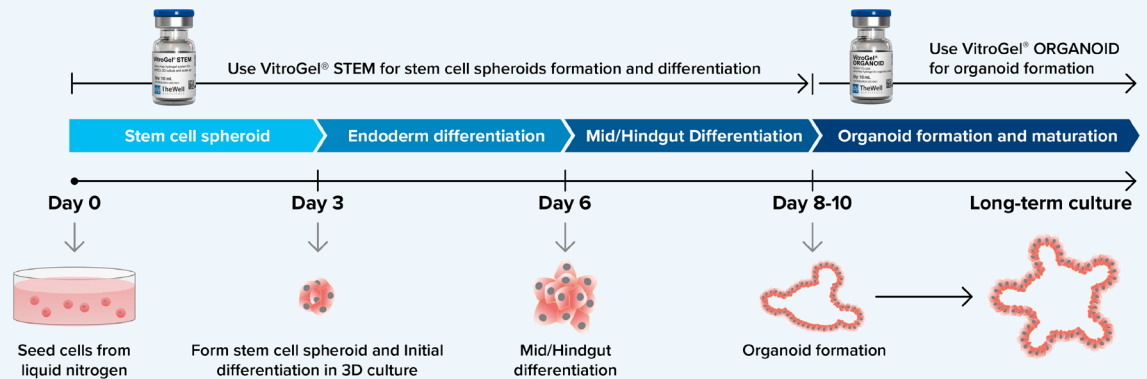


Figure 3. Immunofluorescence images of hPSC spheroids with key pluripotent stem cell markers

VitroGel® STEM ensures the undifferentiated state of stem cell lines during scale-up. As shown in Figure 3, hPSC aggregates in VitroGel® STEM hydrogel and retain pluripotency after 7 days, evidenced by the expression of key pluripotent stem cell markers, SSEA4, OCT4, SOX2, and TRA-1-60.

Xeno-free 3D Organoid Workflow Overview

Start from iPSC spheroids for stem cell differentiation and organoid formation



Complimentary Product



VitroGel® ORGANOID (1-4) 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.

Product	Cat No.	Size
VitroGel® ORGANOID 1	VHM04-1S	2 mL
	VHM04-1	10 mL
VitroGel® ORGANOID 2	VHM04-2S	2 mL
	VHM04-2	10 mL
VitroGel® ORGANOID 3	VHM04-3S	2 mL
	VHM04-3	10 mL
VitroGel® ORGANOID 4	VHM04-4S	2 mL
	VHM04-4	10 mL

Product	Cat No.	Size
VitroGel® STEM	VHM02S	2 mL
	VHM02	10 mL



Read the full application note on the Xeno-free 3D Organoid Workflow Overview:

thewellbio.com/application-notes/xeno-free-organoid-generation-workflow/