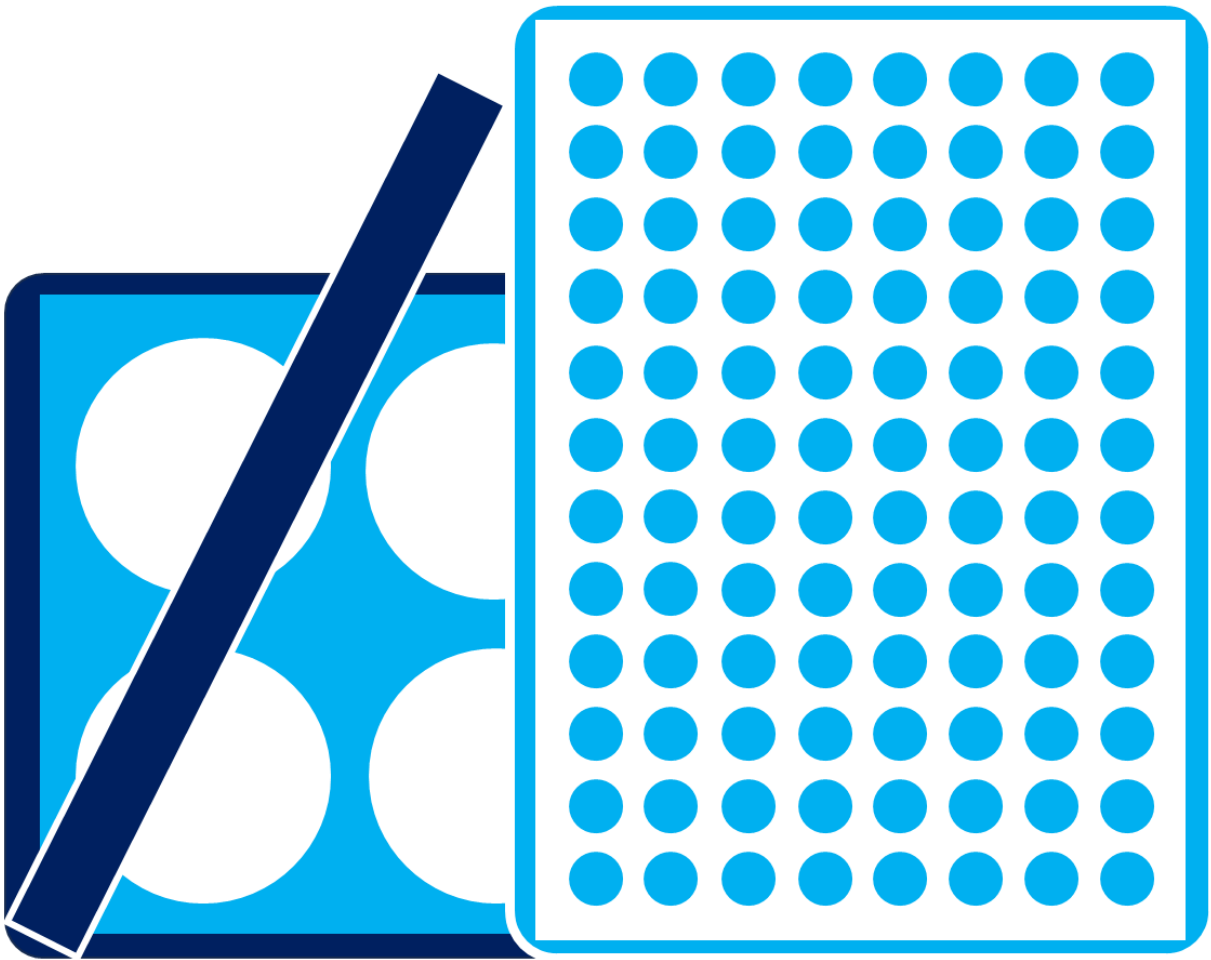
CELL guidance systems

# PeptiGel® for Complex Cell Culture and Bioprinting

## *In vivo and in vitro* applications



# Synthetic 3D Matrix for Enhanced Cellular Responses

## Why use PeptiGel®?

3D cell culture is a better simulation of the *in-vivo* environment than 2D cell culture, as it allows for enhanced cell-to-cell interactions and signaling. 3D cell culture also enables a wider range of applications as well as being an improved method to model disease. Using the biologically relevant peptide-based PeptiGel® provides a controlled synthetic extracellular matrix that mimics the cell microenvironment.

PeptiGel® technology allows us to tune mechanical and functional properties, providing you with the most suitable materials tailored to your application's needs. In providing the optimal environment for your cells, the PeptiGel hydrogel is a tailored, better alternative to traditional animal-derived matrices such as Matrigel™, Geltrex™ and collagen. PeptiGels® have been independently and extensively validated against numerous cell lines (over 40 and counting).

## What is PeptiGel®?

PeptiGels® are a family of related, but distinct synthetic peptide hydrogels that spontaneously self-assemble to form 3D nano-fibrous hydrogels that mimic the native extracellular matrix (ECM). These synthetic self-assembling peptide hydrogels (SAPHs) provide a canvas for 3D cell culture and bioprinting.

*Reliable, defined and tunable hydrogels for advanced 3D cell culture*

## How does it work?

The proprietary hydrogel technology allows us to tune the mechanical stiffness of these hydrogels to match the stiffness of most tissue types. The fibre surfaces can be (bio)chemically functionalized with several integrating biomimetic peptide sequences from key extracellular matrix (ECM) proteins that are proven to signal and enhance biological processes. These can include RGD (fibronectin), IKVAV (laminin), YIGSR (laminin) and GFOGER (collagen).

## Key Benefits and Features of PeptiGel®

**Animal and disease free**
-uses amino acids to build a fully synthetic and animal product-free

**Mechanically tuneable**
-range of mechanical strengths and viscosities available

**Biochemically functional**
-incorporation of bioactive peptide sequences from key ECM proteins

**Sprayable, injectable and printable**
-use in high-throughput liquid handling systems and extrusion-based bioprinting

**Clinically translatable**
-fully-defined components and biocompatibility enables clinically translatable research

**Transparent**
-compatible with imaging techniques

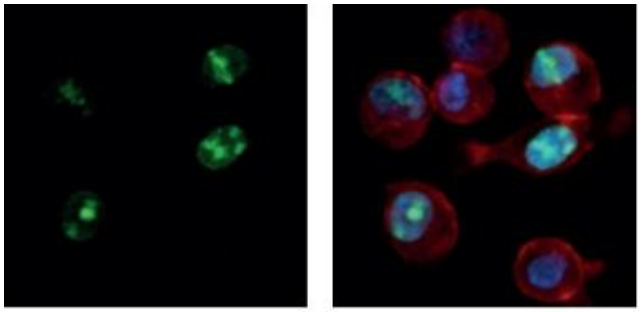
Biiodegradable
- Peptides are naturally deraded by protease activity over time

# Validated Cell Culture Applications

## Cancer

### A platform to recapitulate the tumor microenvironment

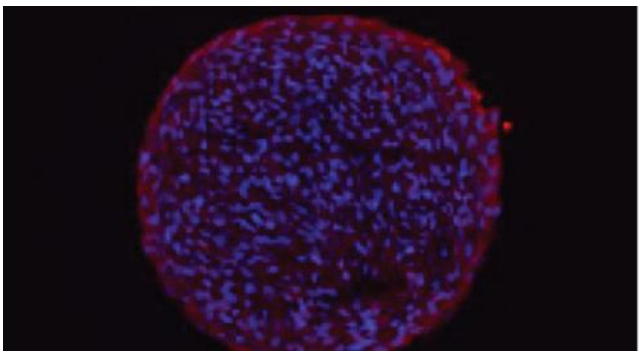
PeptiGel® hydrogels have been demonstrated to be a suitable platform to culture cancer cells under different conditions of stiffness, extracellular pH, and temperature. This biomaterial has been used as a cell culture substrate to assess the effect of these factors on the proliferation, apoptosis and signaling in Suit2 cells (pancreatic cancer cell line).



## Regenerative Medicine

### Using PeptiInk® Alpha-1™ for bioprinting chondrocytes

PeptiGel® peptides have been assessed for their use as bioinks for bioprinted human *in vitro* cartilage models. PeptiInk Alpha 1 has been demonstrated as a potential bioprinting manufacturing material for human cartilage that is more ethical and sustainable compared to current *in vitro* models.

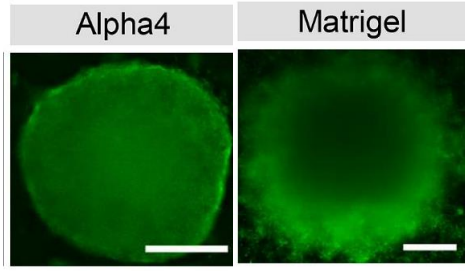


*Bespoke peptide hydrogel design available. Visit www.cellgs.com for more information.*

## Organoids

### Growth and differentiation of hiPSC-derived kidney organoids

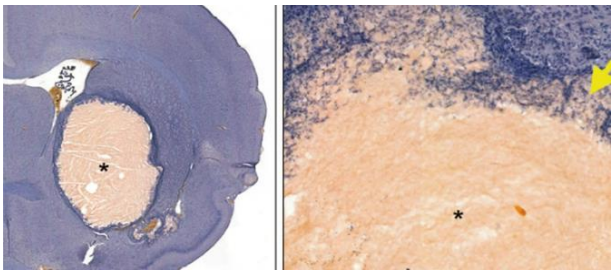
PeptiGel® peptide hydrogel has been utilised as a microenvironment for the selected differentiation of hiPSC-derived kidney organoids, which have the potential to be used in a range of applications.




## Xenografts

### PeptiGel® Alpha 2 in a model of intracerebral haemorrhage (ICH)

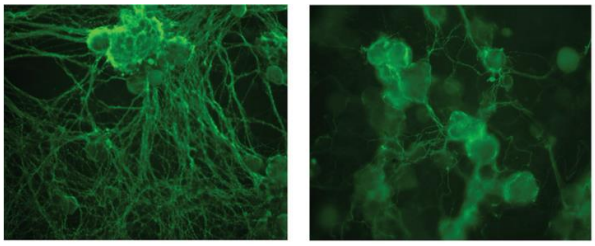
PeptiGel® Alpha 2 has been used to facilitate the regeneration of ICH lesion. Using a collagenase-induced ICH model in rats, ~~it was concluded that~~ The hydrogel Alpha2 was safe, well-tolerated and ~~was~~ retained for ~~several~~ weeks, allowing infiltration of host cells



## Nerve Autografting

### Improving the neurotrophic potential of human adipose-derived stem cells

PeptiGel® substrates loaded with human adipose-derived stem cells (hdASC) are being developed as tissue engineering therapies for the repair of peripheral nerve injuries



Cell Guidance Systems' reagents and services enable control, manipulation and monitoring of the cell, both *in vitro* and *in vivo*

**Growth Factors**
- Conventional (unformulated)
- PODS® - Sustained release

**Exosomes**
- Exo-spin™ - Purification
- ExoLISA™ - ELISA-like detection
- Instant Exosomes™ - purified and characterized
- NTA Service
- Freeze drying service

**PeptiGel®**
- Tunable self-assembling peptide hydrogels

**Other products and services**
- Small Molecules
- Softwell™ - 2D hydrogel (Europe only)
- Orangu™ - Cell counting reagent
- LipoQ™ - Lipid quantification assay
- Primary Hepatocytes

**Cytogenetics**
- Karyotype Analysis
- Array Hybridization

**Scan for Peptigel product page**

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