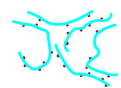


The 3-D Life Hydrogel system: User-controlled composition of extracellular environments

The 3-D Life Hydrogel system is a complete set of reagents for the flexible design of extracellular matrix compositions in three-dimensional cell cultures. Ease of use and complete control of biomolecular modification allow the creation of hydrogels applicable for many cell types.



The polymers polyvinyl alcohol (PVA) or dextran which are functionalized with SH-reactive groups represent the biologically inert basis of 3-D Life Hydrogels.



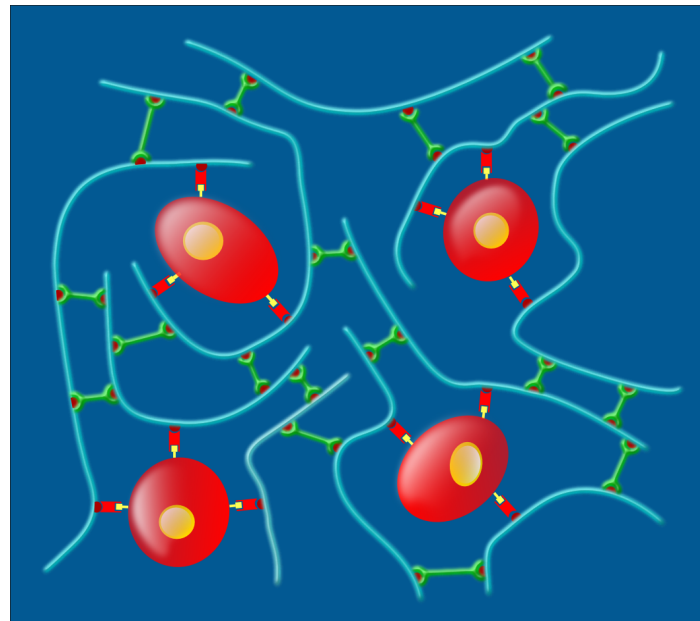
Adhesion peptides such as 3-D Life RGD and GFOGER-3 bind via thiol groups of their terminal cysteines to a portion of the SH-reactive groups on the polymer and provide a cell-adhesive matrix.



Cells bind to the polymer-peptide conjugates with their corresponding adhesion receptors, e.g. integrins.



Thiol-functionalized crosslinkers based on polyethylene glycol (PEG) or hyaluronic acid react with the remainder of the SH-reactive groups on the polymer and crosslink the polymer molecules to form the gel.



• Control over cell spreading and migration

Thiol-reactive PVA or dextran polymer can be crosslinked either with thiol-modified PEG-Link or CD-Link. While PEG-Link is biologically stable during the culture period, CD-Link contains an amino acid sequence which can be cleaved by cell-secreted matrix-metalloproteases. Use of CD-Link in combination with a cell adhesion peptide (e.g. 3-D Life RGD Peptide) allows spreading and migration of motile cells within the gel.

• Independent variation of peptide densities and gel strength

Peptide densities and gel stiffness can be varied independently by adjusting concentrations of peptide, polymer and crosslinker. Equal gel strengths can be maintained at different peptide densities.

• Easy recovery of cells after culture

Gels made of dextran polymer can be degraded by the addition of dextranase after culture to recover live or chemically fixed cells. The degradation is protease-free, keeps natural extracellular matrix intact, and does not harm cells. Not suited for hydrogels formed with crosslinkers based on hyaluronic acid.

• Hyaluronic acid: a choice of biomodification

Hyaluronic acid can be included in 3-D Life Hydrogels by using HyLink as a crosslinker.

Biomimetic variations provide different 3-D cell micro-environments for different cell culture requirements. The choice of crosslinker determines whether cells can locally degrade the hydrogel and create space to move. The addition of peptides provides a cell adhesive extracellular matrix, a prerequisite for most cells to spread, migrate, proliferate and survive.

Choice of hydrogel components determines hydrogel properties

