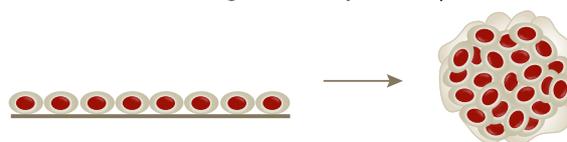


3D CELL CULTURE KITS

In their natural physical environment, cells that form tissues and organs do not exist as single cell entities but are surrounded by other cells. They are embedded within a complex non-cellular structure known as the extracellular matrix (ECM) which forms an interface between the cells and their adjacent stroma – anchoring and agglutinating the cells in a three-dimensional (3D) formation.

Despite this, most of the current cell research is still being performed using traditional two-dimensional (2D) monolayer cultures. However, the limitations and problems of 2D cell culture are increasingly known. As 2D cell culture does not adequately take into account the natural 3D environment of cells, it is frequently an insufficient model for *in vivo* model contexts. There is a growing evidence that 3D cell culture systems represent more accurately the actual physiological *in vivo* conditions where cells are permitted to grow or interact with their surroundings in a 3D fashion and are thus also more reflective of *in vivo* cellular processes/responses. As shape, size, and functionality of a cell is largely affected by the physical environment in which it is grown, cells in the 3D culture environment differ morphologically and physiologically from cells in the 2D culture environment and show clear differences with regard to many cellular processes such as cell proliferation, differentiation, apoptosis, and gene expression.

2D Cell Culture versus 3D Cell Culture



	2D Cell Cultures	3D Cell Cultures
Morphology	Elongated, unnatural cell shape	More natural cell shape – physiological resemblance (spheroids)
Cell-Cell Interaction	Unnatural interactions between cells – poor or even non-existent	More natural interactions between cells – close to <i>in vivo</i> actions
Spatial Distribution	Cell monolayer	Cell multilayer
Cell Environment	All cells are exposed equally	Outer cell from spheroids are usually only being exposed
Cell Growth & Viability	Stressed cells, sometimes poor or slow growth	Overall improved viability
Cell Cycle	More or less same stage	Mixture (viable/proliferating, quiescent, hypoxic necrotic)
Intracellular Biology	Artificial interactions - cells behave differently to those <i>in vivo</i>	Close to real interactions - cells behave more like those <i>in vivo</i>
Cell Physiology	May not be physiologically relevant	More reflective of <i>in vivo</i> physiological responses
Cell-Drug Interaction	May show misleading drug testing results (e.g. "false-positives")	Better predictor models - more realistic drug uptake/metabolism studies
Stem Cells	Poorer stem cell expansion	Improved stem cell expansion

Artificially created 3D cell culture environments improve the functionality, differentiation and viability of cells. By mimicking the *in vivo* conditions and cellular responses, 3D matrices and scaffolds provide a more physiologically relevant microenvironment and screening platform for many cell types including cancer and stem cells in developmental morphogenesis, pharmacology, drug metabolism and drug toxicity studies.

3D Cell Culture Matrices

PromoKine offers a range of 3D Cell Culture Matrix Kits, including **Basement Membrane Extract (BME)**, animal-based), **Alginate Hydrogel** (plant-based), proprietary **Duo-Matrix** and **Dry Scaffold** (natural polymers, animal-free) to meet the needs and requirements of various research fields. Our 3D Culture Matrix Kits provide a standardized, user friendly and adaptable to high-throughput strategy for setting up spheroid/organoid formations, 3D cell cultures and pharmacological studies to screen and characterize compounds in a more natural 3D environment.

PromoKine's 3D Cell Culture Matrix Kit (BME) contains a commonly used cell-adhesive matrix with a microporous structure which is derived from animal sources, providing a very good scaffold for cells to grow in a 3D fashion (e.g. spheroids/organoids). BME is a more naturally relevant matrix and for example well suited for modeling the morphological effects of early oncogenesis on three-dimensional microenvironments. It can be used for many applications, e.g. for co-culturing of cells, propagating e.g. primary endothelial, epithelial, and smooth muscle cells or promoting differentiation of stem cells – and is also utilized in angiogenesis, cell invasion, cell attachment as well as tumorigenicity, toxicity and drug discovery assays.

PromoKine's BME is growth factor-reduced and endotoxin-free, and is free of any human-derived substances.

PromoKine's 3D Cell Culture Matrix Kit (Alginate Hydrogel) is based on alginate, an anionic polysaccharide derived from the cell walls of algae. It provides a nanoporous matrix which lacks cell adhesion sites as well as growth hormones and other ECM proteins. Hence, it is a more controlled environment which is also easy to handle and preferred by certain cell types. As it solidifies to a gel in the presence of calcium ions and liquefies in the presence of calcium-chelating agents, it is an ideal scaffold for culturing of cells in three dimensions and conveniently harvesting these cultured cells. It supports successful 3D cell culture of different cell types including primary endothelial and epithelial cells, fibroblasts, keratinocytes, chondrocytes, tumor and stem cells, and can be used e.g. for cell encapsulation, tumor models, tissue modeling as well as drug screening/discovery assays.



Our **3D Cell Culture Matrix Kit (Duo-Matrix)** is a proprietary blend of an animal- and a non-animal-derived matrix that provides a more dynamic microenvironment as opposed to a single component matrix. Thus, it is a preferred environment for modeling cell growth, migration and differentiation as well as setting up drug screening and toxicity assays

Kit components: All kits include the respective matrix (BME, Alginate-Hydrogel, Duo-Matrix) and Wash Buffer as well as Cross-linking Solution (Alginate-Hydrogel, Duo-Matrix).

PromoKine's **3D Cell Culture Scaffold Kit** provides a standardized and high-throughput adaptable strategy with a ready-to-use 96-well microtiter plate that contains proprietary 3D scaffolds for setting up spheroid formations, tumor models as well as pharmacological studies and convenient drug discovery assays, with an optimized scaffold dissociation method.

Kit components: Kit includes Ready-to-Use Scaffolds (96-well plate), Scaffold Dissociation Solution (enzyme-free), and Neutralization Buffer.

Catalog Number	Product Name	Size
PK-CA577-K518	3D Cell Culture Matrix Kit (BME*)	100 assays
PK-CA577-K517	3D Cell Culture Matrix Kit (Alginate Hydrogel*)	100 assays
PK-CA577-K519	3D Cell Culture Matrix Kit (Duo-Matrix*)	100 assays
PK-CA577-K990	3D Cell Culture Scaffold Kit	100 assays

*matrix is also available separately; **please see** www.promocell.com/product-category/cell-biology/cell-analysis/3d-cell-culture for more information

3D Cell Culture – Cell Harvesting & Viability Assay Kits

Isolating intact cells in 3D cell culture from the extracellular matrix proteins comprising the 3D matrices in order to use them for cell passaging or biochemical and molecular analysis can be very difficult. While proteases (such as trypsin and accutase) are commonly used to degrade these matrices, this is not recommended in some cases where cells are sensitive to protease digestion as these proteases may modify cell surface and/or cellular proteins and signaling, thus altering physiological assessments. Further, some protease-based dissociation methods do not completely dissolve the matrices.

PromoKine's **3D Cell Culture Harvesting Kit** provides an optimized and standardized saline-based solution for a simplified non-enzymatic isolation of cells and spheroids from matrices (especially for PromoKine's 3D Cell Culture Kits: PK-CA577-K517, -K518, -K519; but it also works with collagen and laminin) with high viability rates for subsequent biochemical, protein and cell-based analysis. This kit provides reagents for extracting cells and/or cell aggregates from 3D cell cultures for biochemical analysis, as well as reagents for the preparation of lysates for immunoblotting.

Kit components: Kit includes Matrix Dissociation Saline Solution and Neutralization Buffer.

Quantification of viable cell numbers is an indispensable tool in *in vitro* screening in many biological and pharmacological studies. Calcein-AM is a non-fluorescent compound that easily penetrates intact and live cells and does fluoresce brightly green once the AM group is cleaved off by intracellular esterases. It has been widely used to assess cell viability and proliferation. However, with the use of 3D matrices, some protease-based dissociation methods do not completely dissolve the matrices and cell aggregates, which can distort results of quantitative *in vitro* assays such as viability assessment.

PromoKine's **3D Cell Culture Viability Assay Kit** provides an easy-to-use, high-throughput and sensitive method for screening, characterizing and studying cell viability, and cytotoxicity in three-dimensional cell cultures. The standardized fluorometric method reliably quantifies viable cells detecting as low as 50 viable cells per well. The measured fluorescence intensity at Ex/Em = 485/530 nm is directly proportional to the number of viable cells. The complete kit comes with an optimized and gentle non-enzymatic dissociation solution for the recovery of viable and dead cells from spheroids in matrices and scaffolds.

Kit components: Kit includes Matrix Dissociation Saline Solution, Viability Assay Buffer, and Calcein AM.

Catalog Number	Product Name	Size
PK-CA577-K982	3D Cell Culture Harvesting Kit	100 samples
PK-CA577-K948	3D Cell Culture Viability Assay Kit	100 assays

please see www.promocell.com/product-category/cell-biology/cell-analysis/3d-cell-culture for more information

PromoCell also offers a wide range of cell staining reagents separately.

Please see: www.promocell.com/product-category/cell-biology/cell-analysis/cell-staining-reagents

For more Cell Analysis Products such as Cell Viability & Cytotoxicity Kits, Apoptosis Assay Kits or individual cell stains please see: www.promocell.com/product-category/cell-biology/cell-analysis and www.promocell.com/product-category/cell-biology/apoptosis.

PromoCell GmbH

Sickingenstr. 63/65
69126 Heidelberg
Germany

Email: info@promocell.com
www.promocell.com

USA/Canada

Phone: 1 – 866 – 251 – 2860 (toll free)
Fax: 1 – 866 – 827 – 9219 (toll free)

Deutschland

Telefon: 0800 – 776 66 23 (gebührenfrei)
Fax: 0800 – 100 83 06 (gebührenfrei)

France

Téléphone: 0800 – 90 93 32 (ligne verte)
Téléfax: 0800 – 90 27 36 (ligne verte)

United Kingdom

Phone: 0800 – 96 03 33 (toll free)
Fax: 0800 – 169 85 54 (toll free)

Other Countries

Phone: +49 6221 – 649 34 0
Fax: +49 6221 – 649 34 40

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