

APPLICATION REPORT

CELLSTAR® microplates with cell-repellent surface as platform for BIOMIMESYS®, a new generation of a mimetic hydrogel for 3D cell culture

Research with two-dimensional cell cultures is still predominant in pharmaceutical and basic research. However, monolayer cultures can only mimic conditions in physiological tissue to a limited extent. The employment of 3D cultures is regarded as a rational approach to come closer to the microenvironment, in which mammalian cells grow *in vivo*. One option for 3D culture is the usage of BIOMIMESYS®, a hydrogel scaffold based on hyaluronic acid, which is a major component of the cell's extracellular matrix. The highly porous nature of the scaffold allows the rapid uptake of nutrients, oxygen, etc. into the cells to create a reproducible study model for all downstream analytical techniques used with 2-D cell culture. No changes of technique are needed for 3D cell culture with BIOMIMESYS®. The BIOMIMESYS® hydrogel allows the unimpeded passage of antibodies for labelling and buffers for the extraction of proteins and RNA, with no need for prior cell extraction. Moreover, the Biomimesys® products are compatible with all analytical technologies, e.g. for microscopy, spectroscopic application, histology and flow cytometry.

BIOMIMESYS® is a ready-to-use format. 96 / 48 / or 24 hydrogel plugs are contained in the wells of a Greiner Bio-One CELLSTAR® 96 well F-bottom microplate with cell-repellent surface. Due to the surface properties of these microplates cell attachment is prevented effectively. Cell-repellent properties are achieved through an innovative chemical modification of the vessel surface. As all microplates from Greiner Bio-One, microplates with cell-repellent surface are manufactured with a footprint conform to the recommendations of the American National Standards Institute (ANSI 1-2004) to guarantee compatibility with all widely-used lab equipment.

A major field of application for BIOMIMESYS® is cancer research. The ability to culture cancer cells effectively *in vitro* is becoming increasingly important as the pace of tumor research accelerates. Tumor development is a complex multistep process involving phenotypic heterogeneity, altered cross-talk and microenvironment which together create the unique characteristics of tumor cells. Cancer cells grown in BIOMIMESYS® have been shown to develop into 3D spheroids with active proliferation and are therefore representative of the tumor microenvironment (Fig. 1). Functionality can be tested in any of the different biological assays compatible with BIOMIMESYS®. Spheroids cultivated in BIOMIMESYS® are well applicable for drug screening assays (Fig. 2). Cells can be easily retrieved from the physiological matrix to perform cell cycle analysis (Fig. 3)

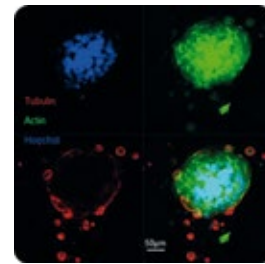


Figure 1: HT29 spheroid after 12 days of culture show a specific, characteristic localisation of α -tubulin at the outer edge of the spheroid.

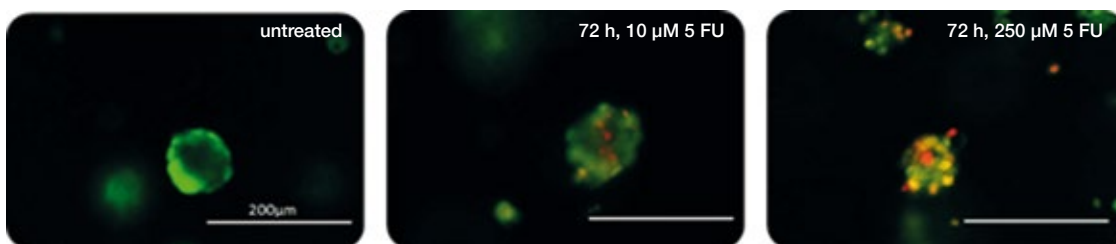
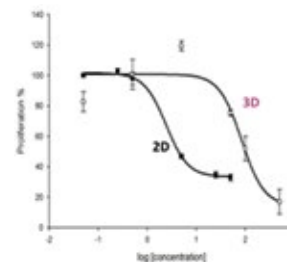


Figure 2: The effect of a cytotoxic agent on DLD-1 spheroids cultivated in BIOMIMESYS® can be measured by quantitative testing (WST1, bottom). Results are in correlation with qualitative analyses (Live/Dead® staining, Life Technologies)



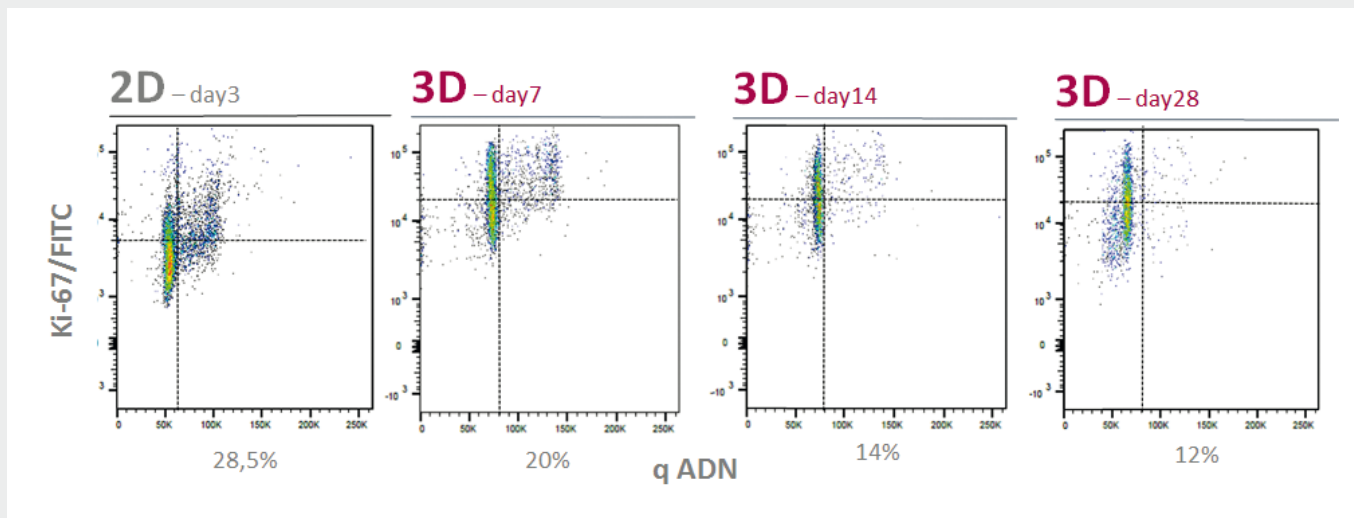


Figure 3: IP= level of cell viability and Ki-67= cell proliferation marker. In 3D, there is less cell proliferation compared with traditional cell culture.

Further fields of applications of BIOMIMESYS® comprise stem cell and adipocyte research. **Table 1** shows cell lines already tested so far successfully with BIOMIMESYS®. For more detailed information please visit www.celenys.com.

Table 1: Tested cell lines

Cancer cell lines		Cancer cell lines	
Human brain metastasis	SA87	Human ovarian carcinoma	IGROV-1
Human breast adenocarcinoma	MCF-7	Human pancreas carcinoma	PANC-1
Human breast carcinoma	CAL-51	Human prostate cancer	PC3
Human cervix adenocarcinoma	HeLa	Normal human colon fibroblast	CCD18-co
Human colorectal adenocarcinoma	DLD-1, HT29, Caco-2	Normal mouse fibroblast	3T3-L1
Human glioblastoma	CB109 / CB74 / CB191	Primary cells	
Human liver hepatocellular carcinoma	HepG2	Human white pre-adipocyte subcutaneous	HWP cryopreserved
Human liver hepatoma	PLC / PRF-5	Cryopreserved human hepatocyte	CHH
Human lung carcinoma	NCI-H460	Stem Cells	
Human osteosarcoma	SaOs	Hematopoietic	CD34+
		Murine embryonic stem cells	mES
		Human induced pluripotent stem cells	hiPSC

Ordering Information Greiner Bio-One GmbH

Cat.-No.	Description	Quantity per bag	Quantity per case
655 970	96 well microplate, PS, F-bottom/chimney well, cell-repellent surface, clear, sterile, with lid	1	6
655 976	96 Well microplate, PS, F-bottom/chimney well, cell-repellent surface, black, µClear®, sterile, with lid	8	32
655 976-SIN	96 Well microplate, PS, F-bottom/chimney well, cell-repellent surface, black, µClear®, sterile, with lid	1	32

Further CELLSTAR® cell culture products with cell-repellent surface can be found on our website www.gbo.com.

Product Information BIOMIMESYS®, Celenys

BIOMIMESYS® is available under 96-well plate format containing 96 / 48 / or 24 hydrogel plugs.

For further product information and ordering please visit www.celenys.com



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www.gbo.com/bioscience

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