Soft Substrates Benefits *in vitro*

Why use CellSoft® soft substrates:

- Match *in vitro* substrate to native stiffness
- Reduce "substrate shock" to cells
- Retain cell stemness longer

Cellular mechanical responses to substrate stiffness during cell culture, shear stress, mechanical strain, cell morphology, substrate topology, etc., impact its survival, proliferation and differentiation (Kureel et al., 2019, Anderson et al., 2016; Engler et al., 2006; Gilbert et al., 2010; Lutolf et al., 2009; Murphy et al., 2014; Winer et al., 2009; Yeung et al., 2005). This is a challenge for clinical applications and cell based therapies where long expansion times and large batch sizes of stem cells are needed.

Recent studies show "hMSCs maintained their proliferation rate and showed nine times higher population doubling in comparison to their counterparts cultured on plastic Petriplates" (Kureel et al, 2019).

The ability to control the cell culture system to best mimic an *in vivo* environment will help advance new therapies and treatments to patients.

Contact our Sales team to learn more!

References:

Smith, Lucas, et al. "Mechanosensing of Matrix by Stem Cells: From Matrix Heterogeneity, Contractility, and the Nucleus in Pore-Migration to Cardiogenesis and Muscle Stem Cells in Vivo." Seminars in Cell & Developmental Biology, vol. 71, 2017, pp. 84–98., doi:10.1016/j.semcdb.2017.05.025.

Hirata, Mitsuhi, and Tetsuji Yamaoka. "Effect of Stem Cell Niche Elasticity/ECM Protein on the Self-Beating Cardiomyocyte Differentiation of Induced Pluripotent Stem (IPS) Cells at Different Stages." Acta Biomaterialia, vol. 65, 2018, pp. 44–52., doi:10.1016/j.actbio.2017.10.032.

Engler, A.J., et al. "Matrix Elasticity Directs Stem Cell Differentiation." Journal of Biomechanics, vol. 39, 2006, doi:10.1016/s0021-9290(06)84031-5.

About Us:

Flexcell® has been designing, developing and manufacturing dynamic cell stretching bioreactor systems, accessories and disposables for over 30 years.

- First to commercialize use of elastomer surfaces and vacuum to stretch cells *in vitro*
- Cited in 4,000+ scientific publications
- Used in over 1,300 labs world-wide

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FLEXCELL®
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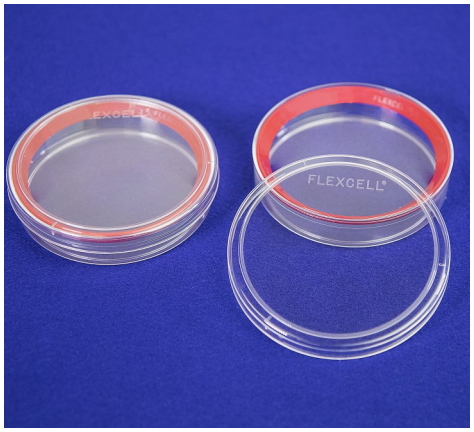
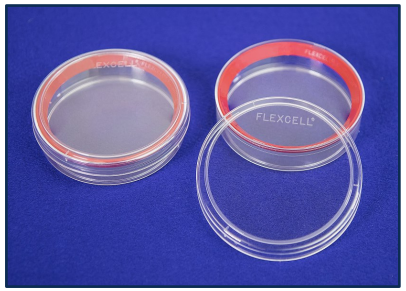
CellSoft® Soft Substrate Cultureware

Stretch More Than Your Imagination!



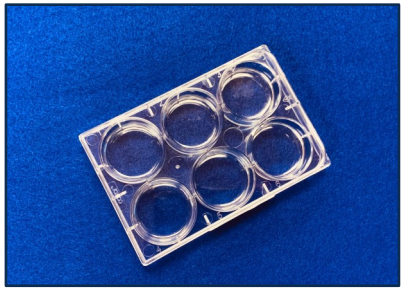
CellSoft® Soft Substrate Cultureware

Grow Batch Size and Passage



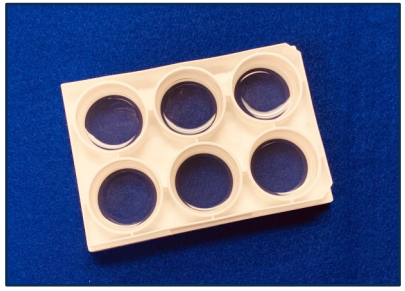
CellSoft® 100mm round dish

Culture Cells and Passage



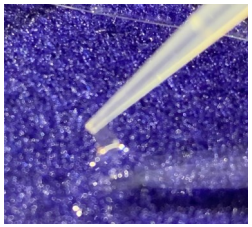
CellSoft® 6-well polystyrene-base

Culture Cells and Stretch



CellSoft® BioFlex® 6-well

Cells Sense Soft!



Growing cells on soft substrates influences cell-morphology, gene expression and stem cell differentiation. Therapeutic applications of stem cells require control over their differentiation. With CellSoft® Soft Substrate culture plates, researchers can match the *in vivo* surface to native tissue stiffnesses.

CellSoft® is a specialized gel coating added to either elastomer membrane or polystyrene surfaces. CellSoft® substrates are "softer" and more stretchable compared to uncoated glass or polystyrene culture plates.

Product Features:

- Moduli range: 1, 5, 10, 20, 40, 60 kPa
- 100mm round dishes, 6-well polystyrene-base plates, BioFlex® 6-well plates
- *CellSoft®* BioFlex® 6-well flexible culture plates to *stretch* cells on soft substrates
- Pre-sterilized, ready-to-seed
- Available in Collagen Type I matrix coating or Untreated surface

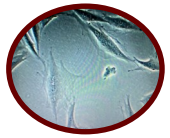
www.flexcellint.com

Match Native Stiffness *In Vitro*

Native Tissue	kPa Stiffness	kPa CellSoft®
	0.2 — 0.5	1
	0.5 — 2	1
	2 — 8	5
	8 — 16	10
	16 — 32	20, 40
	32 - 64	60

Cell Growth *In Vitro:*

Substrate Stiffness



Hard & Rigid Surface

Polystyrene 2gP

Soft & Stretchable

CellSoft®

Moduli 1—60 kPa