

The Corning® Guide to Surface Selection by Cell Type

The right surface — right from the start

The development and normal functioning of cells depends on interactions with molecules in their microenvironment. To create physiologically relevant *in vitro* models that support normal cell growth and function, the components of the *in vivo* environment must be incorporated. Use of extracellular matrix (ECM) proteins (natural, synthetic, or mimetic) as coatings on the cultureware allows the development of cell type specific model systems which more closely mimic *in vivo* conditions. Use the Corning selection guide to help you choose the best surface for your application and cell type.

The numbers in the following tables refer to the applicable document references, which are listed at the end of this document.

For product information, please refer to the Corning Surfaces Brochure (CLS-C-DL-AC-006) or visit www.corning.com/lifesciences/advancedsurfaces.

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Primary Cells

| Primary Cells | Extracellular Matrices (ECMs) and Biological Coatings | | | | | | | | | | | | | ECM Mimetics and Advanced Surfaces | | | | Enhanced TC-treated Surfaces | | | | |
|---|---|--------------|-------------|------------------|-------------|---------|---------|-------------|------------------------|-------------------|-------------|-------------|--------------------------|------------------------------------|--------------------|----------------------|---------------------|------------------------------|-----------|-------------------|----------------|-------------------|
| | Cell-Tak™ | Collagen I | Collagen IV | Matrigel® Matrix | Fibronectin | Gelatin | Laminin | Osteopontin | Poly-Lysine (PDL, PLL) | PDL/LM and PLO/LM | PuraMatrix® | Vitronectin | PureCoat™ ECM Mimetic Fn | PureCoat ECM Mimetic COL I | Synthemax® Surface | Ultra-Low Attachment | Osteo Assay Surface | laminin-521 (Human) | Primaria™ | CellBIND® Surface | PureCoat Amine | PureCoat Carboxyl |
| Aortic endothelial cells, BAEC | | 1 | | 2, 3 | 4 | | 4 | | | | | 5 | | | | | | | | | | |
| Bile duct cells (epithelial) | | 6 | | 7 | | | | | | | | | | | | | | | | | | |
| Bone marrow cells (bone resorption, osteoclast) | | | | | | | | | | | | | | | | 8-10 | | | | | | |
| Brain microvessel (endothelial) | | 11, 12 | 12 | 13 | 12 | 14 | 12 | | | | | 12 | | | | | | | | | | |
| Cardiomyocytes; cardiac (endothelium, progenitor cells) | | 15 | | 16 | 17 | | 18 | | 19 | | 20 | | | | | | | | 21 | | | 22 |
| Colonocytes (epithelial) | | | 23 | 24 | | | | | | | | | | | 25 | | | | | | | |
| Dorsal root ganglia | | | | 26, 27 | | | | | 28 | 29 | | | | | | | | | | | | |
| Embryonic cortical neurons | | | | 30 | | | | | | | 31 | | | | | | | | | | | |
| Embryonic sympathetic neurons | | | 32 | 33 | | | 32 | | | | 32 | | | | | | | | | | | |
| Endothelial cells; endothelial colony forming cells | | | 34 | | 34, 35 | | 34 | | | | | | 36 | 36 | | | | | 37 | | | |
| Erythrocyte culture (parasite development stages [asexual, sexual]) | 378 | | | 379 | | | | | | | | | | | | | | | | | | |
| Hepatocytes | | 38, 386, 387 | 39, 387 | 40, 387 | | | 387 | | 41 | | 42 | | | | | | | | 43, 44 | 45 | | |
| Hippocampal neurons | | | | 46, 47 | 48 | | 46, 48 | | 46, 49, 50 | 49, 50 | 47, 51 | | | | | | | | | | | |
| Human periodontium (periodontal ligament) | 52 | | | | | | | | | | | | | | | | | | | | | |
| Human osteoclast precursors (osteoclast, pit formation) | | | | | | | | | | | | | | | | 53, 54 | | | | | | |
| HUVEC (endothelial) | | 55, 56 | | 57, 58 | 56, 59-61 | 62 | 56 | 63 | | | 64 | 56, 58, 61 | | | | | | | 61 | | | |
| HVSMC | | | | 58 | | | 65 | | | | | 58 | | | | | | | | | | |
| Keratinocytes | | 66, 67 | | 67 | 67, 68 | | | | | | 51 | 68 | | 315 | | 69 | | | | | | |
| Mammary epithelial cells; breast cells (luminal, myoepithelial and endothelial) | | 70, 71, 73 | | 71, 72 | | | 74 | | | | 71 | | | | | 75 | | | | | | |
| Microvascular, BME (endothelial) | | 76 | 77 | 78 | 79, 80 | 76, 81 | | | | | 82 | 80 | | | | | | | | | | |
| Mouse splenic T-cells | 83 | | 84 | 84 | | | | | | | | | | | | | | | | | | |
| Muscle cells, myoblasts, myogenic cells, myotubes | | | | 85 | | | 86 | | | | | | | | | | | | | 87 | | |
| Neuronal cells (cortical, cerebellar granule, astrocytes, sensory, sympathetic) | | | 88 | | | | 88, 89 | | 90-98 | 99 | | | | | | | | | | | 100 | |
| Oligodendrocytes (glial; precursors) | | | | 101 | | | 102 | | 101, 103 | | | 102 | | | | | | | | | | |
| Osteoblasts | | 104 | | | | | | | | | 105 | 104 | | | | | | | | | | |
| Pancreatic islet, neonatal (3- to 5-day-old) rat islets of langerhans | 106 | | | 107 | 106 | | | | | | | | | | | 108 | | | | | | 22 |
| Parotid acinar cells | 109 | | | 110 | | | | | | | | | | | | | | | | | | |
| Peripheral blood mononuclear cells | | 111, 112 | 113 | 114 | 112-114 | | | | | | | 113 | | | | 115 | 116 | | | | | |
| Postnatal mouse vestibular ganglion neurons | 117 | | | | | | | | | | | | | | | | | | | | | |
| Schwann cells (glial) | | | 118 | 118 | | | 118 | | | | 119 | | | | | | | | | | | |
| Sertoli cells (spermogenic) | 120 | | | 121, 122 | | | | | | | | | | | | | | | | | | |
| Skeletal muscle cells (myocytes, myotubes) | | | | 123 | | | | | | | | | | | | | | | 124 | 125 | | |
| Smooth muscle cells (endothelial, aortic, vascular) | 373 | 126 | 126 | 127 | 126, 128 | | | | | | | | | | | | | | 129 | | | |
| Urothelial cells | | 130 | 130 | 131 | 132 | | | | | | | | | | | | | | | | | |
| Valvular interstitial cells | | | | | 133 | | | | | | | | | | | | | | | | | |
| Zygote and blastocyst development stages | 375 | | | | | | | | | | | | | | | | | | | | | |

Cell Lines (transformed or transfected)

| Cell Lines | Extracellular Matrices (ECMs) and Biological Coatings | | | | | | | | | | | ECM Mimetics and Advanced Surfaces | | | | | Enhanced TC-treated Surfaces | | | | | | |
|---|---|---------------|-------------|--------------------|-------------|---------|----------|---------------|------------------------|-------------------|-------------|------------------------------------|--------------------------|----------------------------|--------------------|----------------------|------------------------------|----------------------|-----------|-------------------|----------------|-------------------|--|
| | Cell-Tak™ | Collagen I | Collagen IV | Matrigel® Matrix | Fibronectin | Gelatin | Laminin | Osteopontin | Poly-Lysine (PDL, PLL) | PDL/LM and PLO/LM | PuraMatrix® | Vitronectin | PureCoat™ ECM Mimetic Fn | PureCoat ECM Mimetic COL I | Synthemax® Surface | Ultra-Low Attachment | Osteo Assay Surface | rLaminin-521 (Human) | Primaria™ | CellBIND® Surface | PureCoat Amine | PureCoat Carboxyl | |
| ARH-77 (lymphoblast) | | | | | 255 | | | | | | | | | | | | | | | | | | |
| BHK-21 (fibroblast) | | | | | 61 | 256 | | | | | 61 | | | | | | | | 61 | | 257, 258 | | |
| Breast cancer cells (established cell lines) | 259, 260 | | | 261, 262 | | | | 259 | | | | | | | | | | | | | | | |
| C2C12 (myoblast) | | 263 | | 264 | | | | | | | 265 | | | | | 266 | | | | | | | |
| Cell immobilization (Gin-1, Nasal epithelial cells, Molt-4 and K562 human leukemia cells, Sf9 Cells) | 267-270 | | | | | | | | | | | | | | | | | | | | | | |
| Chinook Salmon Embryo Cells (CHSE-214) | | | | | | | | | | | | | | | | | | | | 271 | | | |
| CHO, CHO-1, CHO-K1 (epithelial, endothelial, transfected fusion protein) | | | | 272, 273 | | | | 274 | | 51 | | 275 | | | | | | 276 | 277, 278 | 22 | | | |
| COS-7 (fibroblast, transfected) | | 279 | | 280 | 279 | | | 281, 282 | | | 279 | | | | | | | 283 | | | | | |
| Dorsal Root Ganglia (transfected) | | | | 284 | | | | | | | 285 | | | | | | | | | | | | |
| H1299 (transfected- human non-small cell lung carcinoma cell line) | | | | 286 | 287 | | | | | | | | | | | | | | | | | | |
| HEK-293 (transfected, epithelial), EcoPack2™-293, HEK-SRATet cells, Living Colors HEK-ZsGreen proteasome sensor (transfected) | 288 | 289, 290 | | 291 | | 291 | | 274, 292 | | 51 | | | | | 293 | | | 294 | 295, 296 | 258, 297 | | 297 | |
| HeLa | | | | | | | | | | 51 | | | | | | | | | | | | 22 | |
| HepG2 (hepatocyte), Hep3B (hepatoma) | | 299 | | 300 | | | | | | 51 | 377 | | | | 301 | | | | 125 | 258 | 258 | | |
| HT-1080 (epithelial) | | 302, 303 | 304, 305 | 302 | | | | | | | | | | | 307, 308 | | | | | | | 258 | |
| hFOB 1.19, MG63 (osteoblast cell lines) | | | | 309-311 | 312 | | 313 | | | 311 | 312 | | | | 314 | | | | | | | | |
| Human MOLT-4, drosophila S2 (biomaterial and tissue engineering applications) | 374 | | | | | | | | | | | | | | | | | | | | | | |
| Keratinocytes (human neonatal) | | 315, 316 | | | 316 | | | | | | | | 315 | | | | | | | | | | |
| L929 (fibroblast, transfected) | | | | 317 | | | 318 | | | 319 | | | | | | | | | | | | | |
| LnCAP (prostate cancer cell line) | | 307 | | 320 | | | | | | | | | | | 307 | | | | 296 | | 257, 258 | | |
| MCF7 (epithelial) | | 321 | 322 | | 323 | | | | | | 322 | | | | 324 | | | | | | | | |
| MCF-10A (epithelial) | | 71, 325 | | 71, 325 - 328 | 329, 330 | | 330, 331 | | 332 | 71 | 330 | | | | 333 | | | | | | | | |
| MDA-MB-231 | | 302, 307, 334 | 322 | 302, 326, 335-339 | 322, 334 | 322 | 334 | 334 | | | 322 | | | | 307, 324 | | | | | | | | |
| MDA-MB 435 | | 340 | | 338, 339, 341, 342 | | | | | | | 343 | | | | | | | | | | | | |
| MM41 (skeletal myoblasts, transfected) | | 344 | | | | | | | | | | | | | | | | | | | | | |
| MRC5 | | | | | | | | | | | | | | | | | | | | | | 257 | |
| N2AB-1 (neuroblastoma) | 385 | | | | | | | | | | | | | | | | | | | | | | |
| NIH/3T3, 3T3 (fibroblast) | | | | 345 | 346, 347 | | | 349 | | 51 | | | | | | | | | | | | | |
| PC-3, PC-12 | | 307, 350 | | 351, 390 | | | 352 | 348, 353, 354 | 355 | 47, 51 | | | | | | | | 356 | 357 | 22 | 22 | | |
| RTG-2 (rainbow trout gonad cells) | | | | 358 | | | | | | | | | | | | | | | | 271 | | | |
| RAW 264.7 (macrophage; osteoclast differentiation, pit formation) | | | 359 | | | | 359 | | | | | | | | | 360, 361 | | | | | | | |
| SH-SY5Y | | 362 | 362 | 363 | | | 364 | | 364 | 51 | 365 | | | | | | | | | | | | |
| SK-MEL-28 | | | 366 | | 366, 367 | | 366 | | | | 367 | | | | | | | | | | | | |
| U266 (lymphoblast) | | | | | 255 | | | | | | | | | | | | | | | | | | |
| U937 (monocyte) | | 368 | | | | | 369 | | | | 370 | | | | 371 | | | | | | | | |
| Vero cells | | | | | | | | | | | | 275 | 275 | | | | | | | | | | |

Stem and Progenitor Cell Expansion

| | Cell-Tak™ | Collagen I | Collagen IV | Matrigel® Matrix | Fibronectin | Gelatin | Laminin | Osteopontin | Poly-Lysine (PDL, PLL) | PDL/LM and PLO/LM | PuraMatrix® | Vitronectin | PureCoat™ ECM Mimetic Fn | PureCoat ECM Mimetic COL I | Synthemax® Surface | Ultra-Low Attachment | Osteo Assay Surface | rLaminin-521 (Human) | Primaria™ | CellBIND® Surface | PureCoat-Amine | PureCoat-Carboxyl |
|--|---|------------|-------------|------------------|-------------|---------|---------|-------------|------------------------|-------------------|-------------|-------------|------------------------------------|----------------------------|--------------------|----------------------|------------------------------|----------------------|-----------|-------------------|----------------|-------------------|
| Stem and Progenitor Cells | Extracellular Matrices (ECMs) and Biological Coatings | | | | | | | | | | | | ECM Mimetics and Advanced Surfaces | | | | Enhanced TC-treated Surfaces | | | | | |
| Human embryonic stem cell (hESC) | | | 134 | 135 | 134 | | 134 | | | | | 134 | | | 135 | 136 | | 392 | | 134, 137 | | |
| Human induced pluripotent stem cell (hiPSC) | | | | 138, 139 | | | | | | | | | | | 138 | | | 393 | | | | |
| hMSCs (bone marrow derived, adipose derived) | | | | | 140 | | | 140 | | | | 140 | 141 | 140, 142 | | | | | | 397 | | |
| Human retinal progenitor cells (RPE) | | | | | 143 | | | | | | | | | 143 | | | | | | | | |
| rESC; rat endothelial progenitor cells | | | | | | 144 | | | | | | 145, 146 | | | | 144 | | | | | | |
| Neuronal stem cell (intestinal/enteric) | | | | | 147 | | 147 | | | | | | | | | 147 | | | | | | |

In Vitro Differentiation of Pluripotent Stem Cells

| Stem Cells | Extracellular Matrices (ECMs) and Biological Coatings | | | | | | | | | | | | ECM Mimetics and Advanced Surfaces | | | | Enhanced TC-treated Surfaces | | | | | |
|--|---|----------|-----|-------------------------|----------|---------------|----------|----------|-----|-----|---------|-----|------------------------------------|--------------------|-----|----------|------------------------------|-----|--|--|--|--|
| hESC (cerebral organoid model) | | | | 148 | | | | | | | | | | | | | | | | | | |
| hESC (pancreatic) | | | | 149 | | 150 | | | | | | | | | | | | | | | | |
| hESC, hiPSC (cardiomyocytes) | | | | 149, 151-153 | | 154 | | | | | | | | | 135 | | | 394 | | | | |
| hESC, hiPSC, mESC (Germ Cell Layers: ectoderm, mesoderm, endoderm; hematopoietic progenitor; definitive differentiation; cardiomyocytes) | | 155, 228 | 156 | 135, 138, 139, 158, 159 | 157 | 160 | | 161, 162 | | | | 157 | | 135, 138, 159, 163 | | 157 | | 393 | | | | |
| hESC, hiPSC, mESC, miPSC (endothelial) | 164 | 165 | | 164, 166, 167 | | | | 164 | | | | | | | | | | | | | | |
| hESC, hiPSC (intestinal organoids) | | | | 168, 169 | | | | | | | | | | | | 147 | | | | | | |
| hESC, hiPSC (neuronal) | | | | 149, 170, 171 | 170 | | 170, 172 | | 170 | 173 | 175 | 170 | | | | 174, 176 | | 393 | | | | |
| hESC (osteogenic) | | | | | | 177 | | | | | | | | | | | | | | | | |
| hESC, hiPSC (smooth muscle) | | | | 170, 178 | 170 | | 170 | | 170 | | | 170 | | | | | | | | | | |
| hESC, mESC (lung epithelial) | | 179 | | 179, 180 | | 182 | | | | | | | | | | 181 | | | | | | |
| hESC, mESC, rESC (hepatocyte, hepatocyte-like) | | 183 | | 170, 183-186 | 170 | 187 | 170 | | 170 | | | 170 | | | | 183 | | | | | | |
| Human NPCs (differentiation to neuronal cells) | | | | 188 | | | 189 | | | | 188-190 | | | | | | | 393 | | | | |
| hPSCs, mPSCs (renal progenitor cells, renal tubular cells, endoderm) | | 155 | | 191, 192 | | | | | | | | | | | | 192 | | | | | | |
| mESC (hematopoietic) | 164 | | | 164 | | | 164 | | | | | | | | | | | | | | | |
| mESC, Chicken (cardiomyocytes) | | 165, 193 | | 193 | 165 | 154, 194, 195 | 165 | | | | | | | | | | | | | | | |
| mESC, rESC, miPSC (neuronal, progenitor) | | | | 188 | 188, 196 | 197, 198 | 188, 199 | | 200 | | 188 | | | | | 198 | | | | | | |
| mPSCs (inner ear sensory epithelia) | | | | 201 | | | | | | | | | | | | | | | | | | |
| hESC, hiPSC (retinal pigment epithelial) | | | | 396 | | | | | | | | | | 395 | | | | | | | | |

In Vitro Differentiation of Adult Stem Cells

| Stem Cells | Extracellular Matrices (ECMs) and Biological Coatings | | | | | | | | | | | | | ECM Mimetics and Advanced Surfaces | | | | Enhanced TC-treated Surfaces | | | | |
|--|---|-------------------|-------------|--------------------|------------------------|---------|----------|-------------|------------------------|-------------------|-------------|-------------|--------------------------|------------------------------------|--------------------|----------------------|---------------------|------------------------------|-----------|-------------------|----------------|-------------------|
| | Cell-Tak™ | Collagen I | Collagen IV | Matrigel® Matrix | Fibronectin | Gelatin | Laminin | Osteopontin | Poly-Lysine (PDL, PLL) | PDL/LM and PLO/LM | PuraMatrix® | Vitronectin | PureCoat™ ECM Mimetic Fh | PureCoat ECM Mimetic COL I | Synthemax® Surface | Ultra-Low Attachment | Osteo Assay Surface | rLaminin-521 (Human) | Primaria™ | CellBIND® Surface | PureCoat Amine | PureCoat Carboxyl |
| hADSCs; adipose (endothelial) | | | | 202 | | | | | | | | | | | | 203 | | | | | | |
| Cardiac progenitor cells (cardiomyocyte) | | 204 | | | | | 205 | 204 | | | | 205 | | | | 206 | | | | | | |
| Colon (epithelial organoids) | | 207 | | 169, 208 | | | | | | | | | | | | 209 | | | | | | |
| Hair follicle (melanocytes, neurons, smooth muscle) | | | | 210 | 210 | | | | | | | | | | | | | | | | | |
| Hepatic progenitor cells (hepatic, biliary cells) | | | | | | | 211 | | | | | | | | | 212 | | | | | | |
| Intestinal (organoids, crypt-villus) | | 213 | | 214-216 | | | | | | | | | | | | | | | | | | |
| Keratinocytes (epidermal) | | 217 | | | | 217 | | | | | | | | | | | | | | | | |
| Lung (sphere) | | | | 218 | | | | | | | | | | | | 219 | | | | | | |
| Mammary epithelial cells | | | | 220 - 222 | | | | | | | | | | | | 222 | | | | | | |
| MSC (cardiomyocyte, chondrocyte, hematopoietic, hepatocyte, neuron, osteocyte, spheroid) | | 141, 223-227, 232 | | 223, 225, 229, 230 | 140, 223-225, 229, 231 | | 223, 224 | 140 | | | | 233-237 | 140, 232 | | | 238, 239 | | | | | | |
| MSC (endothelial progenitors) | | 240 | | | | | | | | | | 240 | | | | 144 | | | | | | |
| Muscle (skeletal) | | | | | | | 241 | | | | | | | | | | | | | | | |
| Neural progenitor/stem cells (neuron, astrocytes, neuroblast) | | | | 243 | | 198 | 189, 243 | | | | | 244 | 189, 190, 242, 245-247 | | | 198 | | | | | | |
| Pancreatic (endocrine) | | | 249 | 248, 250 | | | 249 | | | | | | | | | | | | | | | |
| Prenatal rat cells (neuron, glial cells) | | | | | | | 251 | | | | | | | | | | | | | | | |
| Retinal (retinal neuron) | | | | | | | | | | | | 252 | | | | | | | | | | |
| Salivary gland | | | | 253 | | | | | | | | | | | | | | | | | | |
| Stomach (gastric units) | | | | 254 | | | | | | | | | | | | | | | | | | |

3D Cell Culture Applications

| Cells | Extracellular Matrices (ECMs) and Biological Coatings | | | | | | | | | | | | | ECM Mimetics and Advanced Surfaces | | | | Enhanced TC-treated Surfaces | | | | | |
|---|---|------------|-------------|------------------|-------------|---------|---------|-------------|------------------------|-------------------|-------------|-------------|--------------------------|------------------------------------|--------------------|----------------------|---------------------|------------------------------|-----------|-------------------|----------------|-------------------|--|
| | Cell-Tak™ | Collagen I | Collagen IV | Matrigel® Matrix | Fibronectin | Gelatin | Laminin | Osteopontin | Poly-Lysine (PDL, PLL) | PDL/LM and PLO/LM | PuraMatrix® | Vitronectin | PureCoat™ ECM Mimetic Fn | PureCoat ECM Mimetic COL I | Synthemax® Surface | Ultra-Low Attachment | Osteo Assay Surface | rLaminin-521 (Human) | Primaria™ | CellBIND® Surface | PureCoat Amine | PureCoat Carboxyl | |
| 4T1 (mouse breast cancer cell line) | | | | 372 | | | | | | | | | | | | | | | | | | | |
| Cardiac fibroblast | | 376 | | | | | | | | | | | | | | | | | | | | | |
| Hep3B (hepatoma; toxicity/drug screening) | | 321 | | | | | | | | | | | | | | | | | | | | | |
| MCF-7 (epithelial) | | 321 | | | | | | | | | | | | | 324 | | | | | | | | |
| MCF-10A (epithelial) | | 71 | | 71, 326 | | | | | | 71 | | | | | 333 | | | | | | | | |
| MDA-MB-231 | | 302, 307 | | 302, 326 | | | | | | | | | | | 307, 324 | | | | | | | | |
| MDA-MB-361 | | | | 326 | | | | | | | | | | | | | | | | | | | |
| HeLa | | | | 391 | | | | | | | | | | | 298 | | | | | | | | |
| HT-1080 (epithelial) | | 302, 307 | | 302, 303 | | | | | | | | | | | 307 | | | | | | | | |
| hESC, Rat (endothelium) | | 145, 380 | | 146 | | | | | | 240 | | | | | 381 | | | | | | | | |
| Human melanoma cell lines SBCL2 (RGP), WM-115, (VGP) and 451-LU (MM) and keratinocytes (spheroid model) | | 382 | | | | | | | | | | | | | | | | | | | | | |
| Mouse embryonic pancreatic progenitors (organoid) | | | | 383 | | | | | | | | | | | | | | | | | | | |
| MSCs, Ovarian cancer cells (OCC) | | | | 384 | | | | | | | | | | | 384 | | | | | | | | |
| Primary rat hepatocytes | | | | 387 | | | | | | 42 | | | | | | | | | | | | | |
| Rat hepatocyte progenitor cells (spheroid) | | | | | | | | | | 42, 388 | | | | | | | | | | | | | |
| SK-MEL-28 cells | | | | 306 | | | | | | | | | | | | | | | | | | | |
| MEFs (stromal fibroblast) | | | | 372 | | | | | | | | | | | | | | | | | | | |
| U266 (lymphoblast) | | | | 389 | | | | | | | | | | | | | | | | | | | |

The data in this surface selection guide has been derived from published papers accessed through NCBI databases, as well as various web references. This guide will be periodically updated as additional literature becomes available.

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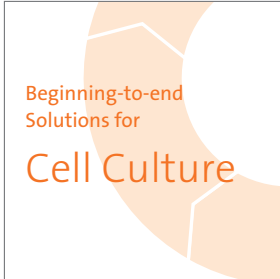
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