BD Extracellular Matrix Proteins

Biological and synthetic surfaces for 2D and 3D cell culture

BD Biosciences provides a wide range of animal, human, and synthetic ECMs for researchers to support improved cell attachment, propagation, differentiation, and migration. BD's extensive experience in protein purification along with rigorous quality assurance testing guarantees high-quality consistent products.

Features

- Provides a wide range of animal, human, and synthetic products to meet the needs of many cell culture systems
- Enables 3D cell culture with gels made from reconstituted basement membranes, purified proteins, or synthetic peptide hydrogel
- Supports in vivo studies, such as cell engraftment, with BD Matrigel™ matrix and BD™ PuraMatrix™ peptide hydrogel
- Ensures high-quality products with extensive quality control testing
- Saves human embryonic stem cell researchers time when using BD Matrigel hESC-qualified matrix

Attachment and differentiation of normal and transformed cells

BD Matrigel matrix, certified LDEV-free and the trusted leading basement membrane, provides a physiologically relevant environment for studies of cell morphology, biochemical function, cell migration or invasion, and gene expression. BD Matrigel matrix is effective for the attachment and differentiation of both normal and transformed anchorage dependent epitheloid cells as well as other cell types including neurons, Sertoli cells, chick lens, vascular endothelial cells, and hepatocytes.

Variety of purified and synthetic proteins and attachment factors

For more defined culture systems, BD provides a wide range of purified proteins for cell attachment including collagen types I to VI, laminin, fibronectin, osteopontin, and vitronectin. For studies of human cells that require **xeno-free** culture conditions, BD offers human collagens, fibronectin, osteopontin, and vitronectin. For researchers who need **animal-free** culture systems, BD offers two synthetic products poly-d-lysine for 2D cell culture and BD PuraMatrix peptide hydrogel for 3D cell culture. Poly-D-Lysine promotes cell attachment and/or differentiation for a variety of cell types including transfected cell lines, neuronal cell lines, glial cells, and primary neurons.

Wide range of applications and cited references

BD ECMs are used for a range applications and cell types including in vitro and in vivo angiogenesis, cell migration and invasion, three-dimensional cell culture, neuronal cell culture, primary hepatocyte culture, culturing human embryonic stem (hES), and induced pluripotent stem (iPS) cells. Be confident in your results with BD ECM's which have been cited in more than 5,400 scientific articles (see the following table for examples of these citations).

BD™ ECM Product Reference Guide

Product	Chemotaxis/Migration	Invasion	3D Culture	Neuronal Cells	Hepatocytes	Endothelial Cells	Tumor Cells	Muscle Cells	Epithelial Cells	Osteoclasts	hES and iPS cells	Non-specific Cell Attachment
BD Cell-Tak™ cell and tissue adhesive Supports surface receptor-independent cell attachment. It can simplify the manipulation of weakly adherent cells and tissue sections in immunofluorescence, in situ hubridization, and immunohistochemistry assays.	–	–	25	–	–	50	–	–	–	–	–	80, 81, 82, 83, 84, 85
BD Matrigel™ matrix **Growth Factor Reduced** is suited for applications where a more highly defined basement membrane preparation is desired. **Phenol Red-Free** is recommended for assays which require color detection. **High Concentration** is suited for in vivo applications where a high protein concentration augments growth of tumors. **hESC-qualified Matrix** supports pluripotent human embryonic stem cell (hESC) growth with mTeSR™1 media from StemCell Technologies.	–	11, 14	19	–	40, 42, 43, 44, 46	49, 52, 53, 54, 55, 57	11, 19, 63, 66, 67, 68	–	19, 63, 66, 70	–	73, 74, 75, 76, 77, 78, 79	–
Collagen Has been shown to be involved in cell attachment and differentiation, integrin binding, and chemotaxis.	1, 2, 5	11, 13	16, 17, 18	28, 33	41, 45, 47, 48	51, 56, 58, 60	1, 69	–	–	72	–	17

References

1. Hall, C.L., et al. Cancer Res. **66**:8648 (2006).
2. Xue, C., et al. Cancer Res. **66**:192 (2006).
3. Azare, J., et al. Mol. Cell Biol. **27**:4444 (2007).
4. Brideau, G., et al. Cancer Res. **67**:11528 (2007).
5. Goldman, J., et al. FASEB J. **21**:1003 (2007).
6. Weaver, A.K., et al. J. Biol. Chem. **282**:31558 (2007).
7. Komander, D., et al. Mol. Biol. Cell. **19**:4837 (2008).
8. Tuinstra, R.A., et al. Proc. Natl. Acad. Sci. **105**:5057 (2008).
9. Chen, R.Q., et al. J. Biol. Chem. **284**:16752 (2009).
10. Zhao, Y., et al. J. Biol. Chem. **284**:1385 (2009).
11. Horak, C.E., et al. Cancer Res. **67**:11751 (2007).
12. Biname, F., et al. Mol. Biol. Cell. **19**:945 (2008).
13. Mack, P.J., et al. J. Biol. Chem. **284**:8412 (2009).
14. Yang, J., et al. Proc. Natl. Acad. Sci. **106**:3913 (2009).
15. Semino, C.E., et al. Differentiation. **71**:262 (2003).
16. Guo, C. & Piacentini, L. J. Biol. Chem. **278**:46699 (2003).
17. Soundararajan, P., et al. J. Neurosci. **26**:3526 (2006).
18. Chen, T., et al. Stem Cells. **25**:392 (2007).
19. Lee, G.Y., et al. Nat. Methods. **4**:359 (2007).
20. Wang, S., et al. Tissue Eng. **14**:227 (2008).
21. Aguirre, A., et al. J. Neurosci. **25**:11092 (2005).
22. Flanagan, L.A., et al. J. Neurosci. Res. **83**:845 (2006).
23. Gelain, F., et al. PLoS ONE. **1**:e119 (2006).
24. Kim, W.Y., et al. Neuron. **52**:981 (2006).
25. Risner, J.R. & Holt J.R. J. Neurophysiol. **96**:2364 (2006).
26. Biernaskie, J., et al. J. Neurosci. **27**:9545 (2007).
27. Hall, B.J., et al. J. Neurosci. **27**:13446 (2007).
28. Iacovitti, L., et al. Brain Res. **1127**:19 (2007).
29. Liew, C.G., et al. Stem Cells. **25**:1521 (2007).
30. Shrestha, B. & Diamond, M.S. J. Virol. **81**:11749 (2007).
31. Tanaka, S., et al. J. Biol. Chem. **282**:10506 (2007).
32. Bard, L., et al. J. Neurosci. **28**:5879 (2008).
33. Heinen, A., et al. Proc. Natl. Acad. Sci. **105**:8748 (2008).
34. Bhattacharyya, B.J., et al. J. Neurosci. **28**:6720 (2008).
35. Samuels, I.S., et al. J. Neurosci. **28**:6983 (2008).
36. Thonhoff, J.R., et al., Brain Res. **1187**:42 (2008).
37. Watase, K., et al. Proc. Natl. Acad. Sci. **105**:11987 (2008).
38. Mitra, S., et al. J. Biol. Chem. **284**:4398 (2009).
39. Kohyama, J., et al. Proc. Natl. Acad. Sci. **105**:18012 (2008).
40. Schuetz, E.G., et al. J. Cell Physiol. **134**:309 (1988).
41. DiPersio, C.M., et al. Mol. Cell Biol. **11**:4405 (1991).
42. Mann, D.J., et al. J. Mol. Endocrinol. **8**:235 (1992).
43. Schuetz, J.D. and Scheutz E.G., Cell Growth and Diff. **4**:31 (1993).
44. Rana, B., et al. Mol. Cell Biol. **14**:5858 (1994).
45. Lee, P., et al. Proc. Natl. Acad. Sci. **101**:9263 (2004).
46. Bi, Y., et al. Drug Metab. Dispos. **34**:1658 (2006).
47. Fahmi, O.A., et al. Drug Metab. Dispos. **36**:1971 (2008).
48. Healan-Greenberg, C., et al. Drug Metab. Dispos. **36**:500 (2008).

The above reference guide only represents a sample of citations for these products.

Product	Chemotaxis/Migration	Invasion	3D Culture	Neuronal Cells	Hepatocytes	Endothelial Cells	Tumor Cells	Muscle Cells	Epithelial Cells	Osteoclasts	hES and iPS cells	Non-specific Cell Attachment
Fibronectin Is involved in cellular migration during wound healing and development as well as regulation of cell growth and differentiation.	3, 4, 7, 8, 10	11, 12	–	22	–	–	11, 65	59, 61, 62	–	–	76	–
Laminin Has been shown to stimulate neurite outgrowth, promote cell attachment, chemotaxis, cell differentiation, and neuronal survival.	9	–	–	22, 24, 26, 27, 29, 30, 31, 32, 34, 35, 37, 38, 39	–	–	64	–	–	–	–	–
Poly-d-lysine Is a synthetic polymer used to promote attachment of a wide variety of cells, particularly neurons, glial cells, and transfected cells.	–	–	–	37, 38	–	–	–	–	–	–	–	–
BD PuraMatrix™ peptide hydrogel Is a synthetic peptide that forms a clear 3D gel which mimics the fiber and pore size of the basement membrane. It can be used for in vitro and in vivo studies.	–	–	15, 20	21, 23, 36	15, 20	86	–	–	–	–	–	–
Vitronectin Mediates cell adhesion by integrin binding to the RGD (Arg-Gly-Asp) motif. Vitronectin participates in a variety of events including haemostasis, phagocytosis, tissue repair, and immune function.	6	–	–	–	–	–	–	–	–	71	–	–

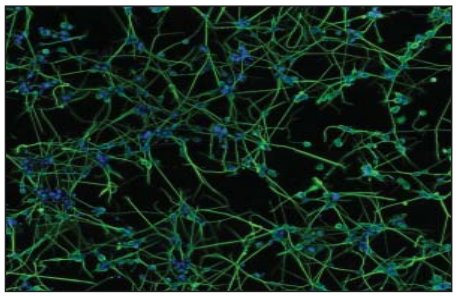
Osteopontin is used to enhance attachment of tumor cell lines and osteoclasts. It is also a chemotactic factor for macrophages, smooth muscle cells, endothelial cells, and glial cells.

3D cell culture systems provide more in vivo-like culture conditions. BD Matrigel matrix, BD collagen I, BD laminin/entactin high concentration, and BD PuraMatrix peptide hydrogel have been developed to meet the wide range of 3D culture needs, from reconstituted basement membrane to synthetic, defined surfaces.

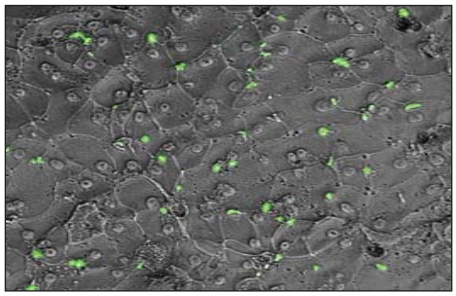
49. Di Simone, N., et al. J. Endocrinol. **189**:691. (2006).
50. Hawkins, B.J., et al. Mol. Cell Biol. **27**:7582 (2007).
51. Ingram, D.A., et al. Stem Cells. **25**:297 (2007).
52. Kong, D., et al. Cancer Res. **67**:3310 (2007).
53. Lee, S., et al. Cell. **130**:691 (2007).
54. Michaud-Levesque, J., et al. Carcinogenesis. **28**:280 (2007).
55. Nishiyama, K., et al. J. Biol. Chem. **282**:17200 (2007).
56. Schmidt, M., et al. Development. **134**:2913 (2007).
57. Takeda, Y., et al. Blood. **109**:1524 (2007).
58. Dugas, J.C., et al. J. Neurosci. **28**:8294 (2008).
59. Hosseinkhani, M., et al. Stem Cells. **24**:571 (2007).
60. Mendias C.L., et al. Proc. Natl. Acad. Sci. **105**:388 (2008).
61. Cohen-Karni, T., et al. Proc. Natl. Acad. Sci. **106**:7309 (2009).
62. Mori, K., et al. J. Biol. Chem. **284**:5067 (2009).
63. Park, C.C., et al. Cancer Res. **66**:1526 (2006).
64. Calabrese, C., et al. Cancer Cell. **11**:69 (2007).
65. Clark, E.S., et al. Cancer Res. **67**:4227 (2007).
66. Itoh, M., et al. Cancer Res. **67**:4759 (2007).
67. Wang, X., et al. Cell. **128**:129 (2007).
68. Postovit, L.M., et al. Proc. Natl. Acad. Sci. **105**:4329 (2008).
69. Radjabi, A.R., et al. J. Biol. Chem. **283**:2822 (2008).
70. Senoo, M., et al. Cell. **129**:523 (2007).
71. Zou et al., J. Biol. Chem. **176**:877 (2007).
72. Yang, D., et al. Endocrinology. **149**:41728 (2008).
73. Xu, C., et al. Nat. Biotechnol. **19**:971 (2001).
74. Amit, M., et al. Biol. Reprod. **70**:837 (2004).
75. Ludwig, T., et al. Nat. Methods. **3**:637 (2006).
76. Ludwig, T., et al. Nat. Biotechnol. **24**:185 (2006).
77. Harb, N., et al. PLoS ONE. **3**:e3001 (2008).
78. Takahashi, K., et al. Cell. **131**:1 (2007).
79. Yu, J., et al. Science. **381**:1917 (2007).
80. Duebel, J., et al. Neuron. **49**:81 (2006).
81. Callen, E., et al. Cell. **130**:63 (2007).
82. Calderon, B., et al. Proc. Natl. Acad. Sci. **105**:6121 (2008).
83. Park, H.S., et al. J. Biol. Chem. **283**:26081 (2008).
84. Haggie, P.M. & Verkman, A.S. J. Biol. Chem. **284**:7681 (2009).
85. Skals, M., et al. Proc. Natl. Acad. Sci. **106**:4030 (2009).
86. Sieminski, AL., et al. Primary sequence of ionic self-assembling peptide gels affects endothelial cell adhesion and capillary morphogenesis. J. Biomed. Mater Res. A **87**:494 (2008).

BD Extracellular Matrix Proteins

Get high quality data with BD ECMs.



PC12 neurite outgrowth on BD Collagen I.



BD Gentest™ choly-lysyl-fluorescein sequestered in the bile canaliculi of BD Gentest inducible-qualified human cryohepatocytes cultured on BD BioCoat collagen I overlaid with BD Matrigel matrix.

Description	Species	Qty.	Cat. No.
BD Extracellular Matrix Proteins and Attachment Factors			
BD Matrigel™ matrix	mouse	5 ml	356234
	mouse	10 ml	354234
	mouse	50 ml (5 x 10 ml)	356235
BD Matrigel matrix, high concentration	mouse	10 ml	354248
BD Matrigel matrix, phenol red-free	mouse	10 ml	356237
BD Matrigel matrix, growth factor reduced	mouse	5 ml	356230
	mouse	10 ml	354230
BD Matrigel matrix, high concentration, growth factor reduced	mouse	10 ml	354263
BD Matrigel matrix, phenol red-free, growth factor reduced	mouse	10 ml	356231
BD Matrigel hESC-qualified matrix	mouse	5 ml	354277
BD Cell-Tak™ cell and tissue adhesive	*Mytilus edulis*	1 mg	354240
	Mytilus edulis	5 mg	354241
	Mytilus edulis	10 mg (2 x 5 mg)	354242
Collagen I	bovine	30 mg	354231
	human	0.25 mg	354243
	human	10 mg	354265
	human recombinant	250 ug	354254
	rat tail	100 mg	354236
	rat tail	1 g (10 x 100 mg)	356236
Collagen I, high concentration	rat tail	100 mg	354249
Collagen II	bovine	5 mg	354257
Collagen III	human	0.25 mg	354244
	human recombinant	250 ug	354255
Collagen IV	human	0.25 mg	354245
	mouse	1 mg	354233
	mouse	10 mg (10 x 1 mg)	356233
Collagen V	human	0.25 mg	354246
Collagen VI	human	500 ug	354261
Fibronectin	human	1 mg	354008
	human	5 mg	356008
	human	25 mg (5 x 5 mg)	356009
Laminin	mouse	1 mg	354232
Ultra-pure laminin	mouse	1 mg	354239
Laminin/entactin complex, high concentration	mouse	10 mg	354259
Osteopontin	human	50 ug	354256
Poly-d-lysine	–	20 mg	354210
BD™ PuraMatrix™ peptide hydrogel	–	5 ml	354250
Vitronectin	human	0.25 mg	354238

To place an order in the U.S., contact Customer Service at: tel: 877.232.8995 fax: 800.325.9637
For technical assistance, contact Technical Support at: tel: 877.232.8995 or 978.901.7389

BD Biosciences
Two Oak Park
Bedford, MA 01730 USA
tel: 877.232.8995
fax: 800.325.9637