

ADVANCED HEALTHCARE MATERIALS

Supporting Information

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Hybrid Endometrial-Derived Hydrogels: Human Organoid Culture Models and In Vivo Perspectives

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Supporting Display items included: Figure S1, Table S1, Table S2, and Table S3.

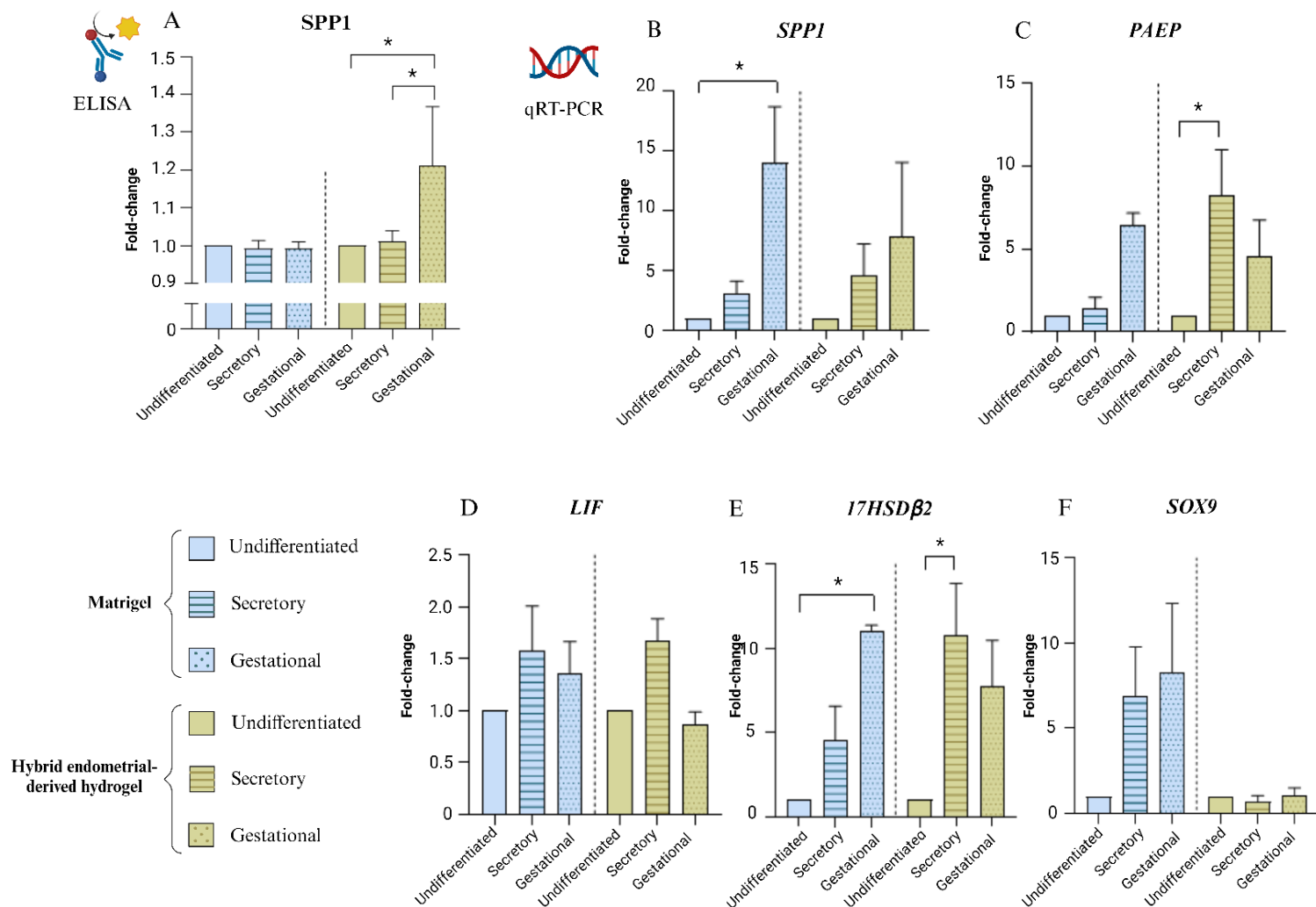


Figure S1. Comparison of hEO biomarker expression within Matrigel or hybrid endometrial-derived hydrogel. (A) SPP1 protein secretion and (B) relative gene expression of *SPP1*, *PAEP*, *LIF*, *17HSDβ2*, and *SOX9* in undifferentiated, secretory, gestational human endometrial organoids (hEOs) grown in the hybrid endometrial-derived hydrogel and Matrigel. Data are presented as the mean fold change from four biopsies (calculated with respect to the expression in the corresponding undifferentiated control group) ± standard error of mean. *p < 0.05.

Table S1. List of EndoECM hydrogel peptides detected by LC-MS/MS.

General protein classification	Protein classification	Peptide name	% Cov	Accession number
Collagen	Collagen I	Collagen type I alpha 2 chain OS=Sus scrofa OX=9823 GN=COL1A2 PE=1 SV=2	32.86	tr F1SFA7 F1SFA7_PIG
Collagen	Collagen I	Collagen alpha-2(I) chain OS=Enhydralutris kenyoni OX=391180 GN=LOC111147195 PE=4 SV=1	14.78	tr A0A2Y9JGL9 A0A2Y9JGL9_ENHLU
Collagen	Collagen I	Collagen alpha-2(I) chain OS=Odocoileus virginianus texanus OX=9880 GN=COL1A2 PE=4 SV=1	15.25	tr A0A6J0Z5J9 A0A6J0Z5J9_ODOVR

Collagen	Collagen I	collagen alpha-1(I) chain OS=Physeter macrocephalus OX=9755 GN=COL1A1 PE=4 SV=1	14.15	tr A0A2Y9FQF2 A0A2Y9FQF2_PHYMC
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Monodelphis domestica OX=13616 GN=COL1A1 PE=4 SV=3	5.52	tr F7CV32 F7CV32_MONDO
Collagen	Collagen I	Collagen alpha-2(I) chain (Fragments) OS=Orycteropus afer OX=9818 GN=COL1A2 PE=1 SV=1	24.56	sp C0HJN4 CO1A2_ORYAF
Collagen	Collagen I	collagen alpha-1(I) chain OS=Dipodomys ordii OX=10020 GN=Col1a1 PE=4 SV=1	11.49	tr A0A1S3GXN3 A0A1S3GXN3_DIPOR
Collagen	Collagen I	Collagen alpha-2(I) chain OS=Rattus norvegicus OX=10116 GN=Col1a2 PE=1 SV=3	10.35	tr F1LS40 F1LS40_RAT
Collagen	Collagen I	Collagen alpha-2(I) chain OS=Castor canadensis OX=51338 GN=COL1A2 PE=4 SV=1	4.39	tr A0A250Y7L9 A0A250Y7L9_CASCN
Collagen	Collagen I	Collagen alpha-2(I) chain OS=Erinaceus europaeus OX=9365 GN=COL1A2 PE=4 SV=1	11.04	tr A0A1S2ZPI9 A0A1S2ZPI9_ERIEU
Collagen	Collagen I	Collagen type I alpha 2 chain OS=Suricata suricatta OX=37032 GN=COL1A2 PE=4 SV=1	22.09	tr A0A673THT2 A0A673THT2_SURSU
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Sus scrofa OX=9823 GN=COL1A1 PE=1 SV=1	18.75	tr A0A5G2QQE9 A0A5G2QQE9_PIG
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Myotis lucifugus OX=59463 GN=COL1A1 PE=4 SV=1	12.36	tr G1QDY4 G1QDY4_MYOLU
Collagen	Collagen I	Collagen alpha-2(I) chain (Fragments) OS=Toxodon sp. OX=1563122 GN=COL1A2 PE=1 SV=1	17.40	sp C0HJP8 CO1A2_TOXSP
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Cavia porcellus OX=10141 GN=COL1A1 PE=4 SV=2	9.35	tr H0V0L8 H0V0L8_CAVPO
Collagen	Collagen I	Collagen alpha-2(I) chain-like isoform X2 OS=Lipotes vexillifer OX=118797 GN=LOC103069249 PE=4 SV=1	8.11	tr A0A340WV05 A0A340WV05_LIPVE
Collagen	Collagen II	Collagen alpha-1(II) chain isoform X1 OS=Physeter macrocephalus OX=9755 GN=COL2A1 PE=4 SV=1	6.52	tr A0A2Y9EMB7 A0A2Y9EMB7_PHYMC
Collagen	Collagen III	Collagen alpha-1(III) chain OS=Bison bison OX=43346 GN=COL3A1 PE=4 SV=1	5.39	tr A0A6P3J3V1 A0A6P3J3V1_BISBI
Collagen	Collagen III	Collagen type III alpha 1 chain OS=Ornithorhynchus anatinus OX=9258 GN=COL3A1 PE=4 SV=2	3.99	tr F7B0J9 F7B0J9_ORNAN
Collagen	Collagen III	Collagen type III alpha 1 chain OS=Rhinolophus ferrumequinum OX=59479 GN=mRhiFer1_003162 PE=4 SV=1	3.28	tr A0A7J7YGW2 A0A7J7YGW2_RHIFE
Collagen	Collagen III	Collagen alpha-1(III) chain preproprotein OS=Sus scrofa OX=9823 GN=COL3A1 PE=1 SV=2	3.75	tr F1RYI8 F1RYI8_PIG
Collagen	Collagen III	collagen alpha-1(III) chain isoform X1 OS=Phyllostomus discolor OX=89673 GN=COL3A1 PE=4 SV=1	2.81	tr A0A7E6DJG4 A0A7E6DJG4_9CHIR
Collagen	Collagen IV	Collagen type IV alpha 2 chain OS=Ictidomys tridecemlineatus OX=43179 GN=COL4A2 PE=4 SV=2	0.53	RRRRRtr I3N655 I3N655_ICTTR
Collagen	Collagen V	Collagen alpha-2(V) chain OS=Sus scrofa OX=9823 GN=COL5A2 PE=1 SV=1	1.33	tr Q59IP2 Q59IP2_PIG

Collagen	Collagen V	Collagen type V alpha 3 chain OS=Loxodonta africana OX=9785 GN=COL5A3 PE=4 SV=1	1.79	tr G3U7D7 G3U7D7_LOXAF
Collagen	Collagen VI	Collagen alpha-3(VI) chain isoform 4 OS=Sus scrofa OX=9823 PE=4 SV=1	4.84	tr A0A480XVS1 A0A480XVS1_PIG
Collagen	Collagen VI	Collagen type VI alpha 2 chain OS=Bos taurus OX=9913 GN=COL6A2 PE=1 SV=1	2.18	tr Q1JQB0 Q1JQB0_BOVIN
Collagen	Collagen VI	Collagen alpha-3(VI) chain isoform 4 OS=Sus scrofa OX=9823 PE=4 SV=1	4.86	tr A0A480QLL4 A0A480QLL4_PIG
Collagen	Collagen XIV	Collagen type XIV alpha 1 chain OS=Myotis myotis OX=51298 GN=mMyoMyo1_003127 PE=4 SV=1	0.45	tr A0A7J7TJ09 A0A7J7TJ09_MYOMY
Collagen	Collagen XXVIII	collagen alpha-1(XXVIII) chain isoform X6 OS=Phascolarctos cinereus OX=38626 GN=COL28A1 PE=4 SV=1	1.46	tr A0A6P5LJ27 A0A6P5LJ27_P HACI
ECM glycoprotein	Laminin	Laminin subunit beta 1 OS=Sus scrofa OX=9823 GN=LAMB1 PE=1 SV=4	3.92	tr F1SAE9 F1SAE9_PIG
ECM glycoprotein	Laminin	Laminin subunit beta 2 OS=Sus scrofa OX=9823 GN=LAMB2 PE=1 SV=4	2.27	tr F1SPT5 F1SPT5_PIG
ECM glycoprotein	Laminin	Laminin subunit alpha-5 OS=Sus scrofa OX=9823 PE=4 SV=1	1.16	tr A0A480YRU8 A0A480YRU8_PIG
ECM glycoprotein	Dermatopontin	Dermatopontin OS=Odocoileus virginianus texanus OX=9880 GN=DPT PE=3 SV=1	27.36	tr A0A6J0VX25 A0A6J0VX25_ODOVR
ECM glycoprotein	Fibrillin	Fibrillin-1 OS=Sus scrofa OX=9823 GN=FBN1 PE=1 SV=3	27.03	tr F1SN67 F1SN67_PIG
ECM glycoprotein	Fibronectin	Fibronectin OS=Sus scrofa OX=9823 PE=4 SV=1	15.55	tr A0A480S614 A0A480S614_PIG
ECM glycoprotein	Fibrinogen	Fibrinogen beta chain OS=Sus scrofa OX=9823 GN=FGB PE=1 SV=3	21.38	tr I3L651 I3L651_PIG
ECM glycoprotein	Fibrinogen	Fibrinogen alpha chain OS=Sus scrofa OX=9823 GN=FGA PE=1 SV=4	3.46	tr F1RX36 F1RX36_PIG
ECM glycoprotein	Fibrinogen	Fibrinogen gamma chain OS=Sus scrofa OX=9823 GN=FGG PE=1 SV=2	2.20	tr I3LJW2 I3LJW2_PIG
ECM glycoprotein	Von Willebrand factor	Von Willebrand factor OS=Sus scrofa OX=9823 GN=VWF PE=1 SV=3	1.09	tr K7GNN0 K7GNN0_PIG
ECM regulators	Elastase inhibitor	Elastase. neutrophil expressed OS=Sus scrofa OX=9823 GN=ELANE PE=1 SV=2	23.62	tr I3LK80 I3LK80_PIG
ECM regulators	Elastase inhibitor	Leukocyte elastase inhibitor OS=Sus scrofa OX=9823 GN=SERPINB1 PE=2 SV=1	7.41	tr M3TYG7 M3TYG7_PIG
ECM regulators	Serpin	SERPIN domain-containing protein OS=Sus scrofa OX=9823 GN=LOC100156325 PE=1 SV=3	2.96	tr F1SCC6 F1SCC6_PIG
ECM regulators	Plasminogen	Plasminogen OS=Sus scrofa OX=9823 GN=PLG PE=1 SV=3	3.32	tr F1SB81 F1SB81_PIG
ECM regulators	Transglutaminase	Transglutaminase 2 OS=Sus scrofa OX=9823 GN=TGM2 PE=1 SV=3	2.34	tr F1SDX6 F1SDX6_PIG
ECM affiliated proteins	Annexin	Annexin OS=Camelus ferus OX=419612 GN=CB1_000598015 PE=3 SV=1	20.19	tr S9YFQ9 S9YFQ9_CAMFR
ECM affiliated proteins	Lectin	C-type lectin domain-containing protein OS=Sus scrofa OX=9823 GN=LOC110259262 PE=1 SV=2	4.44	tr I3LEF9 I3LEF9_PIG
ECM affiliated proteins	Lectin	C-type lectin domain-containing protein OS=Sus scrofa OX=9823 PE=4 SV=1	4.44	tr A0A4X1VP71 A0A4X1VP71_PIG

ECM affiliated proteins	Lectin	C-type lectin domain-containing protein OS=Sus scrofa OX=9823 GN=LOC100625180 PE=4 SV=1	4.44	tr A0A4X1VRS4 A0A4X1VRS4_PIG
ECM affiliated proteins	Lectin	C-type lectin domain-containing protein OS=Sus scrofa OX=9823 GN=LOC110259262 PE=4 SV=2	4.44	tr A0A286ZIU8 A0A286ZIU8_PIG
Secreted factors	Protein S100	S100 calcium binding protein A9 OS=Sus scrofa OX=9823 GN=S100A9 PE=1 SV=1	6.76	tr K7GME6 K7GME6_PIG
Other components	Azurocidin	Azurocidin OS=Sus scrofa OX=9823 GN=AZU1 PE=1 SV=2	46.75	sp P80015 CAP7_PIG
Other components	Caveolin	Caveolin-1 OS=Bos mutus OX=72004 GN=E5288_WYG014419 PE=3 SV=1	16.77	tr A0A6B0R7N6 A0A6B0R7N6_9CETA
Other components	Caveolin	Caveolin-2 OS=Equus caballus OX=9796 GN=CAV2 PE=3 SV=1	5.52	tr A0A3Q2L026 A0A3Q2L026_HORSE
Other components	Beta actin	Actin cytoplasmic 1 OS=Bison bison bison OX=43346 GN=ACTB PE=3 SV=1	27.20	tr A0A6P3HXP4 A0A6P3HXP4_BISBI
Other components	Beta actin	Actin-depolymerizing factor OS=Ovis aries OX=9940 GN=GSN PE=3 SV=1	1.92	tr W5P627 W5P627_SHEEP
Other components	Vimentin	Vimentin OS=Ovis aries OX=9940 GN=VIM PE=3 SV=1	4.86	tr W5PNW7 W5PNW7_SHEEP

Table S2. List of peptides of EndoECM hydrogel and PuraMatrix detected in the hybrid endometrial-derived hydrogel by LC-MS/MS.

EndoECM hydrogel

General protein classification	Protein classification	Peptide name	% Cov	Accession number
Collagen	Collagen I	Collagen type I alpha 2 chain OS=Sus scrofa OX=9823 GN=COL1A2 PE=1 SV=2	25.02	tr F1SFA7 F1SFA7_PIG
Collagen	Collagen I	collagen alpha-2(I) chain OS=Enhydra lutris kenyoni OX=391180 GN=LOC111147195 PE=4 SV=1	12.14	tr A0A2Y9JGL9 A0A2Y9JGL9_ENHLU
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Ornithorhynchus anatinus OX=9258 GN=COL1A1 PE=4 SV=2	10.01	tr F7ESN3 F7ESN3_ORNAN
Collagen	Collagen I	collagen alpha-1(I) chain OS=Physeter macrocephalus OX=9755 GN=COL1A1 PE=4 SV=1	11.83	tr A0A2Y9FQF2 A0A2Y9FQF2_PHYMC
Collagen	Collagen I	collagen alpha-2(I) chain OS=Peromyscus maniculatus bairdii OX=230844 GN=Col1a2 PE=4 SV=1	8.65	tr A0A6I9M7T0 A0A6I9M7T0_PERMB
Collagen	Collagen I	collagen alpha-1(I) chain OS=Dipodomys ordii OX=10020 GN=Col1a1 PE=4 SV=1	9.71	tr A0A1S3GXN3 A0A1S3GXN3_DIPOR
Collagen	Collagen I	Collagen alpha-2(I) chain OS=Rattus norvegicus OX=10116 GN=Col1a2 PE=1 SV=3	8.75	tr F1LS40 F1LS40_RAT
Collagen	Collagen I	collagen alpha-2(I) chain OS=Erinaceus europaeus OX=9365 GN=COL1A2 PE=4 SV=1	7.90	tr A0A1S2ZPI9 A0A1S2ZPI9_ERIEU
Collagen	Collagen I	collagen alpha-2(I) chain OS=Odocoileus virginianus texanus OX=9880 GN=COL1A2 PE=4 SV=1	12.61	tr A0A6J0Z5J9 A0A6J0Z5J9_ODOVR
Collagen	Collagen I	Collagen type I alpha 2 chain OS=Suricata suricatta OX=37032 GN=COL1A2 PE=4 SV=1	18.58	tr A0A673THT2 A0A673THT2_SURSU
Collagen	Collagen I	collagen alpha-1(I) chain OS=Trichechus manatus latirostris OX=127582 GN=LOC101354262 PE=4 SV=1	11.16	tr A0A2Y9DPQ3 A0A2Y9DPQ3_TRIMA
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Felis catus OX=9685 GN=COL1A1 PE=4 SV=3	11.91	tr M3W2F5 M3W2F5_FELCA

Collagen	Collagen I	Collagen type I alpha 1 chain OS=Myotis lucifugus OX=59463 GN=COL1A1 PE=4 SV=1	13.73	tr G1QDY4 G1QDY4_MYOLU
Collagen	Collagen I	Collagen alpha-2(I) chain (Fragments) OS=Toxodon sp. OX=1563122 GN=COL1A2 PE=1 SV=1	14.76	sp C0HJP8 CO1A2_TOXSP
Collagen	Collagen I	Collagen type I alpha 1 chain OS=Cavia porcellus OX=10141 GN=COL1A1 PE=4 SV=2	12.24	tr H0V0L8 H0V0L8_CAVPO
Collagen	Collagen I	collagen alpha-2(I) chain OS=Mus caroli OX=10089 GN=Col1a2 PE=4 SV=1	7.14	tr A0A6P5PPK1 A0A6P5PPK1_MUSCR
Collagen	Collagen II	Collagen alpha-1(II) chain OS=Fukomys damarensis OX=885580 GN=H920_11344 PE=4 SV=1	1.30	tr A0A091DAI9 A0A091DAI9_FUKDA
Collagen	Collagen III	collagen alpha-1(III) chain OS=Bison bison bison OX=43346 GN=COL3A1 PE=4 SV=1	5.66	tr A0A6P3J3V1 A0A6P3J3V1_BISBI
Collagen	Collagen III	Collagen type III alpha 1 chain OS=Ornithorhynchus anatinus OX=9258 GN=COL3A1 PE=4 SV=2	3.99	tr F7B0J9 F7B0J9_ORNAN
Collagen	Collagen III	collagen alpha-1(III) chain isoform X1 OS=Phyllostomus discolor OX=89673 GN=COL3A1 PE=4 SV=1	1.99	tr A0A7E6DJG4 A0A7E6DJG4_9CHIR
Collagen	Collagen III	collagen alpha-1(III) chain OS=Enhydra lutris kenyoni OX=391180 GN=LOC111148079 PE=4 SV=1	3.07	tr A0A2Y9JGN5 A0A2Y9JGN5_ENHLU
Collagen	Collagen V	Collagen alpha-2(V) chain OS=Sus scrofa OX=9823 GN=COL5A2 PE=1 SV=1	1.33	tr Q59IP2 Q59IP2_PIG
Collagen	Collagen V	Collagen type V alpha 1 chain OS=Cavia porcellus OX=10141 GN=COL5A1 PE=4 SV=2	0.49	tr H0W3X0 H0W3X0_CAVPO
Collagen	Collagen VI	Collagen alpha-3(VI) chain isoform 4 OS=Sus scrofa OX=9823 PE=4 SV=1	4.01	tr A0A480QLL4 A0A480QLL4_PIG
Collagen	Collagen VI	Collagen type VI alpha 1 chain OS=Ictidomys tridecemlineatus OX=43179 GN=Col6a1 PE=4 SV=2	3.21	tr I3NGQ8 I3NGQ8 ICTTR
Collagen	Collagen VI	Collagen type VI alpha 3 chain OS=Otolemur garnettii OX=30611 GN=COL6A3 PE=4 SV=1	0.60	tr H0XEJ5 H0XEJ5_OTOGA
Collagen	Collagen XIV	Collagen type XIV alpha 1 chain OS=Myotis myotis OX=51298 GN=mMyoMyo1_003127 PE=4 SV=1	0.45	tr A0A7J7TJ09 A0A7J7TJ09_MYOMY
Collagen	Collagen XXVIII	collagen alpha-1(XXVIII) chain isoform X6 OS=Phascolarctos cinereus OX=38626 GN=COL28A1 PE=4 SV=1	1.46	tr A0A6P5LJ27 A0A6P5LJ27_PHACI
ECM glycoprotein	Laminin	Laminin subunit gamma 1 OS=Sus scrofa OX=9823 GN=LAMC1 PE=1 SV=3	8.50	tr F1S663 F1S663_PIG
ECM glycoprotein	Laminin	Laminin subunit beta 2 OS=Sus scrofa OX=9823 GN=LAMB2 PE=1 SV=4	1.16	tr F1SPT5 F1SPT5_PIG
ECM glycoprotein	Laminin	Laminin subunit beta 1 OS=Sus scrofa OX=9823 GN=LAMB1 PE=1 SV=4	1.85	tr F1SAE9 F1SAE9_PIG
ECM glycoprotein	Dermatopontin	dermatopontin OS=Odocoileus virginianus texanus OX=9880 GN=DPT PE=3 SV=1	27.36	tr A0A6J0VX25 A0A6J0VX25_ODOVR
ECM glycoprotein	Fibrillin	Fibrillin-1 OS=Sus scrofa OX=9823 GN=FBN1 PE=1 SV=3	19.89	tr F1SN67 F1SN67_PIG
ECM glycoprotein	Fibronectin	Fibronectin OS=Sus scrofa OX=9823 PE=4 SV=1	14.29	tr A0A480S614 A0A480S614_PIG
ECM glycoprotein	Fibrinogen	Fibrinogen beta chain OS=Sus scrofa OX=9823 GN=FGB PE=1 SV=3	27.09	tr I3L651 I3L651_PIG
ECM glycoprotein	Fibrinogen	Fibrinogen alpha chain OS=Sus scrofa OX=9823 GN=FGA PE=1 SV=4	1.19	tr F1RX36 F1RX36_PIG
ECM glycoprotein	Von Willebrand factor	von Willebrand factor OS=Sus scrofa OX=9823 GN=VWF PE=1 SV=3	1.09	tr K7GNN0 K7GNN0_PIG
ECM glycoprotein	Tenascin XB	Tenascin XB OS=Sus scrofa OX=9823 GN=TNXB PE=3 SV=1	1.26	tr A5A8W4 A5A8W4_PIG
ECM glycoprotein	Nephronectin	Nephronectin OS=Felis catus OX=9685 GN=NPNT PE=3 SV=3	3.61	tr M3X223 M3X223_FELCA
ECM regulators	Elastase inhibitor	Elastase. neutrophil expressed OS=Sus scrofa OX=9823 GN=ELANE PE=1 SV=2	19.93	tr I3LK80 I3LK80_PIG

ECM regulators	Serpin	SERPIN domain-containing protein OS=Sus scrofa OX=9823 GN=LOC100156325 PE=1 SV=3	2.96	tr F1SCC6 F1SCC6_PIG
ECM regulators	Plasminogen	Plasminogen OS=Sus scrofa OX=9823 GN=PLG PE=1 SV=3	2.30	tr F1SB81 F1SB81_PIG
ECM regulators	Transglutaminase	Transglutaminase 2 OS=Sus scrofa OX=9823 GN=TGM2 PE=1 SV=3	6.28	tr F1SDX6 F1SDX6_PIG
ECM affiliated proteins	Annexin	Annexin OS=Camelus ferus OX=419612 GN=CB1_000598015 PE=3 SV=1	13.14	tr S9YFQ9 S9YFQ9_CAMFR
ECM affiliated proteins	Lectin	C-type lectin domain-containing protein OS=Sus scrofa OX=9823 GN=LOC110259262 PE=4 SV=2	13.33	tr A0A286ZIU8 A0A286ZIU8_PIG
Secreted factors	Protein S100	Protein S100 OS=Gorilla gorilla gorilla OX=9595 PE=3 SV=1	11.83	tr G3RWR9 G3RWR9_GORGO
Other components	Azurocidin	Azurocidin OS=Sus scrofa OX=9823 GN=AZU1 PE=1 SV=2	41.87	sp P80015 CAP7_PIG
Other components	Caveolin	Caveolin (Fragment) OS=Bos taurus OX=9913 GN=CAV1 PE=2 SV=1	27.96	tr Q3ZBX4 Q3ZBX4_BOVIN
Other components	Caveolin	Caveolin OS=Sus scrofa OX=9823 GN=CAV2 PE=2 SV=1	9.88	tr G8GCE6 G8GCE6_PIG
Other components	Vimentin	Vimentin OS=Ovis aries OX=9940 GN=VIM PE=3 SV=1	4.07	tr W5PNW7 W5PNW7_SHEEP

PuraMatrix

Peptide name	Sequence	% Cov	Modification
AcN-(RADA) ₄ -CNH ₂	ADARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ARADARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ARADARADARADA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	DARADARADAR	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	RADARADARA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	RADARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	RADARADARADA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	RADARADARADARA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	RADARADARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	RADARADARADARADA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ARADARADA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ARADARADARA	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ADARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ADARADARAD	100	Acetyl@N-term
AcN-(RADA) ₄ -CNH ₂	ARADARADA	100	Acetyl@N-term

Table S3. Matrisome components of the EndoECM and/or the hybrid endometrial-derived hydrogels with relevant biological processes and molecular functions.

		PROTEIN	EndoECM hydrogel	Hybrid endometrial-derived hydrogel	ECM-RELATED BIOLOGICAL PROCESSES	ECM-RELATED MOLECULAR FUNCTION
CORE MATRISOME	Collagens	Collagen I	✓	✓	Collagen fibril organization; collagen metabolic processes.	ECM structural constituent; identical protein binding; platelet-derived growth factor (PDGF) binding.
		Collagen II	✓	✓	Collagen fibril organization; collagen metabolic processes.	ECM structural constituent; identical protein binding; PDGF binding.
		Collagen III	✓	✓	Collagen fibril organization; collagen metabolic processes.	ECM structural constituent conferring tensile strength; integrin binding; PDGF binding.
		Collagen IV	✓		Collagen fibril organization; collagen metabolic processes.	ECM structural constituent conferring tensile strength; protein binding; PDGF binding.
		Collagen V	✓	✓	Collagen fibril organization.	ECM structural constituent conferring tensile strength.
		Collagen VI	✓	✓	Collagen fibril organization; collagen metabolic processes.	ECM structural constituent conferring tensile strength.
		Collagen XIV	✓	✓	Collagen fibril organization.	ECM structural constituent conferring tensile strength; hormone receptor binding.
	Collagen XXVIII	✓	✓	Collagen fibril organization; collagen metabolic processes.	ECM structural constituent conferring tensile strength.	
	ECM glycoproteins	Laminin	✓	✓	Regulation of basement membrane organization; cell-substrate adhesion; regulation of extracellular matrix organization; substrate adhesion-dependent cell spreading.	ECM structural constituent; integrin binding; structural molecule activity; cell adhesion molecule binding.
Dermatopontin		✓	✓	Cell-substrate adhesion; cell adhesion.	ECM structural constituent; structural molecule activity; cell adhesion molecule binding.	

MATRISOME-ASSOCIATED	ECM regulators	Fibrillin	✓	✓	Sequestering of TGF- β in ECM; maintenance of protein location in extracellular region; sequestering of extracellular ligand from receptor.	ECM structural constituent conferring elasticity; structural molecule activity conferring elasticity.
		Fibronectin	✓	✓	Elastic fiber formation.	ECM structural constituent; integrin binding; collagen binding; heparin binding; proteoglycan binding.
		Fibrinogen	✓	✓	Positive regulation of heterotypic cell-cell adhesion.	ECM structural constituent; cell adhesion molecule binding.
		Von Willebrand factor	✓	✓	Protein complex oligomerization.	Integrin binding; collagen binding; chaperone binding.
		Tenascin XB		✓	Positive regulation of cell fate determination.	Collagen fibril binding.
		Nephronectin		✓	Positive regulation of TFG- β ; positive regulation of transmembrane receptor protein.	ECM structural constituent; integrin binding.
	ECM affiliated proteins	Elastase inhibitor	✓	✓	Biosynthetic process of antibacterial peptides.	Heparin binding; serine-type endopeptidase activity.
		Serpin	✓	✓	Negative regulation of endopeptidase activity.	Endopeptidase inhibitor activity; serine-type endopeptidase inhibitor activity.
		Plasminogen	✓	✓	Regulation of ECM organization; gene expression involved in ECM organization.	ECM constituent conferring elasticity; protein antigen binding.
		Peptidase inhibitor		✓	Negative regulation of endopeptidase activity.	Endopeptidase inhibitor activity; serine-type endopeptidase inhibitor activity.
		Serine protease		✓	Collagen catabolic process; basement membrane assembly.	Serine-type endopeptidase activity; hormone receptor binding.
		Transglutaminase	✓	✓	Cellular response to serotonin.	Protein-glutamine glutaminase activity.
	Annexin	✓	✓	Collagen fibril organization; basement membrane assembly; polarized secretion of basement membrane proteins.	ECM structural constituent; phosphatidylserine binding; actin binding; S100 protein binding; cadherin binding involved in cell-cell adhesion.	

		Lectin	✓	✓	ECM organization; ECM assembly; gene expression involved in ECM organization.	ECM structural constituent conferring compression resistance; laminin binding.
	Secreted factors	Protein S100	✓	✓	Regulation of ECM organization; gene expression involved in ECM organization.	Calcium ion binding; microtubule binding; zinc ion binding; Toll-like receptor 4 binding; arachidonic acid binding; RAGE receptor binding.
OTHER EXTRACELLULAR COMPONENTS		Azurocidin	✓	✓	Induction of positive chemotaxis; ECM-cell signaling.	Heparin binding; heparan sulfate proteoglycan binding.
		Beta actin	✓		Regulation of transepithelial transport; protein localization to adherent junction.	Structural constituent of postsynaptic actin cytoskeleton; tat protein binding.
		Caveolin	✓	✓	Maintenance of protein location in cell.	Transmembrane transporter binding; hormone receptor binding; cholesterol binding.
		Vimentin	✓		Positive regulation of collagen biosynthetic process.	Keratin filament binding, scaffold protein binding.