

SUPPLEMENTARY MATERIALS

Table S1. Materials Used for Cell Culturing and Isolation

Materials	Sources	Concentration
Dulbecco's modified Eagle's Medium (DMEM)	Gibco	DMEM/F-12 (1:1)
Knockout Serum Replacement	Gibco	10%
Human Fibroblast Growth Factor-Basic	PEPRO TECH	4 ng/ml
Leukemia inhibitory factor (LIF)	PEPRO TECH	10 ng/ml
Insulin-Transferrin-sodium selenite media supplement	Sigma	5 µg/ml insulin, 5 µg/ml Transferrin, 5 ng/ml sodium selenite
Amphotericin B	Nanjing Sai Hong Rui Biotechnology Co., Ltd	50 µg/ml
Gentamicin	YiChang Humanwell	1.25 µg/ml
Collagenase A	Invitrogen	1 mg/ml
Matrigel™ Basement Membrane Matrix	BD Biosciences	5%
Trypsin and EDTA (T/E)	Servicebio	0.25% and 1 mM
Dimethyl Sulfoxide	Shanghai Xihe Technology Co., Ltd	0.5%
Human PrimerView Gene Expression Array	Affymetrix, Beijing, China	N/A
OriCell™ Human Mesenchymal Stem Cells (Derived from bone marrow)	Cyagen, Guangzhou, China	N/A
OriCell™ Human Mesenchymal Stem Cell Growth Medium	Cyagen, Guangzhou, China	N/A

Table S2 Reaction system of RNA reverse to cDNA

Component	Vol. (μ l)
5x RT Buffer	4
Enzyme Mix	1
Primer Mix	1
RNA template(0.5 μ g) + H ₂ O	14
Total volume	20

Table S3 Reaction system of real time RT-qPCR

Component	Vol.
2×SYBR Green qPCR buffer	5 μ l
Forward primer (10 μ M)	0.5 μ l
Reverse primer (10 μ M)	0.5 μ l
Template	5 ng
ddH ₂ O	X μ l
Total volume	10 μ l

Table S4. Primer Sequence Use for Real-time RT-qPCR

Gene Bank NO.	Primer	Sequence(5'to3')
ENG	Forward	CTGACCTGTCTGGTTGCACAA
	Reverse	GATGAGGAAGGCACCAAAGG
NT5E	Forward	AATCACTGCATTACAACCTGAAGTAGA
	Reverse	CTTTCTGAGCGATGAGTTTATCCA
THY1	Forward	AGAGGGCTACAAAGGAGGACAA
	Reverse	ACTCCACCCCACCTGACTTG
PDGFRB	Forward	GGCACCAACCCTGCATTG
	Reverse	CTCCCTCCTTGGACCAACTCT
VIM	Forward	TGCCAACCGGAACAATGAC
	Reverse	ACTGCACCTGTCTCCGGTACTC
KIT	Forward	TATTCCCAAGCCCATGAGTC
	Reverse	ACGTGGAACACCAACATCCT
KITLG	Forward	CAGTCATAGATTGGAGTTTGCAT
	Reverse	CACATACACATCACATTTTACAACCT
SOX4	Forward	GGCAGTTCCGTTAAGGGTTT
	Reverse	TGTTTTTGTGGCCTTGAATTT
COL4A1	Forward	TGGCTCTGGCTGTGGCAA
	Reverse	CCCAATGACACCTTGTAACCC
COL14A1	Forward	GCTCAAAGAGGAATTGGGAAA
	Reverse	TTCTTTTCCTGCTAGGGACAT
LAMA1	Forward	GCCAGCTCTAATGCCATC
	Reverse	GGGTTGACAAATTCCTCCAAA
LAMA2	Forward	GCAAGCCACTGGAGGTTAAT
	Reverse	GACAGACTCTTCCTGGGGTTA

THBS2	Forward	AAACCCAAGTGCCTTCAGAG
	Reverse	GCCCAATTTTCACTCCACAT
FZD1	Forward	GAGATAGCGCCTGAAATAAACAAAA
	Reverse	GAGGAGCACACAGGATTTAATGC
BMP2	Forward	AGAAAGAATAAAGCAGGATCCATAGAA
	Reverse	GGAAAGAAGAACAACAACCATCA
CXCL12	Forward	TGCTTACCCGCAAAAGACAA
	Reverse	GGCTTCAGAGGCAATCACAAA
FGF13	Forward	TGTCAACCCCAGTCAGTAAAGA
	Reverse	TTTACACAAGAAGCCACAACAA
GAPDH	Forward	TGACTTCAACAGCGACACCCA
	Reverse	CACCCTGTTGCTGTAGCCAAA

Table S5. Differential gene expression between LNC and BMMS in ECM and growth factor related pathways, as well as WNT and other selected pathways

Gene ID	q-value (%)	Fold Chang e	Gene Title	Gene Symbol	Entrez Gene
extracellular matrix organization					
11716532_a_at	0	272.3	"EGF-like-domain, multiple 6"	EGFL6	25975
11727345_s_at	0	113.79	fibulin 1	FBLN1	2192
11723635_s_at	0	35.7	"matrix metalloproteinase 3 (stromelysin 1, progelatinase)"	MMP3	4314
11740238_a_at	0	34.3	sulfatase 2	SULF2	55959
11730726_s_at	0	33.4	"angiotensinogen (serpin peptidase inhibitor, clade A, member 8)"	AGT	183
11721475_a_at	0	32.0	glycoprotein M6B	GPM6B	2824
11754429_a_at	0	26.7	"laminin, alpha 2"	LAMA2	3908
11729385_at	0	24.8	forkhead box F1	FOXF1	2294
11723030_at	0	16.8	cysteine-rich secretory protein LCCL domain containing 2	CRISPLD 2	83716
11715496_a_at	0	16.0	cathepsin K	CTSK	1513
11738028_a_at	0	15.8	"laminin, alpha 1"	LAMA1	28421 7
11756706_a_at	0	12.6	dipeptidyl-peptidase 4	DPP4	1803
11739782_a_at	0	11.6	"synuclein, alpha (non A4 component of amyloid precursor)"	SNCA	6622
11746856_a_at	0	0.054	"serpin peptidase inhibitor, clade E (nexin,	SERPINE 1	5054

			plasminogen activator inhibitor type 1), member 1"		
11725766_x_at	0	0.078	"collagen, type XI, alpha 1"	COL11A1	1301
11717803_a_at	0	0.096	netrin 4	NTN4	59277
11757425_s_at	0	0.071	vascular cell adhesion molecule 1	VCAM1	7412
11720448_at	0	0.095	SRY (sex determining region Y)-box 9	SOX9	6662
11715453_a_at	0	0.091	"collagen, type IV, alpha 2"	COL4A2	1284
11726855_at	0	0.077	"ADAM metallopeptidase with thrombospondin type 1 motif, 5"	ADAMTS5	11096
11716639_a_at	0	0.097	"collagen, type IV, alpha 1"	COL4A1	1282
11725584_at	0	0.086	hyaluronan synthase 3	HAS3	3038
11718243_a_at	0	0.081	"integrin, alpha 7"	ITGA7	3679
11724065_at	0	0.074	integrin-binding sialoprotein	IBSP	3381
11727790_x_at	0	0.044	secreted phosphoprotein 1	SPP1	6696
11725376_at	0	0.011	hyaluronan and proteoglycan link protein 1	HAPLN1	1404
ECM-receptor interaction					
11754429_a_at	0	26.7	"laminin, alpha 2"	LAMA2	3908
11738028_a_at	0	15.7	"laminin, alpha 1"	LAMA1	28421
					7
11742712_a_at	0	10.1	thrombospondin 2	THBS2	7058
11725766_x_at	0	0.078	"collagen, type XI, alpha 1"	COL11A1	1301

11715453_a_at	0	0.091	"collagen, type IV, alpha 2"	COL4A2	1284
11716639_a_at	0	0.097	"collagen, type IV, alpha 1"	COL4A1	1282
11718243_a_at	0	0.081	"integrin, alpha 7"	ITGA7	3679
11724065_at	0	0.074	integrin-binding sialoprotein	IBSP	3381
11727790_x_at	0	0.044	secreted phosphoprotein 1	SPP1	6696
Focal adhesion					
11754429_a_at	0	26.7	"laminin, alpha 2"	LAMA2	3908
11722855_at	0	19.5	platelet derived growth factor D	PDGFD	80310
11738028_a_at	0	15.7	"laminin, alpha 1"	LAMA1	28421 7
11715852_at	0	14.0	"platelet-derived growth factor receptor, beta polypeptide"	PDGFRB	5159
11742712_a_at	0	10.1	thrombospondin 2	THBS2	7058
11725766_x_at	0	0.078	"collagen, type XI, alpha 1"	COL11A1	1301
11715453_a_at	0	0.091	"collagen, type IV, alpha 2"	COL4A2	1284
11716639_a_at	0	0.097	"collagen, type IV, alpha 1"	COL4A1	1282
11718243_a_at	0	0.081	"integrin, alpha 7"	ITGA7	3679
11724065_at	0	0.074	integrin-binding sialoprotein	IBSP	3381
11727790_x_at	0	0.044	secreted phosphoprotein 1	SPP1	6696
growth factor activity					
11756003_x_at	0	74.8	insulin-like growth factor 2 (somatomedin A) /// INS-IGF2 readthrough	IGF2 /// INS-IGF2	3481 /// 72396

					1
11723033_at	0	46.0	nephroblastoma overexpressed	NOV	4856
11730726_s_at	0	33.4	"angiotensinogen (serpin peptidase inhibitor, clade A, member 8)"	AGT	183
11722855_at	0	19.5	platelet derived growth factor D	PDGFD	80310
11720818_a_at	0	15.2	chemokine (C-X-C motif) ligand 12	CXCL12	6387
11758619_s_at	0	0.038	leukemia inhibitory factor	LIF	3976
11751872_x_at	0	0.091	epithelial mitogen	EPGN	25532
					4
11734363_at	0	0.082	growth differentiation factor 6	GDF6	39225
					5
11756560_a_at	0	0.029	Norrie disease (pseudoglioma)	NDP	4693
response to growth factor					
11721895_x_at	0	39.2	growth arrest-specific 1	GAS1	2619
11740238_a_at	0	34.3	sulfatase 2	SULF2	55959
11730726_s_at	0	33.4	"angiotensinogen (serpin peptidase inhibitor, clade A, member 8)"	AGT	183
11715852_at	0	14.0	"platelet-derived growth factor receptor, beta polypeptide"	PDGFRB	5159
11739782_a_at	0	11.6	"synuclein, alpha (non A4 component of amyloid precursor)"	SNCA	6622
11719292_a_at	0	11.2	integrin beta 1 binding protein 1	ITGB1BP 1	9270
11746856_a_at	0	0.054	"serpin peptidase	SERPINE	5054

			inhibitor, clade E (nexin, plasminogen activator inhibitor type 1), member 1"	1	
11757425_s_at	0	0.071	vascular cell adhesion molecule 1	VCAM1	7412
11720448_at	0	0.095	SRY (sex determining region Y)-box 9	SOX9	6662
11715453_a_at	0	0.091	"collagen, type IV, alpha 2"	COL4A2	1284
11723246_s_at	0	0.097	secreted frizzled-related protein 1	SFRP1	6422
11754706_a_at	0	0.084	hedgehog interacting protein	HHIP	64399
11724065_at	0	0.074	integrin-binding sialoprotein	IBSP	3381
11737331_at	0	0.071	"phosphodiesterase 1C, calmodulin-dependent 70kDa"	PDE1C	5137
11719916_at	0	0.067	"interleukin 1, beta"	IL1B	3553
11726023_a_at	0	0.039	endothelin 1	EDN1	1906
11731445_at	0	0.018	ankyrin repeat domain 1 (cardiac muscle)	ANKRD1	27063
regulation of Wnt signaling pathway					
11757736_s_at	0	309.18	adenomatosis polyposis coli down-regulated 1	APCDD1	14749 5
11740238_a_at	0	34.31	sulfatase 2	SULF2	55959
11728088_at	0	28.7	dickkopf WNT signaling pathway inhibitor 2	DKK2	27123
11724619_at	0	21.1	R-spondin 3	RSPO3	84870
11744512_a_at	0	14.0	TraB domain containing 2A	TRABD2 A	12929 3

11754365_s_at	0	14.0	receptor tyrosine kinase-like orphan receptor 2	ROR2	4920
11756162_s_at	0	13.3	phosphatidic acid phosphatase type 2B	PPAP2B	8613
11731558_a_at	0	6.1	wingless-type MMTV integration site family member 2	WNT2	7472
11739813_a_at	0	3.4	frizzled class receptor 1	FZD1	8321
11720448_at	0	0.095	SRY (sex determining region Y)-box 9	SOX9	6662
11723246_s_at	0	0.097	secreted frizzled-related protein 1	SFRP1	6422
mesenchyme development					
11723006_a_at	0	42.5	S100 calcium binding protein A4	S100A4	6275
11726023_a_at	0	0.039	endothelin 1	EDN1	1906
11747223_a_at	0	12.9	endothelin receptor type B	EDNRB	1910
11723246_s_at	0	0.097	secreted frizzled-related protein 1	SFRP1	6422
11729385_at	0	24.8	forkhead box F1	FOXF1	2294
11721392_a_at	0	0.080	lysyl oxidase-like 3	LOXL3	84695
11715852_at	0	14.0	"platelet-derived growth factor receptor, beta polypeptide"	PDGFRB	5159
11720447_s_at	0	0.168	SRY (sex determining region Y)-box 9	SOX9	6662
Cytokine-cytokine receptor interaction					
11715852_at	0	14.0	"platelet-derived growth factor receptor, beta polypeptide"	PDGFRB	5159

11718025_at	0	11.5	"interleukin 1 receptor, type I"	IL1R1	3554
11719916_at	0	0.067	"interleukin 1, beta"	IL1B	3553
11722598_s_at	0	23.6	atypical chemokine receptor 3	ACKR3	57007
11758608_s_at	0	0.028	"colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)"	CSF2RB	1439
11720818_a_at	0	15.2	chemokine (C-X-C motif) ligand 12	CXCL12	6387
11728039_s_at	0	26.5	chemokine (C-C motif) ligand 8	CCL8	6355
11758619_s_at	0	0.038	leukemia inhibitory factor	LIF	3976