

Summers et al – Supplementary Tables.

Supplementary Table 1. List of cell lines and tissues used for the initial clustering analysis.

<b>Cell line</b>	<b>Cell type</b>
3T3-L1	Embryonic fibroblast - adipocyte like
Baf3	Pro B cell
C2C12	Myoblast
mIMCD-3	Renal inner medullary epithelial cell
min6	Pancreatic beta cell, insulin secreting
neuro2a	Neuroblastoma
NIH3T3	Fibroblast
C3H 10T1/2	Embryonic mesenchymal multipotent osteoblast progenitor
Bruce4 p13	Embryonic stem cell
V26 2 p16	Embryonic stem cell
HSC	Purified lineage-negative haemopoietic stem cell
EP	Erythrocyte precursor
GMP	Granulocyte/monocyte precursor
Granulocytes	Purified CD11b, Gr-1 peripheral granulocyte
CMP	Myeloid precursor
BMM 0	Bone marrow-derived macrophage unstimulated
BMM 2	Bone marrow macrophage 2 hrs after LPS
BMM 6	Bone marrow macrophage 6 hrs after LPS
BMM 24	Bone marrow macrophage 24 hrs after LPS
PM 0	Thioglycollate-elicited peritoneal macrophage unstimulated
PM 1	Peritoneal macrophage 1hr after LPS thio
PM 7	Peritoneal macrophage 7hrs after LPS thio
LD	Splenic lymphoid dendritic (CD11c+ CD8+)
MD	Splenic myeloid dendritic (CD11c, CD8-)
PD	Plasmacytoid dendritic (CD11c+, CD8+)
Microglia	Microglial cell
Osteoclasts	Osteoclast (CSF-1, RANKL-treated bone marrow cultures)
Osteoblast 5	Primary neonatal calvarial osteoblast 5 days after stimulation with glycerophosphate and ascorbate
Osteoblast 14	Osteoblast 14 days after stimulation
Osteoblast 21	Osteoblast 21 days after stimulation
RAW264/7	Macrophage-like cell line
Mast cells	Culture-derived bone marrow mast cells (with IL3)
Mast cells IgE	Mast cells plus IgE
Mast cells IgE+Ag 1	Mast cells plus IgE 1 hr after antigen
Mast cells IgE+Ag 6	Mast cells plus IgE 6 hrs after antigen
NK	NK1.1-positive natural killer cells
MZB	Spleen marginal zone B lymphocyte
FB	Lymph node B lymphocyte
T helper	CD4-positive T helper cells
T cytotoxic	CD8-positive Cytotoxic T cells
T regulatory	CD25-positive Regulatory T cells
DPT	Thymocyte CD4+ CD8+ double-positive progenitors
SPT4	Thymocyte CD4+
SPT8	Thymocyte CD8+
Lymph node	Lymph node cells
Spleen	Splenocyte

Chang MK, Raggatt L-J, Alexander KA *et al*: Osteal tissue macrophages are intercalated throughout human and mouse bone lining tissues and regulate osteoblast function in vitro and in vivo. *Journal of Immunology* 2008; **181**: 1232-1244.

Lattin JE, Schroder K, Su AI *et al*: Expression analysis of G Protein-Coupled Receptors in mouse macrophages. *Immunome Res* 2008; 4: 5.

Supplementary Table 2. List of genes which clustered with *Fbn1* at 0.9P (the *Fbn1*-associated cluster).

<b>Gene Symbol</b>	<b>Gene Name and Aliases</b>
1200009F10Rik	Inhibitor of IKK interacting protein
2310016C16Rik	Probable glutathione peroxidase 8
2810055F11Rik	Probable proline racemase
4833427G06Rik	Unclassified
8430436O14Rik	Unclassified
9330132E09Rik	Dermatan-sulfate epimerase-like protein
AC153973.1	Unclassified
AC154759.2-3	Zinc finger, CCHC domain containing 24
Acta2	Alpha-2 actin, smooth muscle, aorta; vascular smooth muscle actin
Adamts12	A disintegrin-like and metalloproteinase with thrombospondin type 1 motif, member 12
Aebp1	Aortic carboxypeptidase-like protein
Ak1	Adenylate kinase 1 (soluble)
AL808105.15-1	Unclassified
Ankrd25	Ankyrin repeat domain 25
Antxr1	Anthrax toxin receptor 1
Atoh8	Drosophila atonal homologue 8
Bgn	Biglycan; proteoglycan I
Bmper	Bone morphogenic protein-binding endothelial cell precursor derived regulator; BMP-binding endothelial cell derived regulator; homologue of Drosophila crossveinless 2
Boc	Brother of CDON (cell adhesion molecule-related/downregulated by oncogenes)
Cacna2d1	Voltage-dependent calcium channel subunit alpha-2/delta-1
Cald1	Caldesmon 1
Calu	Calumenin
Capn6	Calpain 6
Casp12	Caspase 12, apoptosis related cysteine protease
Ccdc102a	Coiled coil domain containing 102a
Ccdc80	Steroid sensitive protein 1
Cd248	CD248 antigen; tumour endothelial marker; endosialin
Cdc42ep5	CDC42 (cell division cycle 42) effector protein; CEP5; binder of Rho GTPases 3 (BORG3)
Cdh11	Cadherin 11; osteoblast cadherin
Chsy3	Chondroitin sulfate synthase 3
Col11a1	Collagen type XI alpha 1 chain
Col12a1	Collagen type XII alpha 1 chain
Col16a1	Collagen type XVI, alpha 1 chain
Col1a1	Collagen type I alpha 1 chain; collagen of skin, tendon and bone
Col1a2	Collagen type I alpha 2 chain; collagen of skin, bone, tendon
Col3a1	Collagen type III alpha 1 chain; fetal collagen; blood vessel collagen
Col4a1	Collagen type IV alpha 1 chain; basement membrane collagen; arresten
Col4a2	Collagen type IV alpha 2 chain; basement membrane collagen; arresten
Col5a1	Collagen type V alpha 1 chain
Col5a2	Collagen type V alpha 2 chain; fetal membrane collagen; AB collagen
Col6a1	Collagen type VI alpha 1 chain; intimal collagen; short chain collagen

Col6a2	Collagen type VI alpha 2 chain
Copz2	Coatomer protein complex, subunit zeta 2
Cpa6	Carboxypeptidase A6; CPAH
Ctf1	Cardiotrophin 1
Cyp1b1	Cytochrome P450, subfamily 1 polypeptide 1
D10Ertd610e	RAC/cdc42 exchange factor
Dcamk11	Doublecortin and calmodulin kinase like domain 1; KIAA0369
Ddr2	Discoidan domain receptor family member 2; neurotrophic tyrosine kinase receptor related; NTRKR3; TKT
Dnm3os	Dynamin 3, opposite strand
Dock1	Dedicator of cytokinesis 1; downstream of CRK binding protein, 180kD; homologue of C. elegans ced5
Edg2	Endothelial differentiation gene 2; lysophosphatidic acid receptor egd2; ventricular zone gene
Efemp2	EGF containing fibulin-like extracellular matrix protein 2;; Fibulin 4; FBLN4
Epdr2	Ependymin related protein 2 (zebrafish)
Ephb2	Ephrin receptor; ELK related tyrosone kinase; ERK; (developmentally regulated) EPH tyrosine kinase 3; HEK5
Ephb3	Ephrin receptor; EPH-like tyrosone kinase 2; human embryo kinase 2; HEK2; TYRO6
Fam114a1	Family with sequence similarity 114 member a1
Fam115c	Family with sequence similarity 115 member c
Fbn1	Fibrillin 1
Fgfr2	Fibroblast growth factor receptor 2; protein tyrosine kinase receptor like 14; keratinocyte growth factor receptor
Fibin	Fin bud initiation factor homolog
Figf	Fos-induced growth factor; vascular endothelial growth factor D
Fkbp10	FK506 binding protein 10
Fkbp14	FK506 binding protein 14
Fkbp9	FK506 binding protein 9
Fn1	Fibronectin 1; large external transformation sensitive protein; FNZ
Fstl1	Follistatin-like 1; follistatin related protein
Fzd1	Homologue of drosophila Frizzled, member 1
Fzd2	Homologue of drosophila Frizzled, member 2
Gas1	Growth arrest specific 1
Gas2	Growth arrest specific 2
Ggcx	Gamma glutamyl carboxylase
Gpc6	Glypican 6
Gpr124	G-protein coupled receptor 124
Gpr177	G-protein coupled receptor 177
Gpr23	G-protein coupled receptor 23; purinergic receptor P2Y, G protein coupled 9; P2Y5-like receptor
Gstm2	Glutathione S transferase Mu 2; GST4; muscle GST
Gulp1	PTB domain-containing engulfment adaptor protein 1; CED6
Has2	Hyaluronan synthase 2
Id3	Inhibitor of DNA binding 3; HEIR1
Il6st	Interleukin 6 signal transducer; GP130 transducer chain
Irs1	Insulin receptor substrate 1
Irx3	Iroquois homeobox protein 1
Kdelr3	KDEL (Lys-Asp-Glu-Leu) endoplasmic reticulum protein retention receptor 3

Lama4	Laminin alpha 4 (formerly LAMA3)
Lamb2	Laminin beta 2; laminin s; laminin B1
Lepre1	Leucine and proline enriched proteoglycan 1; leprecan; prolyl 3 hydroxylase 1; growth suppressor 1
Lgals7	Soluble galactoside binding lectin 7; galectin 7
Lix11	Lix 1 like; limb expression 1 like
Lox	Lysyl oxidase
Loxl1	Lysyl oxidase like 1
Loxl3	Lysyl oxidase like 3
Lrig3	Leucine-rich repeats and immunoglobulin-like domains 3
Lrrc17	Leucine rich repeat containing 17
Lrrn4cl	LRRN4 C-terminal like
Ltbp2	Latent transforming growth factor binding protein 2 (formerly LTBP3)
Map4k5	Mitogen activated protein kinase kinase kinase 5; MAPKKKK5
Mark1	MAP/microtubule affinity regulating kinase 1
Matn2	Matrilin 2
Mkx	Mohawk
Mmp2	Matrix metalloproteinase; collagenase type IV; gelatinase
Mrc2	Mannose receptor C type 2
Mrgprf	MAS-related GPR, member F
Msrb3	Methionine sulphoxide reductase B 3
Mxra7	Matrix remodelling associated 7
Myl9	Myosin light chain 9, regulatory
Naalad2	N-acetylated alpha linked acidic dipeptidase 2; NAALADase II
Ndn	Necdin
Nfatc4	Nuclear factor of activated T cells, calcineurin dependent
Nfix	Nuclear factor 1, X type; CCAAT binding transcription factor
Npr2	Natriuretic peptide receptor B; guanylate cyclase B; atrial natriuretic peptide receptor type B
Npr3	Natriuretic peptide receptor C; atrial natriuretic peptide clearance receptor
Nr2f1	Nuclear receptor subfamily 2, group F, member 1; transcription factor COUP1; chicken ovalbumin upstream promoter transcription factor; ERB-A related 3;
Nuak1	NUAK family, SNF1-like kinase 1
Obsl1	Obscurin-like 1
Palld	Palladin
Parva	Parvin alpha
Pcdh18	Protocadherin 18; KIAA1562
Pcdhb22	Protocadherin beta 22
Pcdhgb1	Protocadherin gamma cluster
Pcolce	Procollagen c-endopeptidase enhancer
Pdgfrb	Platelet derived growth factor receptor beta
Pdgfrl	Platelet derived growth factor receptor like; platelet derived growth factor beta-like tumour suppressor
Pdlim2	PDZ and LIM domain containing protein 2; mystique; STAT interacting LIM protein (SLIM)
Pdzn3	PDZ domain containing RING finger 3
Phldb2	Pleckstrin homology-like domain, family B member 2
Pkd2	Polycystic kidney disease 2; PKD adult type; polycystin 2
Plekhf1	Pleckstrin homology domain containing, family F (with FYVE domain)

	member 1
Plekhg4	Pleckstrin homology domain containing, family G (with RhoGef domain) member 4
Pls3	Plastin 3; T-plastin
Pmepa1	Prostate transmembrane protein, androgen induced 1; transmembrane prostate androgen-induced RNA
Postn	Periostin; osteoblast specific factor 2
Ppap2a	Phosphatidic acid phosphatase type 2A
Ppic	Peptidyl-prolyl isomerase C; cyclophilin C
Prickle2	Homologue of Drosophila prickle, member 2
Prkcdbp	Protein kinase C, delta binding protein
Prrx1	Paired mesoderm homeobox 1; paired related homeobox gene 1
Prrx2	Paired-related homeobox 2; paired-like homeobox gene 2
Prss23	Serine protease 23
Ptgis	Prostaglandin I2 synthase; prostacyclin synthase; CYP8; CYP8A1
Ptn	Pleiotropin; neurite outgrowth promoting factor; heparin binding growth factor 8
Ptx3	Pentraxin 3; pentaxin 3
Qscn6	Quiescin Q6
Rbms3	Single stranded interacting RNA binding motif protein 3
Rcn1	Reticulocalbin 1
Rcn2	Reticulocalbin 2; endoplasmic reticulum calcium binding protein 55kD; TCBP49; E6 binding protein; vitamin D receptor associated factor
Rcn3	Reticulocalbin 3, EF-hand calcium binding domain
Rerg	RAS-like, estrogen-regulated, growth-inhibitor
Rhoj	Ras homologue gene family member J
Rnd3	RHO family GTPase 3; Ras homologue gene family member E; ARHE
Ror1	Receptor tyrosine kinase like orphan receptor 1; neurotrophic tyrosine kinase receptor related 1
Samd4	sterile alpha motif domain containing 4
Sc65	synaptonemal complex protein Sc65
Scarf2	Scavenger receptor class F, member 2
Sdc2	Syndecan 2; heparan sulphate proteoglycan; fibroglycan
Sec23a	scavenger receptor class F, member 2
Selm	Selenoprotein M; SEPM
Sema5a	Sema domain, seven thrombospondin repeats (type 1 and type 1-like), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 5A
Sept11	Septin 11
Serpine2	Serpin E2; serine (or cysteine) peptidase inhibitor, clade E, member 2; glial derived neurite promoting factor; protease nexin 1
Serpinf1	Serpin F1; serine (or cysteine) peptidase inhibitor, clade F, member 1; pigment epithelium derived factor
Serpinh1	Serpin H1; serine (or cysteine) peptidase inhibitor, clade H, member 1; colligin 2; HSP47; rheumatoid arthritis antigen A47; collagen binding protein 2
Sertad4	SERTA domain containing 4; mammary gland RCB-0527 Jyg-MC(B) cDNA, RIKEN full-length enriched library, clone:G930041P03 product:unclassifiable, full insert sequence
Slc16a4	Solute carrier family 16 (monocarboxylic acid transporter) member 4; monocarboxylate transporter 5

Slc27a3	Solute carrier family 27 (fatty acid transporter) member 3; fatty acid transport protein 3
Slc2a10	Solute carrier family 2 (facilitated glucose transporter) member 10; glucose transporter 10; GLUT10
Slc35a2	Solute carrier family 35 (UDP-galactose transporter) member 2; UDP-galactose translocator
Slit3	Homologue of Drosophila slit, member 3; SLIL2; multiple epidermal growth factor like domains 5
Smad6	Similar to Mothers against decapentaplegic homolog 6
Snai1	Homologue of Drosophila snail, member 1
Snai2	Homologue of Drosophila Snail, member 2; homologue of chicken SLUG; neural crest transcription factor
Snx7	Sorting nexin 7
Sox9	SRY box 9; SRY related HMG box gene 9
Sparc	Acidic cysteine rich secreted protein; osteonectin
Stonin-1	Stoned B-like factor
Svepl1	Sushi, von Willibrand factor type A, EGF and pentraxin domains containing protein 1; polydom; selectin like osteoblast-derived protein
Synpo	Synaptopodin
Tbx15	T-box 15
Tfpi	Tissue factor pathway inhibitor; extrinsic pathway inhibitor; lipoprotein associated coagulation inhibitor
Tgfb11	Transforming growth factor beta 1 induced 1; androgen receptor co-activator; hydrogen peroxide inducible clone 5 (HIC5)
Tgfb2	Transforming growth factor beta 2; glioblastoma-derived T-cell suppressor factor (G-TSF)
Tgfb3	Transforming growth factor beta 3
Thbd	Thrombomodulin
Thbs1	Thrombospondin 1
Thbs2	Thrombospondin 2
Thbs3	Thrombospondin 3
Timp1	Tissue inhibitor of metalloproteinase 1; erythroid potentiating activity; collagenase inhibitor
Timp2	Tissue inhibitor of metalloproteinase 2;
Timp3	Tissue inhibitor of metalloproteinase 3;
Tmem45a	Transmembrane protein 45A
Tmem58	Transmembrane protein 58
Tnfaip6	Tumour necrosis factor alpha induced protein 6
Tpbp	Trophoblast glycoprotein; M6P1
Tpm1	Tropomyosin; skeletal muscle alpha tropomyosin
Tspan6	Tetraspanin 6; transmembrane 4 superfamily
Twist1	Transcription factor TWIST; homologue of Drosophila TWIST
Ubtd2	Ubiquitin domain-containing protein 2
Ugcgl2	UDP-glucose ceramide glucosyltransferase-like 2
Vasnl	Vasorin
Vcl	Vinculin; metavinculin
Vgll3	Vestigial like 3
Wisp1	WNT1 inducible signalling pathway protein 1; member of connective tissue growth factor family (CCN)
Zfp449	Zinc finger protein 449

Zfp503  
Zfpm2

Zinc finger protein 503  
Zinc finger protein, multitype 2; friend of GATA2 (FOG2); modulator of transcription factor GATA4;



Supplementary Table 3. Clustering of gene expression in mouse tissues.

<b>Gene Symbol</b>	<b>Full Name</b>	<b>In <i>Fbn1</i>-associated cluster?</b>
1110025N19Rik	Unclassified	
5330426P16Rik	Unclassified	
6820427D17Rik	Unclassified	
Adam23	A disintegrin-like and metalloproteinase, member 23	
Adamts1	A disintegrin-like and metalloproteinase with thrombospondin type 1 motif, member 1	
Adamts2	A disintegrin-like and metalloproteinase with thrombospondin type 1 motif, member 2	
Adamtsl4	ADAMTS-like protein 4	
AK013470	Unclassified	
AK051785	Unclassified	
Ampd3	AMP deaminase 3	
Anxa1	Annexin A1	
Aspn	Asporin	
Axl	Tyrosine-protein kinase receptor UFO	
BC014809.1	Similar to tropomyosin 2 (beta)	
Bgn	Biglycan; proteoglycan I	Yes
Bhlha9	Class A basic helix-loop-helix protein 9; Class B basic helix-loop-helix factor 42 (Bhlhf42)	
Bmp4	Bone morphogenic protein-binding 4	
Calu	Calumenin	Yes
Capn6	Calpain 6	Yes
Ccl2	C-C motif chemokine 2	
Cd44	CD44 antigen	
Cdkn1c	Cyclin-dependent kinase inhibitor 1C	
Clic4	Chloride intracellular channel protein 4	
Col15a1	Collagen type XV alpha 1 chain	
Col16a1	Collagen type XVI, alpha 1 chain	Yes
Col2a1	Collagen type II, alpha 1 chain	
Col4a1	Collagen type IV alpha 1 chain; basement membrane collagen; arresten	Yes
Col4a2	Collagen type IV alpha 2 chain; basement membrane collagen; arresten	Yes
Col4a5	Collagen type IV alpha 5 chain; basement membrane collagen; arresten	
Col4a6	Collagen type IV alpha 6 chain; basement membrane collagen; arresten	
Col5a1	Collagen type V alpha 1 chain	Yes
Colec12	Collectin-12; Collectin placenta protein 1; Scavenger receptor with C-type lectin	
Corin	Atrial natriuretic peptide-converting enzyme	
Crispld2	Cysteine-rich secretory protein LCCL domain-containing 2	
Csrp2	Cysteine and glycine-rich protein 2	
Ctgf	Connective tissue growth factor	

Cthrc1	Collagen triple helix repeat-containing protein 1	
Cxcl7	Pro-platelet basic protein (Ppbb)	
Cyr61	Protein CYR61; Cysteine-rich angiogenic inducer 61; Insulin-like growth factor-binding protein 10	
Dnm3os	Dynamin 3, opposite strand	Yes
Egln3	EGL nine homolog 3 ( <i>C. elegans</i> )	
Eln	Elastin	
F2r	Proteinase-activated receptor 1 (PAR-1); Thrombin receptor	
Fbln2	Fibulin 2	
Fbn1	Fibrillin 1	Yes
Fbn2	Fibrillin 2	
Fkbp10	FK506 binding protein 10	Yes
Fkhl18	Forkhead box protein S1	
Fstl3	Follistatin-like 3; follistatin related protein	
Galnt2	Polypeptide N-acetylgalactosaminyltransferase 2	
Gfpt2	Glucosamine--fructose-6-phosphate aminotransferase 2	
Ghr	Growth hormone receptor	
Glipr1	Glioma pathogenesis-related protein 1	
gnf1m33829_at	Unclassified	
Gpc3	Glypican 3	
Gpc6	Glypican 6	Yes
Gpr124	G-protein coupled receptor 124	Yes
Gpx7	Glutathione peroxidase 7	
Grb10	Growth factor receptor-bound protein 10	
H19	H19 fetal liver mRNA	
Hand2	Heart- and neural crest derivatives-expressed protein 2	
Hspg2	Basement membrane-specific heparan sulfate proteoglycan core protein	
Htra1	Serine protease HTRA1; Serine protease 11	
Igf2	Insulin-like growth factor II	
Igf2r	Cation-independent mannose-6-phosphate receptor; Insulin-like growth factor 2 receptor	
Igfbp3	Insulin-like growth factor-binding protein 3	
Itga5	Integrin alpha-5	
Itgb5	Integrin beta-5	
Itm2a	Integral membrane protein 2A; E25 protein	
Klra4	Killer cell lectin-like receptor 4; T-cell surface glycoprotein Ly-49D	
Lamc1	Laminin subunit gamma-1(formerly laminin B2 chain)	
Lamc2	Laminin subunit gamma-2 (formerly laminin 5 gamma 2 subunit)	
Lmcd1	LIM and cysteine-rich domains protein 1	
Lox	Lysyl oxidase	Yes
Loxl2	Lysyl oxidase like 2	
Ltbp1	Latent transforming growth factor binding protein 1	
Mfap4	Microfibril associated protein 4	
Mfap5	Microfibril associated protein 5	

Msln	Mesothelin	
Muc16	Putative uncharacterized proteinMCG4778	
Myadm	Myeloid-associated differentiation marker	
Nid1	Nidogen-1	
Nrk	Nik-related protein kinase	
Olfml2b	Olfactomedin-like protein 2B	
Olf78	Olfactory receptor 78	
P4ha2	Prolyl 4-hydroxylase subunit alpha-2	
Palld	Palladin	Yes
Pdpm	Podoplanin	
Pdzrn3	PDZ domain containing RING finger 3	Yes
Pitx2	Pituitary homeobox 2; Paired-like homeodomain transcription factor 2	
Plac9	Placenta-specific protein 9	
Plagl1	Pleiomorphic adenoma gene-like 1	
Plekha1	Fermitin family homolog 2; Pleckstrin homology domain-containing family C member 1	
Postn	Periostin; osteoblast specific factor 2	Yes
Ppic	Peptidyl-prolyl cis-trans isomerase C	
Ralb	Ras-related protein Ral-B	
Rbms2	Single stranded interacting RNA binding motif protein 2	
Rcn3	Reticulocalbin 3, EF-hand calcium binding domain	Yes
Rhoj	Ras homologue gene family member J	Yes
Ror1	Receptor tyrosine kinase like orphan receptor 1; neurotrophic tyrosine kinase receptor related 1	Yes
Serpina3n	Serine protease inhibitor A3N	
Serpinb9b	Serine (or cysteine) proteinase inhibitor, clade B, member 9b	
Snx24	Sorting nexin-24	
Sorbs1	Sorbin and SH3 domain-containing protein 1	
Stfa2l1	Stefin A2 like 1	
Stfa3	Stefin A-like protein	
Taf10	Transcription initiation factor TFIID subunit 10	
Tgfb3	Transforming growth factor beta 3	Yes
Thbs3	Thrombospondin 3	Yes
Timp1	Tissue inhibitor of metalloproteinase 1; erythroid potentiating activity; collagenase inhibitor	Yes
Tle4	Transducin-like enhancer protein 4; Groucho-related protein 4 (Grg-4)	
Tnc	Tenascin	
Trim47	Tripartite motif-containing protein 47	
Vcan	Versican core protein	
Vcl	Vinculin; metavinculin	Yes
Vim	Vimentin	
Vwf	von Willebrand factor	
Wisp1	WNT1 inducible signalling pathway protein 1; member of connective tissue growth factor family (CCN)	Yes
Wnt2	Wingless-related MMTV integration site 2	

Supplementary Table 4a. Summary of diseases and phenotypes associated with genes of the *Fbn1*-associated gene cluster.

<b>Tissue</b>	<b>Number in human</b>	<b>Number in mouse</b>
Bone	10	10
Skin	6	2
Joints and ligaments	5	1
Heart and heart valves	4	3
Eyes	4	2
Renal system	2	2
Pigmentation	1	0
Blood coagulation	2	1
Blood vessels	5	6
Skeletal muscles	3	1
Nerves and brain	0	3
Lung	0	5
Uterus	0	1
Embryonic lethal	0	8
Reduced life span, neonatal death	0	6
Adipose	1	2
Inflammatory response, immune system	0	4

Supplementary Table 4b. List of genes associated with disease or phenotype in mouse and human.

Gene Name	Phenotype in human	Phenotype in mouse
Aebp1		KO mice have abnormalities of embryonic development and adult tissue repair
Ak1		KO mice have myofibre abnormality
Bgn		KO mice have reduced growth rate and bone mass
Casp12		Mice with deletion clear bacterial infections more rapidly than WT
Cd248		Null mice have reduced growth of implanted colorectal carcinoma
Col1A1 Col1A2	Osteogenesis imperfecta type I, classical Ehlers Danlos syndrome	
Col2A1	Stickler syndrome type III (bone, eye phenotype); Marshall syndrome	Deficient mice have chondrodysplasia (wide, short bones)
Col3A1	Ehlers Danlos syndrome type IV	
Col4A1		Mutant mice have brain, size, ocular and renal abnormalities
Col5A1	Ehlers Danlos syndrome type I/II, Ehlers Danlos syndrome type VII, corneal abnormalities, vascular weakness	
Col5A2	Severe Ehlers Danlos syndrome type I	
Col6A1 Col6A2	Bethlem myopathy, Ulrich congenital muscular dystrophy	KO mice have abnormal skeletal muscle fibres
Cpa6	Duane muscular retraction syndrome	
Cyp1B1	Primary congenital glaucoma, Peters anomaly of the eye	
Efemp2	Cutis laxa	
Ephb2		Deficient mice have synaptic plasticity defect
Ephb3		Mice deficient in both <i>Ephb2</i> and <i>Ephb3</i> have axonal patterning defect plus cleft palate
Fgfr2	Cruzon, Pfeiffer, Alport, Jackson Weiss syndromes, craniosynostosis, autosomal dominant lacrimoauriculo dentodigital syndrome	
Fn1	Ehlers Danlos syndrome Type X	
Gas1		Null mice have craniofacial abnormalities
Ggcx	Multiple coagulation factor deficiency	Null mice have pre or postnatal death with intra-abdominal hemorrhage

Il6st		Ventricular KO mice have dilated cardiomyopathy during aortic pressure overload
Irs1		Null mice have severe osteopenia and bone turnover
Lama4		Null mice have bleeding, locomotor abnormalities, poor microvessel growth
Lamb2	Pierson syndrome	Null mice have abnormal neuromuscular junctions, abnormal glomerular filtration
Lepre1	Osteogenesis imperfecta type VIII	
Lox		Null mice have aortic and lung abnormality; death at birth
Lox11	Glaucoma	Null mice have lung, uterine, vascular abnormalities
Ltbp2		Null mice die at preimplantation stage
Mmp2	Osteolysis (vanishing bone) syndrome	Null mice have airway inflammatory problems, reduced angiogenesis/neovascularisation
Mstb3		Null mice have shortened life span, sensitivity to oxidative stress
Ndn		Mice with paternal deletion allele suffer early postnatal lethality
Nfatc4		Embryonic lethal (E11) with vessel and cardiac abnormalities
Nfix		Null mice die at 1 month of age with skeletal and growth deficiencies
Npr3		Natural mutant mice have overgrowth of long bones, emaciated phenotype
Obsl1	3M syndrome type 2 with growth retardation, short stature	
Pdlim2		Null mice have enhanced inflammatory response
Pkd2	Polycystic kidney disease type 2 with cerebral hemorrhage and aneurysm, cardiac valve disease	
Prrx1		Loss of function mutation is neonatal lethal with skeletal defects
Prrx2		<i>Prrx1/Prrx2</i> double mutant mice have novel defects of skeleton, teeth
Ptgis	Essential hypertension	
Ptx3		Null mice sensitive to invasive aspergillosis
Ror1		Null mice die neonatally due to

		respiratory dysfunction
Sec23a	Craniolelenticulosutural dysplasia	
Serpinf1		Null mice have abnormal eyes, epithelial cell hyperplasia
Serpinh1	Recessive osteogenesis imperfecta	KO mice are embryonic lethal
Slc2a10	Arterial tortuosity syndrome	
Slit3		Null mice have diaphragmatic hernia
Snai1	Waardenburg syndrome type II, piebaldism	
Sparc		Null mice have cataracts, osteopenia, large fat pads, large adipocytes, implanted tumors grow more rapidly
Synpo		Null mice have brain, renal abnormalities
Tfp1	P151L allele overrepresented in people with thrombophilia	
Tgfb3	SNP associated with ossification of spine ligaments	Null mice have cleft palate, delayed pulmonary development
Thbd	Rare cause of severe thrombophilia	Disruption of gene is embryonic lethal due to trophoblast cell abnormalities
Thbs1		Deficient mice have spinal abnormalities, high white blood cell count, lung abnormalities
Thbs2	SNP associated with lumbar disc herniation	Null mice have connective tissue abnormalities including fragile skin, increased bone thickness, long bleeding times
Timp3	Sorsby fundus dystrophy	
Tpm1	Mild familial cardiac hypertrophy	KO is embryonic lethal, missense mutation results in cardiac abnormalities
Twist1		<i>Twist1/Twist 2</i> double heterozygote has increased proinflammatory cytokines, cachexia, neonatal death

Supplementary Table 5. Transcription factor binding motifs over-represented in the cluster genes.

Motif ID	Transcription factor motif	Proportion of cluster genes containing site	Uncertainty for cluster genes	Proportion of non-cluster genes containing site	Uncertainty for non-cluster genes	Significance of over-representation (Z score)
M00649	MAZ	0.553846	0.035598	0.099342	0.002345	12.74024
SP1_gershenson	SP1_gershenson	0.615385	0.034839	0.174894	0.002978	12.59755
MA0039	Klf4	0.328205	0.033626	0.048872	0.00169	8.296611
M01066	BLIMP1	0.292308	0.032571	0.039343	0.001524	7.758165
M00491	MAZR	0.307692	0.033051	0.062027	0.001891	7.420663
M00706	TFII-I	0.2	0.028645	0.029077	0.001317	5.960714
MA0090	TEAD	0.169231	0.026851	0.018627	0.00106	5.604489
M00734	CIZ	0.164103	0.026523	0.02336	0.001184	5.301216
M00935_M00302	NF-AT	0.164103	0.026523	0.031413	0.001368	4.996229
MA0041	Foxd3	0.138462	0.024733	0.022008	0.00115	4.70327
sox2_human	SOX2	0.128205	0.023941	0.019549	0.001085	4.533845
M00005	AP-4	0.117949	0.023098	0.014938	0.000951	4.45592
MA0013	Broad_complex_4	0.123077	0.023526	0.02084	0.00112	4.340758
M00800	AP-2	0.128205	0.023941	0.02668	0.001263	4.234752
MA0060	NF_Y	0.179487	0.027482	0.063872	0.001917	4.196815
M00672	TEF	0.102564	0.021726	0.013524	0.000906	4.094728
M00639	HNF-6	0.107692	0.022199	0.016967	0.001013	4.082681
MA0017_MA0114	NR2F1_HNF4	0.107692	0.022199	0.018934	0.001069	3.993686
M00456	FAC1	0.107692	0.022199	0.020532	0.001112	3.921394
M00087_M00086	Ik-1_Ik-2	0.102564	0.021726	0.018627	0.00106	3.858844
nanog_mm8	NANOG_mouse	0.087179	0.020201	0.010205	0.000788	3.807464
HMG_class:HMG:						
MF0011	HMG	0.092308	0.020729	0.014631	0.000941	3.74346
M01004	Helios	0.092308	0.020729	0.016537	0.001	3.651138
MA0005	Agamous	0.076923	0.019082	0.007869	0.000693	3.61639
MA0038	Gfi	0.102564	0.021726	0.024159	0.001204	3.603252
M00478	Cdc5	0.076923	0.019082	0.008238	0.000709	3.596964
M00821	Nrf2	0.087179	0.020201	0.016106	0.000987	3.514034
M00483	ATF6	0.097436	0.021236	0.024282	0.001207	3.439176



M01058	GFI1B	0.071795	0.018486	0.01168	0.000842	3.248474
M00964_M00631	FXR/RXR- alpha_PXR,	0.066667	0.017863	0.008791	0.000732	3.237262
M00532	RP58	0.061538	0.017209	0.005963	0.000604	3.227393
M00261	Olf-1	0.071795	0.018486	0.012418	0.000868	3.208404
MA0030	FOXF2	0.071795	0.018486	0.013033	0.000889	3.175016
octsox_dimer_mm8	OCT4_SOX2_dimer_ mouse	0.071795	0.018486	0.013524	0.000906	3.148309
MA0029	Evi1	0.061538	0.017209	0.008176	0.000706	3.098175
M00418	TGIF	0.076923	0.019082	0.017828	0.001037	3.092317
M00490	Bach2	0.066667	0.017863	0.011987	0.000853	3.057538
M00056	myogenin	0.05641	0.016522	0.006762	0.000643	3.002763
Homeobox_class:H omeo:MF0010	Homeobox	0.061538	0.017209	0.012602	0.000875	2.839922
MA0033	FOXL1	0.051282	0.015796	0.006701	0.00064	2.820094
MA0083	SRF	0.046154	0.015025	0.005041	0.000555	2.734366
M00514	ATF4	0.051282	0.015796	0.00836	0.000714	2.714554
M00451	NKX3A	0.05641	0.016522	0.011803	0.000847	2.696387
M00650	MTF-1	0.061538	0.017209	0.016844	0.001009	2.592657
M00974_M00733	SMAD-4_SMAD	0.05641	0.016522	0.013955	0.00092	2.565725
MA0111	Spz1	0.046154	0.015025	0.007623	0.000682	2.561759
M00947	CP2/LBP-1c/LSF	0.05641	0.016522	0.014139	0.000926	2.554528
MA0015	CF2_II	0.046154	0.015025	0.00793	0.000695	2.541219
MA0119	Hox11_CTF1	0.046154	0.015025	0.008176	0.000706	2.524788
M00432	TTF1	0.041026	0.014204	0.005287	0.000569	2.514081
MA0025	NFIL3	0.051282	0.015796	0.011619	0.00084	2.507511
MA0004_MA0104_ MA0058_MA0059_ MA0093	Arnt_MAX_MYC_M AX_USF1_Mycn	0.061538	0.017209	0.01875	0.001063	2.481639
M00244_M00243_ M00246_M00245	Egr-1_NGFI-C_Egr- 3_Egr-2	0.05641	0.016522	0.015369	0.000964	2.479896
M00023	Hox-1.3	0.041026	0.014204	0.00584	0.000597	2.474955
M00797	HIF-1	0.051282	0.015796	0.012295	0.000864	2.464561
MA0089	TCF11_MafG	0.061538	0.017209	0.019549	0.001085	2.435096
MA0075	Prrx2	0.05641	0.016522	0.018135	0.001046	2.31205
M01073	HIC1	0.051282	0.015796	0.015676	0.000974	2.24992
MA0082	SQUA	0.051282	0.015796	0.015983	0.000983	2.230416
MA0094	Ubx	0.035897	0.013322	0.006455	0.000628	2.207593
MA0063	Nkx2_5	0.035897	0.013322	0.006824	0.000645	2.1798

M00465	POU6F1	0.041026	0.014204	0.010266	0.00079	2.162189
M00281	RFX1	0.05641	0.016522	0.020901	0.001122	2.144308
M01013	IPF1	0.035897	0.013322	0.008729	0.000729	2.036261
MA0099	Fos	0.051282	0.015796	0.019303	0.001079	2.019867

Supplementary Table 6. Genes from the initial *Fbn1*-associated cluster which were correlated at 0.95P

<b>Gene Symbol</b>	<b>Protein Name</b>	<b>Description/Function</b>
<i>Adamts12</i>	A disintegrin-like and metalloproteinase with thrombospondin type 1 motif, member 12	Cell surface adhesion protein; mediates cell-cell and cell-extracellular matrix adhesion and/or proteolysis; expression upregulated by TGF $\beta$
<i>Aebp1</i>	Aortic carboxypeptidase-like protein	Largely restricted to aorta, particularly to smooth muscle cells; perinuclear staining; secreted protein that associates with the ECM
<i>Bgn</i>	Biglycan	Involved in proinflammatory response through TLR2 and 4 signalling; may function in connective tissue metabolism by binding to collagen fibrils and TGF-beta
<i>Ccdc80</i>	Coiled coil domain containing 80	Secreted from adipocytes; downregulated during osteoblast differentiation; located in ECM
<i>Cd248</i>	CD248 antigen; tumour endothelial marker; endosialin	Mediates cell adhesion and migration
<i>Coll1a1</i>	Collagen type 1 alpha 1 chain	Collagen of skin, tendon and bone
<i>Col3a1</i>	Collagen type III alpha 1 chain	Fetal collagen; blood vessel collagen
<i>Col5a2</i>	Collagen type V alpha 2 chain	Fetal membrane collagen; AB collagen
<i>Col6a2</i>	Collagen type VI alpha 2 chain	Short chain collagen found in microfibrillar structures
<i>Ddr2</i>	Discoidan domain receptor family member 2; neurotrophic tyrosine kinase receptor related; NTRKR3; TKT	Novel receptor protein tyrosine kinase
<i>Fbn1</i>	Fibrillin-1	See text
<i>Fstl1</i>	Folistatin-like 1	Secreted by fibroblasts; acts on macrophages to increase TNF, IL1B production, IL6 activity; TGF-beta inducible
<i>Gpc6</i>	Glypican 6	Glycosylphosphatidylinositol-anchored heparan sulfate proteoglycans; localized predominantly to mesenchymal tissues in the developing mouse embryo
<i>Lepre1</i>	Leucine and proline enriched proteoglycan 1; leprecan; prolyl 3 hydroxylase 1; growth suppressor 1	Required for collagen biosynthesis, folding and assembly; carries KDEL ER retention motif
<i>Lox</i>	Lysyl oxidase	Cross-linking of collagens and elastin
<i>Loxl1</i>	Lysyl oxidase like 1	Spacially defined elastin polymer deposition
<i>Lrrc17</i>	Leucine rich repeat containing 17	Unknown
<i>Mrc2</i>	Mannose receptor C type 2	Recycling endocytic receptor; functions in cell motility and remodeling of the extracellular matrix
<i>Msrb3</i>	Methionine sulphoxide reductase B 3	Unknown
<i>Nfatc4</i>	Nuclear factor of activated T cells,	Role in cardiac development -

	calcineurin dependent	valves; transcription factor
<i>Npr2</i>	Natriuretic peptide receptor B; guanylate cyclase B; atrial natriuretic peptide receptor type B	Ligand is C natriuretic peptide; produces of cytoplasmic cyclic GMP
<i>Pdgfrb</i>	Platelet derived growth factor receptor beta	Involved in PDGF-mediated angiogenesis
<i>Prrx1</i>	Paired mesoderm homeobox 1; paired related homeobox gene 1	Transcription factor of cardiac, skeletal and smooth muscle tissue in adults
<i>Prrx2</i>	Paired mesoderm homeobox 2; paired related homeobox gene 2	Strongly expressed in proliferating fibroblasts
<i>Prss23</i>	Serine protease 23	Unknown
<i>Sdc2</i>	Syndecan 2; heparan sulphate proteoglycan; fibroglycan	Transmembrane protein, expressed on endothelial cells
<i>Serpinf1</i>	Serpin F1; serine (or cysteine) peptidase inhibitor, clade F, member 1; pigment epithelium derived factor	Coordinates retinal neuronal and vascular functions; inhibits angiogenesis in mammalian ocular compartment
<i>Serpinh1</i>	Serpin H1; serine (or cysteine) peptidase inhibitor, clade H, member 1; colligin 2; HSP47; rheumtoid arthritis antigen A47; collagen binding protein 2 (CBP1 also)	Collagen specific molecular chaperone
<i>Sparc</i>	Secreted protein acidic cysteine rich; osteonectin	Matrix associated protein; involved in cell shape determination (F-actin dependent), cell cycle progression, synthesis of ECM
<i>Tgfb1i1</i>	Transforming growth factor beta 1 induced 1; androgen receptor co-activator; hydrogen peroxide inducible clone 5 (HIC5)	Induced by TGF beta and hydrogen peroxide; increased during cellular senescence of normal human fibroblasts; interacts with and enhances transcriptional activity of androgen receptor
<i>Tmem45a</i>	Transmembrane protein 45A	Unknown
<i>Vgll3</i>	Vestigial like 3	Contains a TEAD1 interaction domain