Supplemental Table S2. Upregulated Differentially Expressed Genes and Enriched Functional Annotations of BL-PTCs according to the Clinicopathological Prognostic Factors

Annotations	*q* value	Genes
Age		
Proteinaceous extracellular matrix	2.89×10^{-10}	*POSTN, SFTPA2, COL11A1, MMP3, OMD, KERA, ASPN, ADAMTS16, MMP13, PODNL1, CILP, EPYC, COL10A1, SFTPA1, WNT2, MATN3, CTHRC1*
Sequence-specific DNA binding	9.39×10^{-7}	*EMX2, HNF4G, PAX6, TBX5, ZFHX4, ISL1, HOXC10, HOXA11, WT1, PAX7, CREB3L1, ALX3, ALX1, OTX1, PITX2, HOXC8, PITX1, LHX8*
Extracellular space	5.94×10^{-6}	*SFTPA2, RETN, CXCL5, FGF5, C1QTNF3, SRPX2, IBSP, EPYC, WNT2, CAMP, CTHRC1, POSTN, MMP3, OMD, IL36G, KRT34, KERA, SERPINB7, SFRP4, FGF16, SFRP2, MMP13, CILP, SFRP5, TNFSF4, SFTPA1*
Collagen trimer	5.39×10^{-4}	*C1QTNF3, MMP13, SFTPA2, COL11A1, COL10A1, SFTPA1, CTHRC1*
Extracellular region	8.64×10^{-4}	*SFTPA2, COL11A1, MMP3, OMD, IL36G, IGFL3, PRG4, KERA, CXCL5, FGF5, MFAP5, FGF16, SFRP4, MMP13, SFRP2, IBSP, ADAM12, COL10A1, SFTPA1, FOLR3, LIPK, WNT2, MATN3, CAMP*
Skeletal system development	1.04×10^{-2}	*POSTN, COL10A1, BMPR1B, PITX1, NKX3-2, MATN3, HOXC10, HOXA11*
Anterior/posterior pattern specification	3.58×10^{-2}	*EMX2, ALX1, OTX1, HOXC8, HOXC10, HOXA11*
Transcriptional activator activity, RNA polymerase II core promoter proximal region	3.84×10^{-2}	*WT1, CREB3L1, ZIC1, PAX6, OTX1, PITX2, ISL1, PITX1*
Wnt-protein binding	4.62×10^{-2}	*SFRP4, SFRP2, SFRP5, CTHRC1*
Extrathyroidal extension		
Extracellular space	3.66×10^{-18}	*SERPINA11, SERPINB10, CRP, CCL11, COL12A1, RETN, C8B, C1QTNF3, APELA, IFNL2, SRPX2, IL36A, EPYC, WNT2, ELANE, TNFSF18, FGA, POSTN, LUM, IL37, OMD, APOC3, WNT7A, KERA, IGFL1, AZU1, MSMP, MMP10, GREM1, COL1A1, SFRP4, FGF16, ACTA1, COL3A1, SFRP2, MMP13, COL1A2, FAP, LOX, FRMD7, CILP, SFRP5, COL6A3, CEACAM8*
Extracellular region	9.04×10^{-15}	*CRP, CCL11, COL11A1, COL12A1, THBS2, C8B, APELA, IFNL2, IL36A, WIF1, COL10A1, LIPK, WNT2, ELANE, FGA, LUM, IL37, OMD, IGFL3, APOC3, WNT7A, KERA, PRG4, AZU1, TMPRSS11E, MMP10, MFAP5, COL1A1, SFRP4, FGF16, COL3A1, SFRP2, MMP13, COL1A2, COL5A1, LOX, PSG7, COL5A2, ADAM12, PSG6, COL6A3, ITGBL1, FOLR3*
Proteinaceous extracellular matrix	2.70×10^{-12}	*POSTN, LUM, COL11A1, OMD, WNT7A, KERA, ASPN, MMP10, ADAMTS16, MMP13, COL1A2, COL5A1, LOX, CILP, EPYC, COL5A2, COL6A3, COL10A1, WNT2*
Collagen fibril organization	2.65×10^{-11}	*GREM1, COL1A1, COL3A1, SFRP2, COL1A2, COL5A1, LOX, LUM, COL11A1, COL12A1, COL5A2*
Collagen trimer	3.76×10^{-10}	*COL1A1, C1QTNF3, COL3A1, MMP13, COL1A2, COL5A1, LOX, COL11A1, COL12A1, COL5A2, COL10A1, COL6A3*
Collagen catabolic process	2.77×10^{-9}	*COL1A1, COL3A1, MMP13, COL1A2, COL5A1, COL11A1, COL12A1, COL5A2, COL10A1, COL6A3, MMP10*
Extracellular matrix	1.22×10^{-8}	*POSTN, LUM, COL12A1, THBS2, ASPN, MMP10, COL1A1, COL3A1, MMP13, SFRP2, COL1A2, COL5A1, CILP, COL5A2, COL6A3, WNT2*
Extracellular matrix organization	9.57×10^{-7}	*FGA, POSTN, LUM, COL11A1, MFAP5, COL1A1, COL3A1, COL1A2, COL5A1, LOX, COL5A2, COL6A3, COL10A1*
Protein digestion and absorption	2.71×10^{-6}	*COL1A1, COL3A1, COL1A2, COL5A1, COL11A1, COL12A1, COL5A2, COL10A1, COL6A3*
ECM-receptor interaction	2.41×10^{-5}	*COL1A1, COL3A1, COL1A2, COL5A1, COL11A1, COL5A2, COL6A3, THBS2*

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Supplemental Table S2. Continued

Annotations	*q* value	Genes
Lymph node metastasis		
Collagen trimer	2.62×10^{-2}	*MMP13, SFTPA2, COL11A1, COL12A1, SFTPA1*
Extracellular space	3.60×10^{-2}	*POSTN, CCL11, SFTPA2, COL12A1, IL36G, SERPINA9, MSMP, APELA, MMP13, VGF, CFHR1, EPYC, CEACAM8, SFTPA1*
TNM stage		
Extracellular space	9.33×10^{-17}	*SERPINA11, COL12A1, DEFB1, SERPINA6, CXCL5, FGF5, C1QTNF3, FGA, POSTN, AHSG, ADIPOQ, ANXA13, MMP3, OMD, KRT34, KERA, SERPINB7, MMP10, ACTA1, VCAN, SFRP2, MMP13, FRMD7, SLPI, SFRP5, COL6A3, CRP, SFTPA2, GRP, RETN, KLK8, APELA, SRPX2, EPYC, WNT2, CCL17, ELANE, CTHRC1, IL37, LUM, IL36G, AZU1, SLURP1, COL1A1, FGF16, COL3A1, COL1A2, FAP, CFHR1, CILP, TCN1, SST, TNFSF4, OGN, SAA1*
Proteinaceous extracellular matrix	2.86×10^{-16}	*SFTPA2, COL11A1, HAPLN4, ADAMTS16, ADAMTS2, PODNL1, EPYC, COL10A1, PI3, WNT2, CTHRC1, POSTN, LUM, MMP3, OMD, KERA, MMP10, ASPN, VCAN, MMP13, COL1A2, COL5A1, CILP, COL5A2, OGN, COL6A3, MATN3*
Extracellular region	3.53×10^{-15}	*COL12A1, DEFB1, CXCL5, FGF5, ADAMTS2, COL10A1, LIPK, FGA, AHSG, ADIPOQ, MMP3, OMD, KERA, PRLR, MMP10, VCAN, SFRP2, MMP13, PSG7, PSG6, ADAM12, COL6A3, WFDC10B, MATN3, CRP, SFTPA2, GRP, COL11A1, THBS2, CPN2, APELA, WIF1, CLCA2, ARSI, WNT2, CCL17, ELANE, CORIN, IL37, LUM, IGFL3, IL36G, AZU1, SLURP1, MFAP5, COL1A1, FGF16, COL3A1, COL1A2, COL5A1, TCN1, SST, FGF19, COL5A2, OGN, SAA1, FOLR3*
Collagen catabolic process	1.27×10^{-10}	*COL11A1, COL12A1, MMP3, MMP10, COL1A1, COL3A1, ADAMTS2, MMP13, COL1A2, MMP27, COL5A1, COL5A2, COL6A3, COL10A1*
Collagen trimer	4.37×10^{-10}	*SFTPA2, COL11A1, COL12A1, ADIPOQ, COL1A1, C1QTNF3, COL3A1, MMP13, COL1A2, COL5A1, COL5A2, COL6A3, COL10A1, CTHRC1*
Extracellular matrix	9.89×10^{-10}	*POSTN, AHSG, LUM, COL12A1, THBS2, ASPN, MMP10, COL1A1, COL3A1, VCAN, MMP13, SFRP2, COL1A2, MMP27, COL5A1, SLPI, CILP, OGN, COL5A2, COL6A3, WNT2*
Collagen fibril organization	8.38×10^{-8}	*COL1A1, COL3A1, ADAMTS2, SFRP2, COL1A2, COL5A1, LUM, COL11A1, COL12A1, COL5A2*
Skeletal system development	8.38×10^{-8}	*POSTN, AHSG, COL12A1, HAPLN4, HOXC10, HOXA11, COL1A1, COL3A1, VCAN, COL1A2, COL5A2, COL10A1, PITX1, NKX3-2, MATN3*
Extracellular matrix structural constituent	4.38×10^{-7}	*MFAP5, COL1A1, COL3A1, VCAN, COL1A2, COL5A1, LUM, COL11A1, COL5A2, HAPLN4, MATN3*
Protein digestion and absorption	1.38×10^{-6}	*COL1A1, COL3A1, COL1A2, MME, COL5A1, COL11A1, COL12A1, COL5A2, COL10A1, COL6A3, ATP1B4*
MACIS score		
Extracellular space	5.19×10^{-12}	*SERPINA11, SFTPA2, COL12A1, RETN, CXCL5, C1QTNF3, SRPX2, IL36A, IBSP, EPYC, CCL17, WNT2, ELANE, CTHRC1, POSTN, LUM, IL37, PLA2G2A, ADIPOQ, MMP3, OMD, IL36G, KERA, IGFL1, SERPINB7, MMP10, COL1A1, SFRP4, FGF16, ACTA1, COL3A1, SFRP2, MMP13, COL1A2, FAP, LOX, CFHR1, SST, CILP, SFRP5, TNFSF4, SFTPA1, FGF10*
Proteinaceous extracellular matrix	7.31×10^{-12}	*POSTN, SFTPA2, LUM, COL11A1, MMP3, OMD, KERA, ASPN, MMP10, ADAMTS16, MMP13, PODNL1, COL1A2, LOX, CILP, EPYC, COL10A1, SFTPA1, WNT2, MATN3, CTHRC1*
Extracellular region	8.14×10^{-12}	*SFTPA2, COL11A1, COL12A1, THBS2, CPN2, CXCL5, IL36A, IBSP, COL10A1, LIPK, CCL17, WNT2, ELANE, ACTN2, LUM, IL37, PLA2G2A, ADIPOQ, MMP3, OMD, IGFL3, IL36G, KERA, PRG4, PSG2, TMPRSS11E, PRLR, MMP10, MFAP5, COL1A1, SFRP4, FGF16, COL3A1, SFRP2, MMP13, COL1A2, LOX, SST, PSG7, ADAM12, PSG6, ITGBL1, SFTPA1, FOLR3, MATN3, FGF10*

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Supplemental Table S2. Continued

Annotations	*q* value	Genes
Collagen trimer	5.83×10^{-10}	*SFTPA2, COL11A1, COL12A1, ADIPOQ, COL1A1, C1QTNF3, COL3A1, MMP13, COL1A2, LOX, COL10A1, SFTPA1, CTHRC1*
Extracellular matrix	5.97×10^{-6}	*POSTN, LUM, COL12A1, THBS2, ASPN, MMP10, COL1A1, COL3A1, MMP13, SFRP2, COL1A2, IBSP, CILP, WNT2, FGF10*
Collagen catabolic process	3.90×10^{-5}	*COL1A1, COL3A1, MMP13, COL1A2, COL11A1, COL12A1, MMP3, COL10A1, MMP10*
Collagen fibril organization	3.90×10^{-5}	*COL1A1, COL3A1, SFRP2, COL1A2, LOX, LUM, COL11A1, COL12A1*
Sequence-specific DNA binding	6.76×10^{-5}	*MYOG, EMX2, PAX6, TBX5, ZFHX4, HOXD10, ISL1, HOXC10, HOXA11, WT1, PAX7, CREB3L1, ALX3, ALX1, OTX1, PITX2, HOXC8, PITX1, LHX8*
Skeletal system development	1.04×10^{-4}	*COL1A1, COL3A1, POSTN, COL1A2, COL12A1, COL10A1, PITX1, NKX3-2, MATN3, HOXC10, HOXA11*
Sarcomere	4.50×10^{-4}	*ACTA1, MYH2, MYL1, MYL2, MYH7, LMOD2*

BL-PTC, *BRAF*-like papillary thyroid carcinoma; ECM, extracellular matrix; TNM, tumor-node-metastasis; MACIS, metastasis-age-completeness of resection-invasion-size.