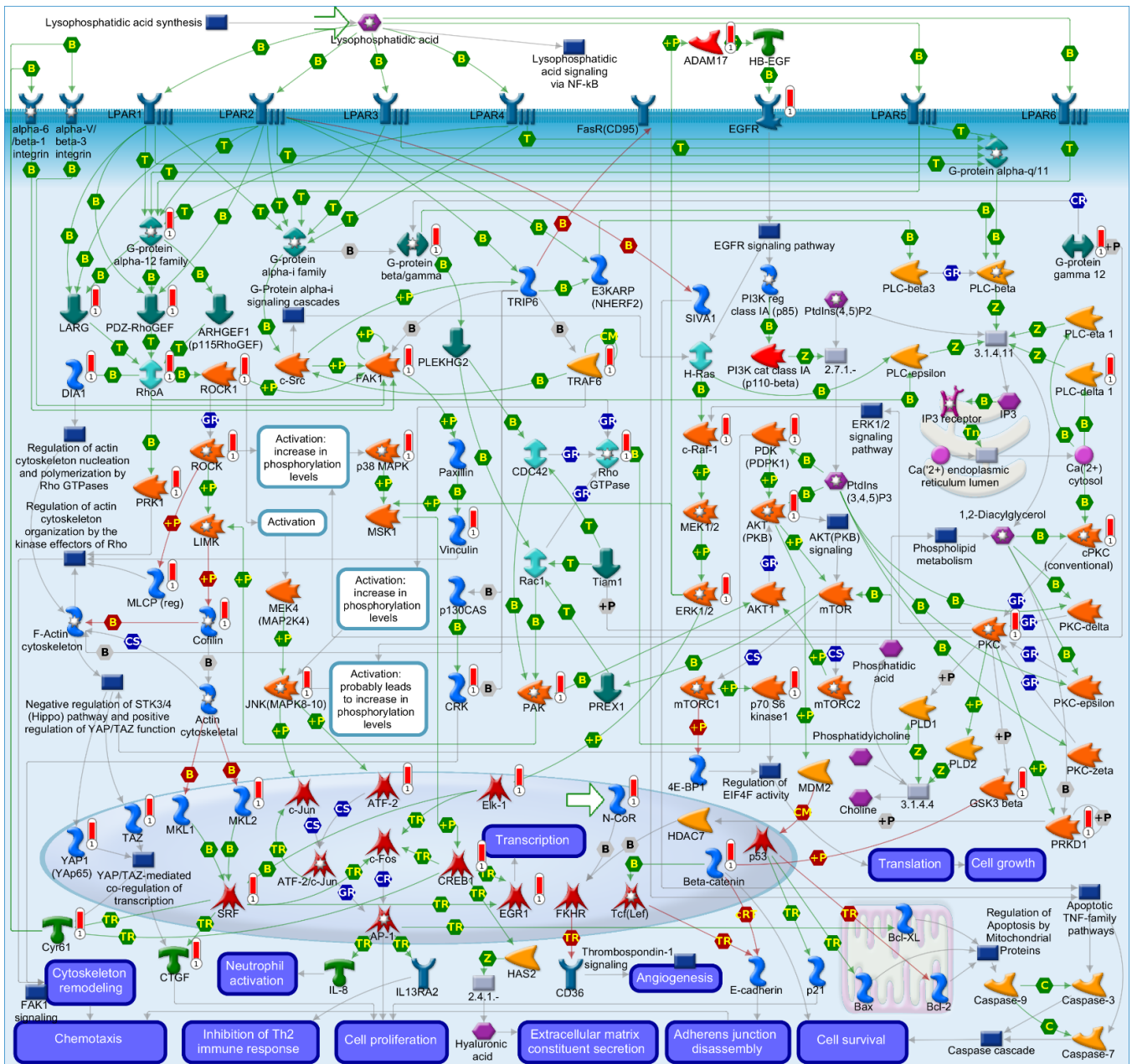
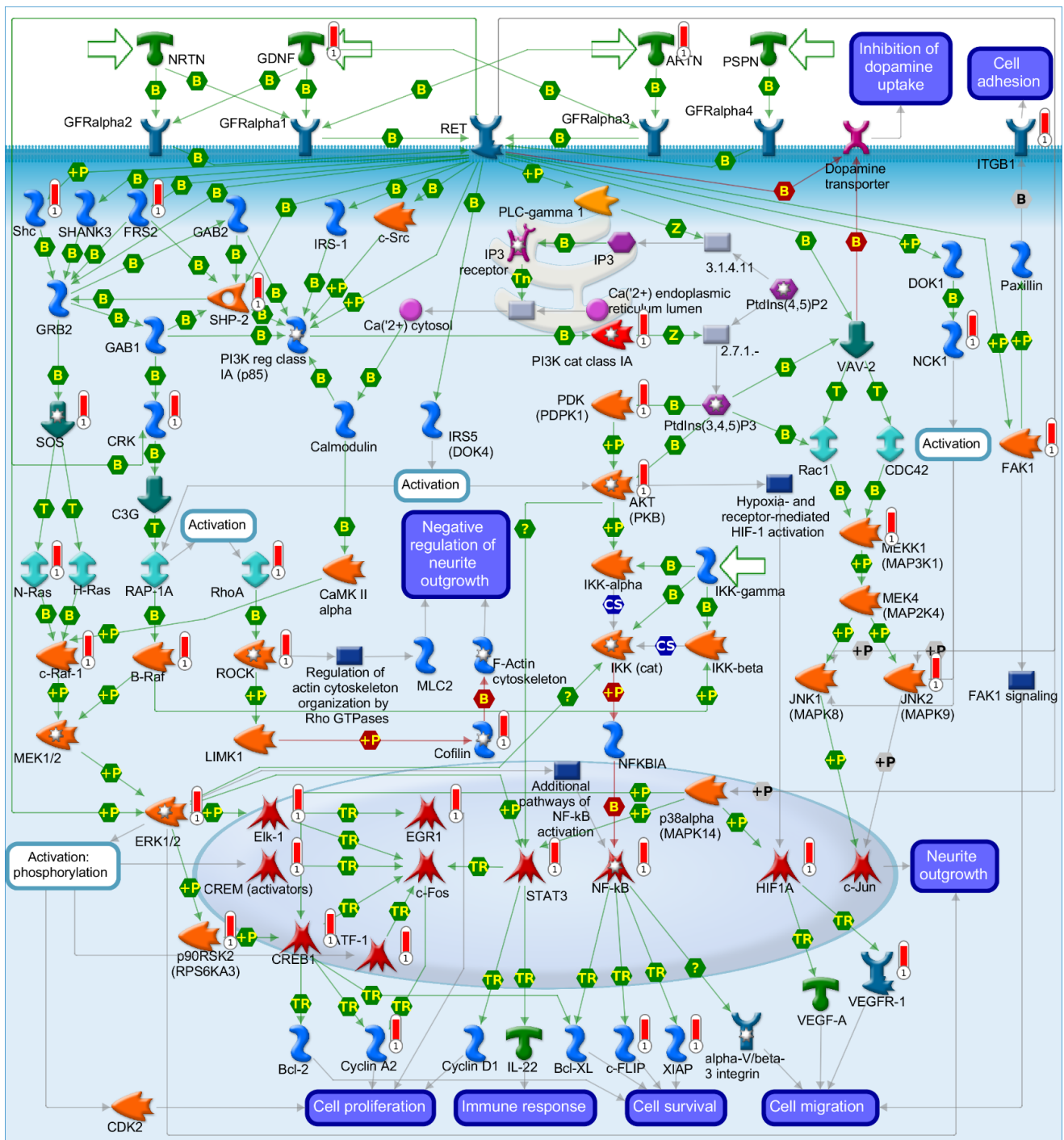


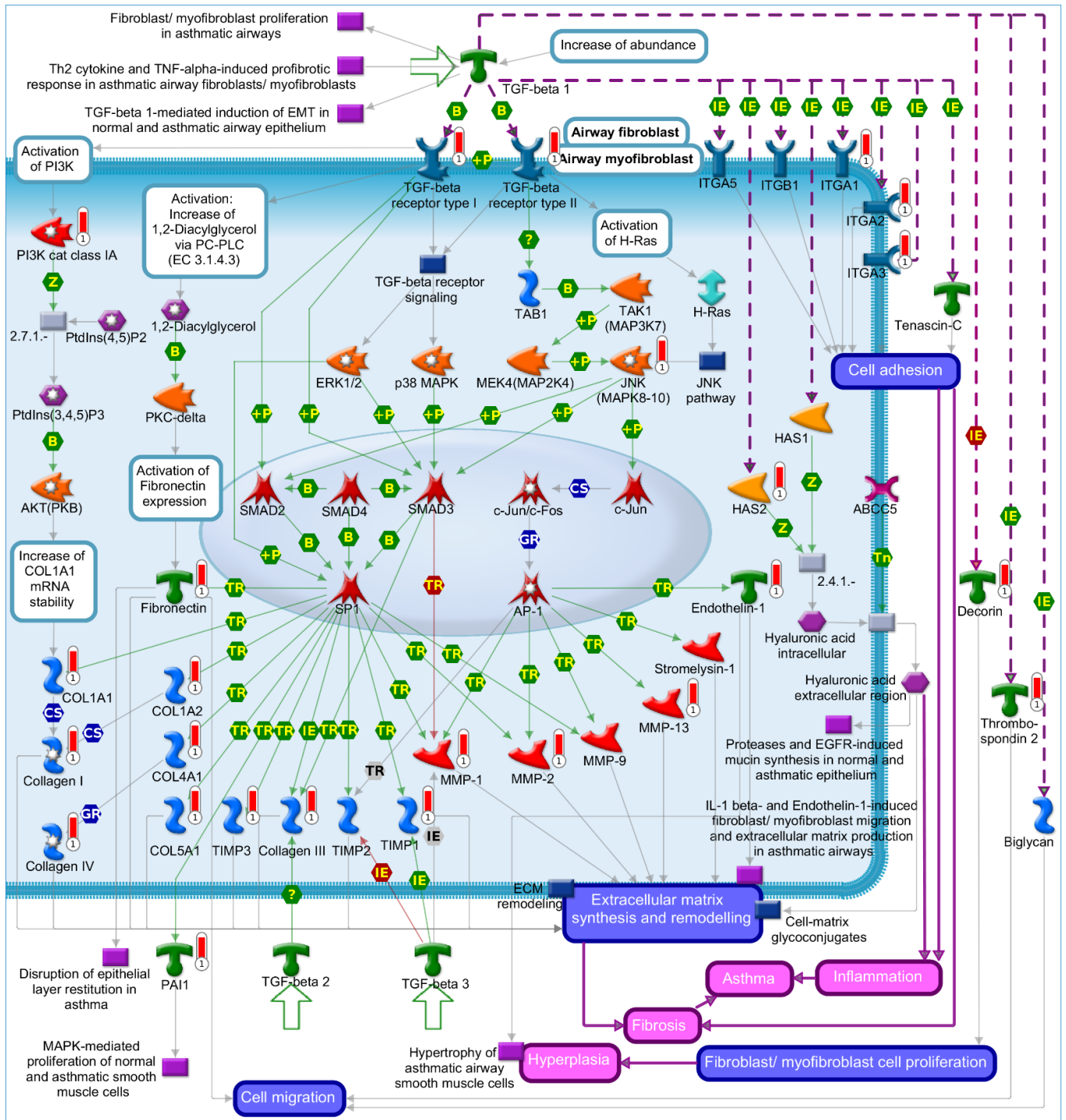
Supplementary data



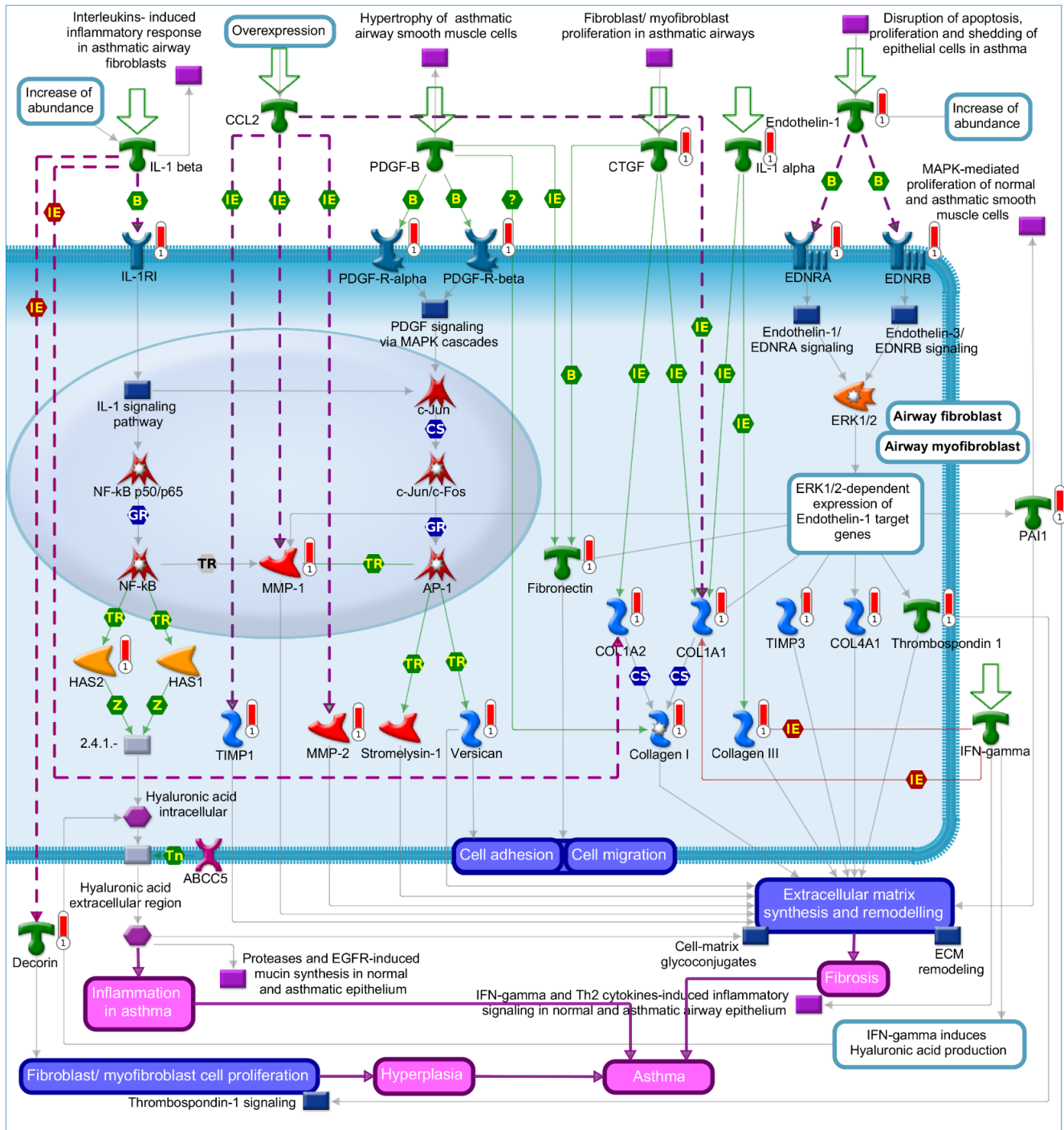
Supplementary Figure S1. MetaCore signaling diagram showing enrichment of the Chemotaxis_Lysophosphatidic Acid (LPA) Signaling via GPCRs” pathway associated with ITGAV expression in cholangiocarcinoma.



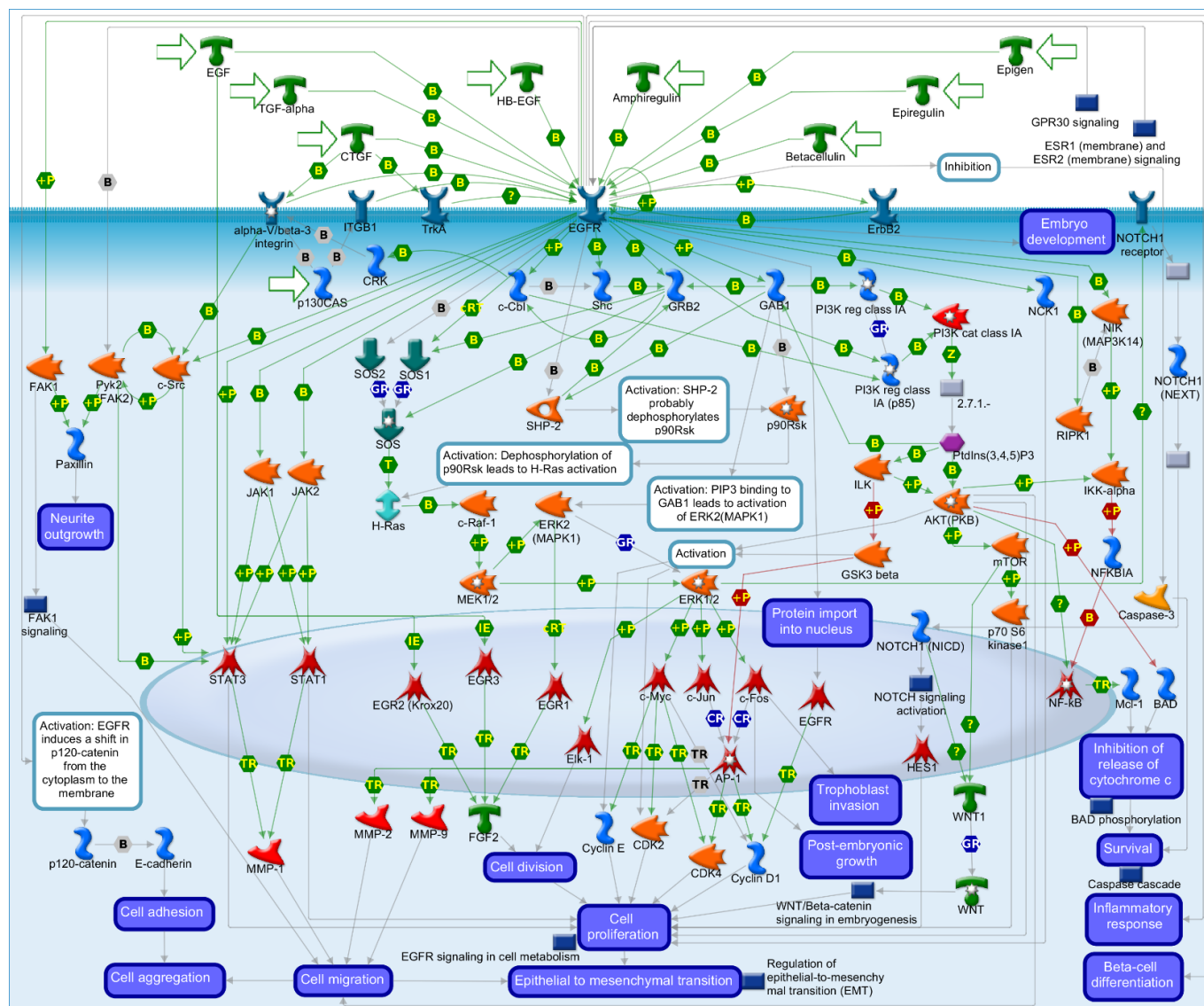
Supplementary Figure S2. MetaCore signaling diagram showing enrichment of the Development_The role of GDNF ligand family RET receptor in cell survival, growth and proliferation pathway associated with ITGAV expression in cholangiocarcinoma.



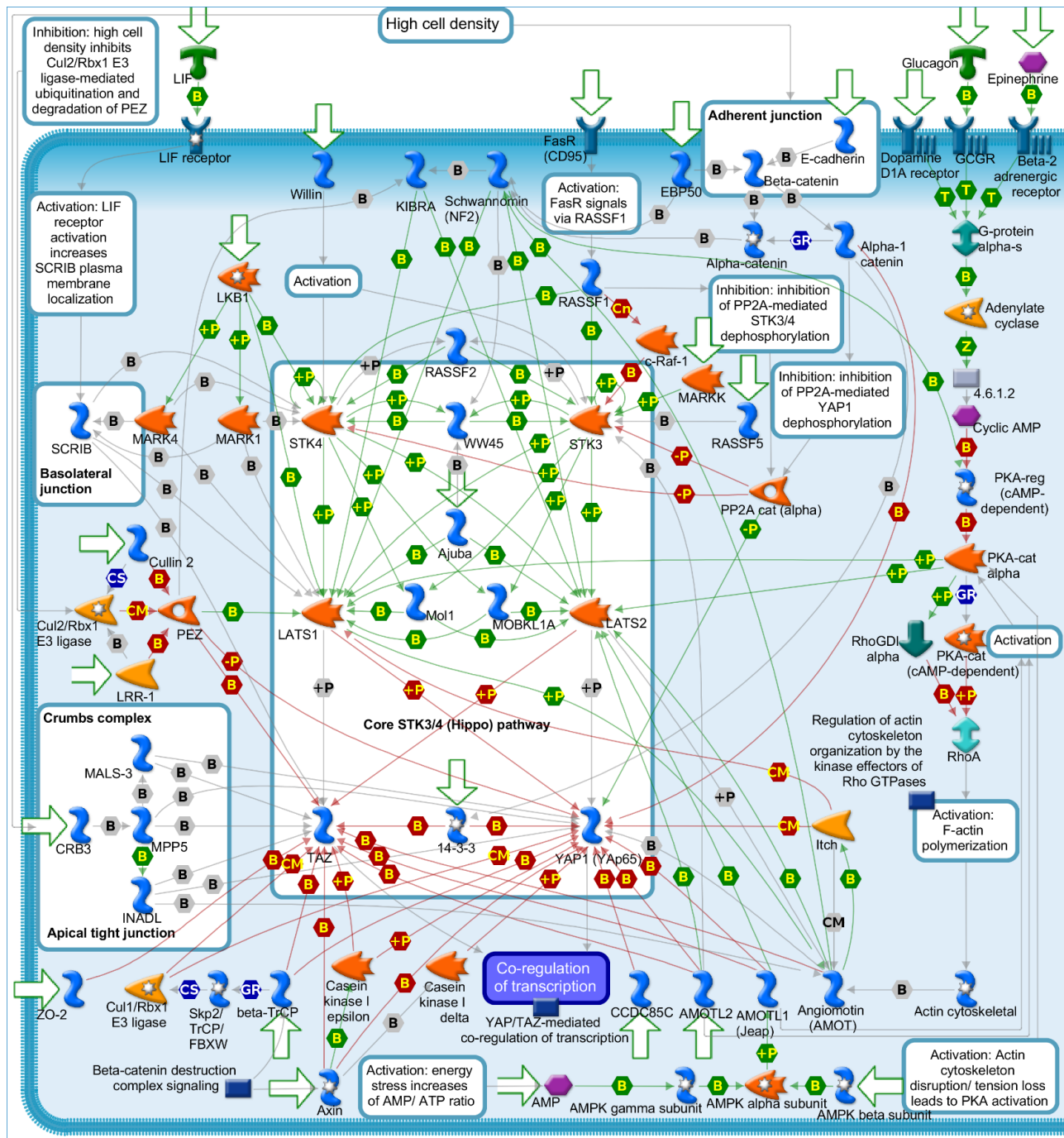
Supplementary Figure S3. MetaCore signaling diagram showing enrichment of TGF-beta-induced fibroblast myofibroblast migration and extracellular matrix production in asthmatic airways pathway associated with ITGB3 expression in cholangiocarcinoma.



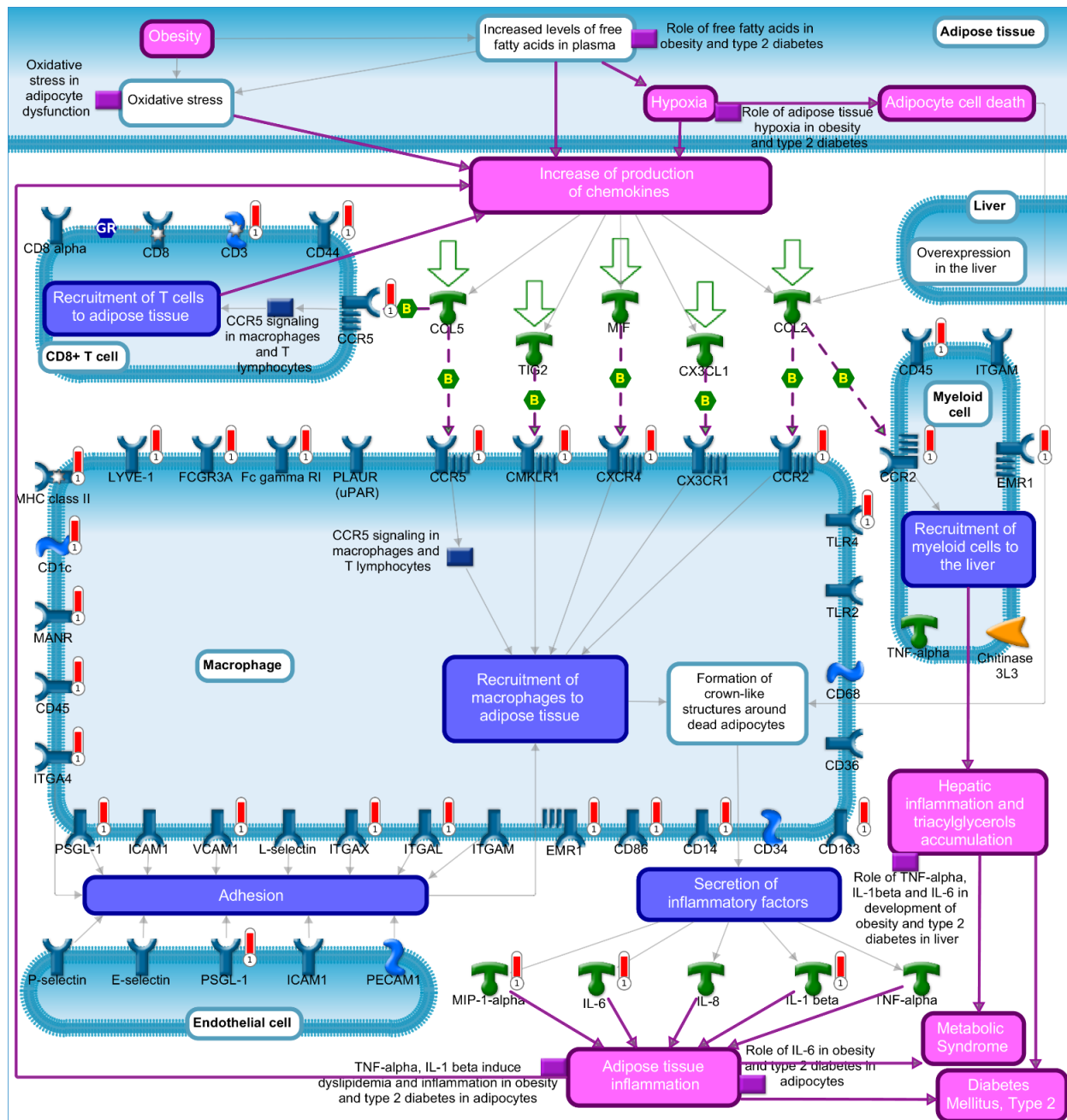
Supplementary Figure S4. MetaCore signaling diagram showing enrichment IL-1 beta- and Endothelin-1-induced fibroblast myofibroblast migration and extracellular matrix production in asthmatic airways pathway associated with ITGB3 expression in cholangiocarcinoma.



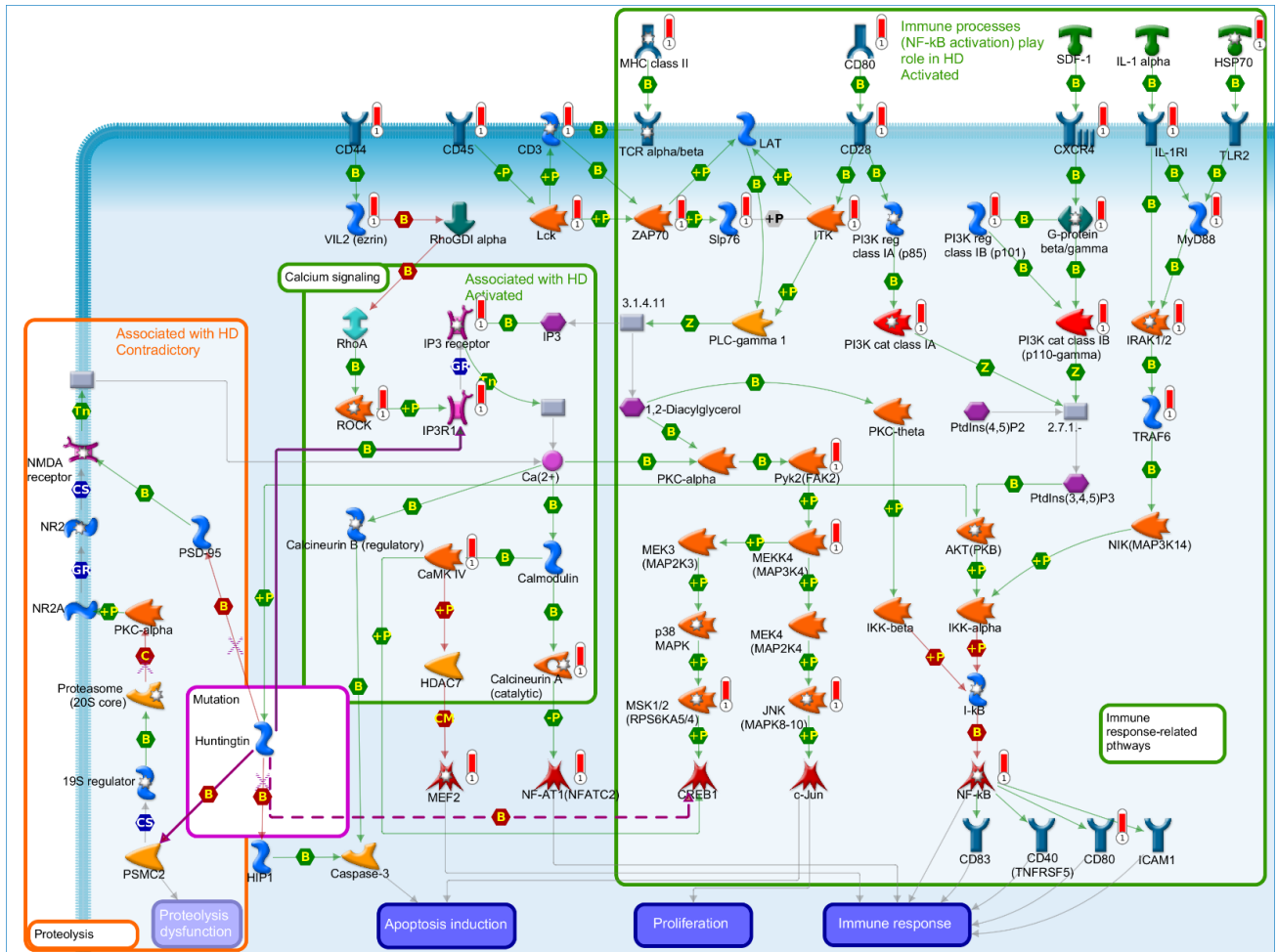
Supplementary Figure S5. MetaCore signaling diagram showing enrichment of Development_EGFR signaling pathway associated with EGFR expression in cholangiocarcinoma.



Supplementary Figure S6. MetaCore signaling diagram showing enrichment of Development_Positive regulation of STK34 (Hippo) pathway and negative regulation of YAP/TAZ function pathway associated with EGFR expression in cholangiocarcinoma.



Supplementary Figure 7. MetaCore signaling diagram showing enrichment of Chemokines in inflammation in adipose tissue and liver in obesity, type 2 diabetes and metabolic syndrome pathway associated with CD724 expression in cholangiocarcinoma.



Supplementary Figure S8. MetaCore signaling diagram showing enrichment of CHDI_Correlations from Replication data_Causal network (positive correlations) pathway associated with CD724 expression in cholangiocarcinoma.

Table S_1.1: Protein–protein interaction (PPI): Node 1 and Node 2 represent the interacting protein pairs, while the Score indicates the STRING confidence score (from 0 to 1)

<i>Node 1</i>	<i>Node 2</i>	<i>Score</i>
<i>AKT1</i>	CD274	0.72
<i>AKT1</i>	EGFR	0.792
<i>AKT1</i>	ITGAV	0.472
<i>AKT1</i>	ITGB3	0.781
<i>AKT1</i>	MAPK1	0.988
<i>AKT1</i>	MAPK3	0.957
<i>AKT1</i>	SRC	0.995
<i>AKT1</i>	STAT3	0.966
<i>EGFR</i>	AKT1	0.792
<i>EGFR</i>	CD274	0.87
<i>EGFR</i>	ITGAV	0.686
<i>EGFR</i>	ITGB3	0.65
<i>EGFR</i>	MAPK1	0.612
<i>EGFR</i>	MAPK3	0.528
<i>EGFR</i>	SRC	0.999
<i>EGFR</i>	STAT3	0.998
<i>MAPK1</i>	AKT1	0.988
<i>MAPK1</i>	EGFR	0.612
<i>MAPK1</i>	ITGAV	0.651
<i>MAPK1</i>	ITGB3	0.728
<i>MAPK1</i>	MAPK3	0.994
<i>MAPK1</i>	SRC	0.932
<i>MAPK1</i>	STAT3	0.996
<i>MAPK3</i>	AKT1	0.957
<i>MAPK3</i>	CD274	0.48
<i>MAPK3</i>	EGFR	0.528
<i>MAPK3</i>	ITGAV	0.551
<i>MAPK3</i>	ITGB3	0.758
<i>MAPK3</i>	MAPK1	0.994
<i>MAPK3</i>	SRC	0.944
<i>MAPK3</i>	STAT3	0.87
<i>SRC</i>	AKT1	0.995
<i>SRC</i>	CD274	0.545
<i>SRC</i>	EGFR	0.999
<i>SRC</i>	ITGAV	0.946
<i>SRC</i>	ITGB3	0.998
<i>SRC</i>	MAPK1	0.932

<i>SRC</i>	MAPK3	0.944
<i>SRC</i>	STAT3	0.999
<i>STAT3</i>	AKT1	0.966
<i>STAT3</i>	CD274	0.992
<i>STAT3</i>	EGFR	0.998
<i>STAT3</i>	ITGAV	0.516
<i>STAT3</i>	MAPK1	0.996
<i>STAT3</i>	MAPK3	0.87
<i>STAT3</i>	SRC	0.999

Table S_2: Pathway analysis of gene co-expressed ITGAV (GDC Dataset) from the MetaCore database (with p-value< 0.05 set as the cutoff value).

S.No.	Maps	pValue	Min FDR	Network Objects from Active Data
1	<u>Development Positive regulation of WNT/Beta-catenin signaling in the cytoplasm</u>	2.627E-15	3.869E-12	PPP2R2A, HECTD1, ITGB1, Bcl-9, Trabid, BIG1, Tankyrases, BIG2, USP9X, USP25, UBE2B, WNT, APC protein, Alpha-1 catenin, FAK1, 14-3-3, GSK3 alpha/beta, IGF-1 receptor, Beta-catenin, PKA-reg type II (cAMP-dependent), JNK(MAPK8-10), PP2A catalytic, ERK2 (MAPK1), AKT(PKB), Makorin-1, Dsh, PKA-cat (cAMP-dependent), USP47, ILK, Frizzled, SET7, ZBED3, YAP1 (YAp65), DOCK4, DACT1
2	<u>Chemotaxis Lyso-phosphatidic acid signaling via GPCRs</u>	5.213E-13	3.839E-10	RhoA, MLCP (reg), ROCK, PRKD1, cPKC (conventional), G-protein alpha-12 family, GSK3 beta, PAK, p70 S6 kinase1, PDZ-RhoGEF, PKC, Vinculin, ATF-2, DIA1, EGFR, TRAF6, PLC-delta 1, LARG, ROCK1, MKL2, ERK1/2, Cyr61, PRK1, FAK1, CREB1, Beta-catenin, EGR1, G-protein beta/gamma, Rho GTPase, N-CoR, TAZ, CRK, JNK(MAPK8-10), c-Raf-1, CTGF, AKT(PKB), PDK (PDPK1), ADAM17, p38 MAPK, Elk-1, SRF, Cofilin, YAP1 (YAp65), G-protein gamma 12
3	<u>Development The role of GDNF ligand and family/ RET receptor in cell survival, growth and proliferation</u>	2.674E-12	1.082E-09	STAT3, RhoA, GDNF, ITGB1, Shc, ROCK, PI3K cat class IA, B-Raf, CREM (activators), NCK1, Cyclin A2, MEKK1(MAP3K1), HIF1A, SHP-2, N-Ras, XIAP, ATF-1, ERK1/2, FAK1, CREB1, EGR1, VEGFR-1, p90RSK2(RPS6KA3), CRK, c-Raf-1, JNK2(MAPK9), SOS, NF-kB, c-FLIP, FRS2, AKT(PKB), PDK (PDPK1), ARTN, Elk-1, Cofilin
4	<u>Glucocorticoid-induced elevation of intraocular pressure as glaucoma risk factor</u>	2.937E-12	1.082E-09	TRIO, RhoA, ITGB1, ROCK, PI3K cat class IA, ROR2, COL4A1, C/EBP zeta, GCR Beta, GCR, PLAT (TPA), Filamin B (TABP), EGFR, SERPINA3 (ACT), WNT2, FAK1, SENP1, Alpha-actinin, GCR Alpha, Filamin A, LAMB3, Collagen IV, Thrombospondin 1, HGF receptor (Met), Fibronectin, PAI1, LAMA1, MLCK
5	<u>Signal transduction Calcium-mediated signaling</u>	6.303E-12	1.681E-09	RhoA, MLCP (reg), ROCK, cPKC (conventional), MARK2, RelA (p65 NF-kB subunit), Calcineurin A (catalytic), PKC, NUR77, MYH11, PKC-alpha, ATF-2, G6PT, ERK1/2, 14-3-3, CaMK I, CREB1, EGR1, ACTA2, JNK(MAPK8-10), HDAC4, MEF2, NURR1, NF-kB, HDAC5, AKT(PKB), p300, p38 MAPK, Elk-1, SRF
6	<u>Development Negative regulation of WNT/Beta-catenin signaling in the cytoplasm</u>	7.022E-12	1.681E-09	ELAVL1 (HuR), KLHL12, WWP1, HECTD1, PEG3, c-Cbl, PKC-alpha, STK3, WNT, HUWE1, APC protein, Amer1, Itch, Alpha-1 catenin, Beclin 1, GSK3 alpha/beta, LATS2, Beta-catenin, G-protein beta/gamma, WDR26, Skp2/TrCP/FBXW, TAZ, PP2A catalytic, PI3K cat class III (Vps34), Dsh, RNF185,

Casein kinase I alpha, Frizzled, YAP1/TAZ, YAP1 (YAp65), G-protein alpha-13, DACT1

7	<u>Role of stellate cells in progression of pancreatic cancer</u>	7.990E-12	1.681E-09	COL1A1, Shc, PI3K cat class IA, RECK, RelA (p65 NF-kB subunit), PDGF-B, EGFR, ERK1/2, FAK1, ACTA2, alpha-5/beta-1 integrin, c-Raf-1, SOS, COL1A2, CTGF, PDGF-R-alpha, AKT(PKB), PDGF receptor, NF-kB p50/p65, OSF-2, PDK (PDPK1), Fibronectin, Collagen I, TGF-beta receptor type I, PDGF-R-beta, NF-kB p65/p65, Collagen III
8	<u>Neurogenesis NGF/ TrkA MAPK-mediated signaling</u>	9.420E-12	1.734E-09	SPHK1, Sequestosome 1(p62), Shc, MAPKAPK2, B-Raf, NUR77, NF-kB1 (p50), K-RAS, PKC-lambda/iota, SHP-2, N-Ras, MAP2K5 (MEK5), ERK1/2, KIDINS220, CREB1, CrkL, EGR1, SUR-8, PP2A regulatory, M-Ras, PKA-reg (cAMP-dependent), CRK, c-Raf-1, SOS, PP2A catalytic, FRS2, SP1, RGS2, PVR, JMJD3, PDZ-GEF1, p38 MAPK, Elk-1, KCTD11, PKA-cat (cAMP-dependent), SRF, p90Rsk
9	<u>Signal transduction ESR1 (membrane) and ESR2 (membrane) signaling</u>	1.384E-11	2.265E-09	RhoA, SREBP1 precursor, Shc, mGluR1, CBP, cPKC (conventional), p120GAP, PI3K cat class IA, Protein kinase G1, GSK3 beta, PKC, ROCK2, PKC-alpha, MSN (moesin), EGFR, N-WASP, Adenylate cyclase, ERK1/2, p190RhoGAP, FAK1, CREB1, IGF-1 receptor, Beta-catenin, EGR1, G-protein beta/gamma, ChREBP, PKA-reg (cAMP-dependent), c-Raf-1, SOS, Striatin, AKT(PKB), PDK (PDPK1), Elk-1, PKA-cat (cAMP-dependent), SRF, p90Rsk, Cofilin, G-protein alpha-13, PR (nuclear)
10	<u>Stellate cells activation and liver fibrosis</u>	1.681E-11	2.477E-09	COL1A1, Shc, PI3K cat class IA, GSK3 beta, PDGF-B, PTCH1, ICAM1, MyD88, TRAF6, IL-1RI, Beta-catenin, ACTA2, IRAK1/2, c-Raf-1, SOS, COL1A2, PDGF-R-alpha, ERK2 (MAPK1), AKT(PKB), SP1, PDGF receptor, NF-kB p50/p65, SARA, Dsh, ERK1 (MAPK3), Elk-1, Frizzled, TGF-beta receptor type I, PDGF-R-beta
11	<u>TGF-beta 1-induced transactivation of membrane receptors signaling in hepatocellular carcinoma (HCC)</u>	2.105E-11	2.667E-09	ITGB1, PI3K cat class IA, GSK3 beta, ITGA2, PTEN, SLUG, DOCK1, FAK1, c-Abl, alpha-2/beta-1 integrin, Beta-catenin, Cyclin A, alpha-5/beta-1 integrin, CRK, PDGF-R-alpha, AKT(PKB), PDGF receptor, ITGA5, Fibronectin, DDX5, Actin, Cofilin, TGF-beta receptor type I, PDGF-R-beta
12	<u>G-protein signaling RhoB activation</u>	2.172E-11	2.667E-09	ELAVL1 (HuR), KIF13A, p190-RhoGEF, PDZ-RhoGEF, PDGF-B, GGTase-I, GCR, HIF1A, ATF-2, SMURF1, EGFR, ATM, LARG, ERK1/2, ARHGEF10, JNK(MAPK8-10), AKT(PKB), TIM1, p164-RhoGEF, ATR, p300, HGF receptor

(Met), p38 MAPK, NFYA, TGF-beta receptor type I, PDGF-R-beta

13	<u>Cell adhesion Integrin-mediated cell adhesion and migration</u>	3.250E-11	3.683E-09	Tensin, Talin, RhoA, ITGB1, p190-RhoGEF, PARD3, PKC, ICAM1, Vinculin, PKC-lambda/iota, PINCH, Zyxin, DOCK1, LARG, FAK1, alpha-2/beta-1 integrin, alpha-5/beta-1 integrin, Alpha-parvin, Alpha-actinin, CRK, GIT2, alpha-1/beta-1 integrin, Collagen IV, Fibronectin, ILK, Collagen I, Collagen III
14	<u>IL-1 beta- and Endothelin-1-induced fibroblast/ myofibroblast migration and extracellular matrix production in asthmatic airways</u>	4.305E-11	4.530E-09	COL1A1, COL4A1, EDNRB, PDGF-B, TIMP3, ERK1/2, Versican, IL-1RI, COL1A2, NF-kB, CTGF, PDGF-R-alpha, ABCC5, NF-kB p50/p65, Thrombospondin 1, Fibronectin, PAI1, EDNRA, Collagen I, PDGF-R-beta, Collagen III
15	<u>Apoptosis and survival NGF/ TrkA PI3K-mediated signaling</u>	4.815E-11	4.728E-09	TRIO, RhoA, MLCP (reg), Shc, ROCK, PI3K cat class IA, MRCKalpha, GSK3 beta, PARD3, FOXO4, p70 S6 kinase1, Calcineurin A (catalytic), MSN (moesin), CLCN4, N-WASP, APC protein, PAK2, DOCK1, ERK1/2, p190RhoGAP, KIDINS220, CREB1, SOS, AKT(PKB), PDK (PDPK1), ARAP3, SSH1L, ILK, Cofilin, Tubulin (in microtubules)
16	<u>Development VEGF signaling via VEGFR2 - generic cascades</u>	1.005E-10	8.833E-09	SPHK1, RhoA, Shc, COX-1 (PTGS1), p120GAP, PI3K cat class IA, GSK3 beta, MAPKAPK2, Calcineurin A (catalytic), PKC, NCK1, MEKK1(MAP3K1), Vinculin, PKC-alpha, PAK2, ROCK1, ERK1/2, FAK1, CREB1, Neurofibromin, Beta-catenin, Fyn, c-Raf-1, SOS, ERK2 (MAPK1), AKT(PKB), HSP90, NF-kB p50/p65, PDK (PDPK1), p38 MAPK, ERK1 (MAPK3), p90Rsk, MLCK
17	<u>Signal transduction PDGF signaling via PI3K/AKT and NFkB pathways</u>	1.019E-10	8.833E-09	PI3K cat class IA (p110-alpha), p120GAP, GSK3 beta, RelA (p65 NF-kB subunit), PDGF-B, MYH11, K-RAS, PTEN, HIF1A, ERK1/2, c-Abl, Transgelin, Beta-catenin, ACTA2, Inversin, PDGFR-ab, NF-kB, PDGF-R-alpha, AKT(PKB), SP1, PDGF receptor, NF-kB p50/p65, PDK (PDPK1), DDX5, Elk-1, SRF, Phox1 (PRRX1), PDGF-R-beta
18	<u>Extracellular matrix-regulated proliferation of airway smooth muscle cells in asthma</u>	1.707E-10	1.393E-08	COL1A1, PI3K cat class IA, PDGF-B, ATF-2, SMAD7, EGFR, ERK1/2, Perlecan, alpha-2/beta-1 integrin, alpha-5/beta-1 integrin, JNK(MAPK8-10), CTGF, Collagen IV, Fibronectin, p38 MAPK, LAMA1, Collagen I, TGF-beta receptor type I, Collagen III

19	<u>Ligand-independent activation of Androgen receptor in Prostate Cancer</u>	1.796E-10	1.393E-08	STAT3, Tip60, Shc, PI3K cat class IA, GSK3 beta, B-Raf, K-RAS, EGFR, N-Ras, FGF1, c-Abl, IGF-1 receptor, Beta-catenin, PP2A regulatory, c-Raf-1, NCOA1 (SRC1), SOS, PP2A catalytic, FRS2, ERK2 (MAPK1), AKT(PKB), PDK (PDPK1), NCOA2 (GRIP1/TIF2), DDX5, STAT5B, ERK1 (MAPK3), Frizzled
20	<u>E-cadherin signaling and its regulation in gastric cancer</u>	3.260E-10	2.401E-08	Ubiquitin, RhoA, Formin, Shc, GSK3 beta, WNT, SLUG, EGFR, FGF1, Beta-catenin, Alpha-actinin, IQGAP1, HAKAI, HGF receptor (Met), TCF8, Dsh, Actin, Alpha-catenin, Frizzled
21	<u>Development Positive regulation of WNT/Beta-catenin signaling in the nucleus</u>	3.974E-10	2.787E-08	SMYD2, Kindlin-2, CBP, Sirtuin1, GSK3 beta, RUNX, WNT, FOXK2, XIAP, Alpha-1 catenin, USP5, Beta-catenin, BCL9/B9L, APPL, FOXK1, ERK2 (MAPK1), p300, CBP/P300, LRRFIP2, NCOA2 (GRIP1/TIF2), Dsh, Casein kinase I alpha, SOX9, Frizzled, UBR5, JRK, YAP1 (YAp65)
22	<u>Oxidative stress ROS signaling</u>	4.834E-10	3.237E-08	ELAVL1 (HuR), PRKD1, Sirtuin1, GSK3 beta, p70 S6 kinase1, RelA (p65 NF-kB subunit), SREBP1 (nuclear), PKC, PTEN, MEKK1(MAP3K1), IRP1, PKA-cat alpha, HIF1A, ATM, DLC1 (Dynein LC8a), IRP2, ERK1/2, GRP75, c-Abl, SENP1, EGR1, PKA-reg (cAMP-dependent), JNK(MAPK8-10), HIF-prolyl hydroxylase, NF-kB, SAE2, AKT(PKB), Isoform p66 Shc, SP1, NF-kB p50/p65, p300, NRF2, ADAM17, p38 MAPK, PAI1
23	<u>Autophagy Autophagy</u>	7.052E-10	4.498E-08	Sequestosome 1(p62), Tip60, PI3K reg class III (p150), APG16L1, Sirtuin1, GSK3 beta, Raptor, C/EBP zeta, HSC70, RalB, eIF2AK3, PKC-alpha, APG7, SNAP-29, AMBRA1, Beclin 1, CREB1, Sec8, SUR-8, PI3K cat class III (Vps34), Exo84, NBR1, Syntaxin 17, Rubicon, APG12, FIP200
24	<u>Cytoskeleton remodeling Integrin outside-in signaling</u>	7.328E-10	4.498E-08	TRIO, Talin, alpha-11/beta-1 integrin, GSK3 beta, Vinculin, PINCH, ERK1/2, FAK1, alpha-2/beta-1 integrin, Beta-catenin, alpha-5/beta-1 integrin, Alpha-parvin, Alpha-actinin, c-Raf-1, SOS, Filamin A, AKT(PKB), Collagen IV, Fibronectin, ILK, Collagen I, WIRE
25	<u>Development Negative regulation of STK3/4 (Hippo) pathway and positive regulation of YAP/TAZ function</u>	8.362E-10	4.801E-08	RhoA, MLCP (reg), G-protein alpha-12 family, PARD3, PDZ-RhoGEF, Nephrocystin-4, STK3, ASPP1, EGFR, Itch, ASPP2, LARG, ERK1/2, LATS2, TAZ, JNK(MAPK8-10), PAR1, RhoGAP5, PJA2, PDK (PDPK1), Actin, ERK1 (MAPK3), ILK, YAP1 (YAp65), ZO-2
26	<u>Development Stimulation of differentiation of mouse embryonic fibroblasts into</u>	8.475E-10	4.801E-08	SREBP1 precursor, Shc, CBP, EGR2 (Krox20), PI3K cat class IA (p110-alpha), HIVP2, Lysyl oxidase, BMP receptor 2, ATF-2, SHP-2, Adenylate cyclase, XIAP, ATF-1, ERK1/2, CREB1, IGF-1 receptor, AKT2, p90RSK2(RPS6KA3), PKA-reg (cAMP-dependent), c-Raf-1, SOS, ERK2 (MAPK1), PDK (PDPK1), p38 MAPK, ERK1 (MAPK3), Elk-1, PKA-cat (cAMP-dependent)

adipocytes by ex-
tracellular factors

27	<u>Signal transduc-</u> <u>tion Angiotensin</u> <u>II/ AGTR1 signal-</u> <u>ing via p38, ERK</u> <u>and PI3K</u>	8.900E- 10	4.856E- 08	ELAVL1 (HuR), Shc, p70 S6 kinases, PI3K cat class IA, RECK, PDGF-B, NUR77, EGFR, MAP2K5 (MEK5), ERK1/2, SP3, CREB1, IGF-1 receptor, EGR1, G-protein beta/gamma, MEF2A, Fyn, c-Raf-1, HDAC4, SOS, AKT(PKB), SP1, OSF-2, PDK (PDPK1), ADAM17, p38 MAPK, Elk-1, PAI1, PKA-cat (cAMP-dependent), p90Rsk, CaMK II delta, PDGF-R-beta, ATP7A
28	<u>Cytoskeleton re-</u> <u>modeling Regula-</u> <u>tion of actin cyto-</u> <u>skeleton organiza-</u> <u>tion by the kinase</u> <u>effectors of Rho</u> <u>GTPases</u>	9.678E- 10	5.091E- 08	Talin, RhoA, MLCP (reg), ROCK, MRCKalpha, PAK, Cdc42 subfamily, RhoJ, Vinculin, MSN (moesin), ERM proteins, Rhov, Spectrin, PRK1, RhoA-related, Caldesmon, Alpha-actinin, Fila-min A, Alpha adducin, PIP5KI, MyHC, MLCK, Cofilin, MRCK
29	<u>Neurophysiological</u> <u>process Dynein-</u> <u>dynactin motor</u> <u>complex in axonal</u> <u>transport in neu-</u> <u>rons</u>	1.088E- 09	5.526E- 08	Ubiquitin, Importin (karyopherin)-beta, Rab-5A, Centractins, DYNLL, ORP1, Dynein 1, cytoplasmic, heavy chain, Kinesin heavy chain, ERK1/2, DCTN1(p150Glued), BPAG1, PRNP, AKT(PKB), Piccolo, Kinesin light chain, PAFAH alpha (LIS1), Dynein 1, cytoplasmic, intermediate chains, DYNC1I1, MAPRPE1(EB1), DYI2, NUDEL, SPTBN2, Tubulin (in micro-tubules)
30	<u>Develop-</u> <u>ment TGF-beta-</u> <u>dependent induc-</u> <u>tion of EMT via</u> <u>RhoA, PI3K and</u> <u>ILK</u>	1.224E- 09	5.814E- 08	RhoA, PI3K cat class IA, GSK3 beta, RelA (p65 NF-kB subunit), PINCH, SMURF1, SLUG, ZO-1, ROCK1, MKL2, Beta-catenin, Caldesmon, ACTA2, AKT(PKB), PDK (PDPK1), Fibronectin, Actin, SRF, ILK, Cofilin, TGF-beta receptor type I
31	<u>IGF-1 signaling in</u> <u>multiple myeloma</u>	1.224E- 09	5.814E- 08	RhoA, Shc, c-IAP2, PRKD1, PI3K cat class IA, FOXO4, p70 S6 kinase1, PTEN, HIF1A, XIAP, ERK1/2, GSK3 alpha/beta, IGF-1 receptor, c-FLIP(Long), c-Raf-1, SOS, NF-kB, ERK2 (MAPK1), AKT(PKB), PDK (PDPK1), ERK1 (MAPK3)
32	<u>Mechanisms of cell</u> <u>adhesion-mediated-</u> <u>drug resistance</u> <u>(CAM-DR) in mul-</u> <u>tiple myeloma</u>	1.668E- 09	7.676E- 08	STAT3, TOP2 beta, Talin, RhoA, ITGB1, c-IAP2, ROCK, gp130, GGTase-I, ICAM1, Vinculin, WNT3, Cyclin A, alpha-5/beta-1 integrin, HSP70, Fibronectin, Dsh, Frizzled

33	<u>Regulation and signaling of HGF receptor (Met) and MSP receptor (RON) in lung cancer</u>	1.747E-09	7.799E-08	STAT3, Shc, PI3K cat class IA, GSK3 beta, p70 S6 kinase1, Rb protein, NCK1, K-RAS, c-Cbl, MEKK1(MAP3K1), PKC-alpha, HIF1A, ATF-2, ERK1/2, FAK1, CREB1, CrkL, Beta-catenin, Delta-catenin, SOS, Alpha adducin, AKT(PKB), SP1, Thrombospondin 1, PDK (PDPK1), HGF receptor (Met), p90Rsk
34	<u>TGF-beta-induced fibroblast/ myofibroblast migration and extracellular matrix production in asthmatic airways</u>	2.209E-09	9.570E-08	COL1A1, ITGA1, ITGB1, PI3K cat class IA, COL4A1, TIMP3, ITGA2, ERK1/2, JNK(MAPK8-10), COL1A2, ABCC5, AKT(PKB), COL5A1, SP1, Collagen IV, TIMP2, ITGA5, Fibronectin, p38 MAPK, PAI1, Collagen I, TGF-beta receptor type I, Collagen III, Thrombospondin 2
35	<u>G-protein signaling Rac1 activation</u>	2.479E-09	1.043E-07	TRIO, GEFT, PI3K cat class IA, PAK, EPS8, Ephrin-A1, K-RAS, AF-6, EGFR, CDEP, Tiam2, DOCK1, KIDINS220, CaMK I, G-protein beta/gamma, Rho GTPase, DOCK7, DOCK6, CRK, SOS, ALS2, p200RhoGAP, FARP2, SHANK, PKA-cat (cAMP-dependent), E3b1(ABI-1), DOCK4
36	<u>MAPK-mediated proliferation of normal and asthmatic smooth muscle cells</u>	2.578E-09	1.055E-07	Shc, p70 S6 kinases, Rb protein, EDNRB, PDGF-B, K-RAS, PKC-alpha, PLAT (TPA), EGFR, N-Ras, ERK1/2, CREB1, G-protein beta/gamma, c-Raf-1, SOS, PDGF-R-alpha, PDGF receptor, Elk-1, PAI1, p90Rsk, EDNRA, TGF-beta receptor type I, PDGF-R-beta
37	<u>Cell adhesion PLAU signaling</u>	2.706E-09	1.077E-07	STAT3, FPRL1, RhoA, Shc, c-IAP2, ROCK, Nucleolin, gp130, PI3K cat class IA, LAMC2, c-IAP1, SHP-2, EGFR, XIAP, ERK1/2, FAK1, alpha-5/beta-1 integrin, c-Raf-1, SOS, NF-kB, AKT(PKB), MYLK1, STAT5B, MLCK, PDGF-R-beta
38	<u>Cell adhesion Tight junctions</u>	3.342E-09	1.295E-07	RhoA, APXL, ROCK, JAM3, PARD3, MUPP1, PDZ-RhoGEF, EPB41, MPP5, Tubulin alpha, ARP3, PKC-lambda/iota, AF-6, N-WASP, ZO-1, ACTR3, CGNL1, Actin, ZO-2, Tubulin (in microtubules)
39	<u>Development Positive regulation of STK3/4 (Hippo) pathway and negative regulation of YAP/TAZ function</u>	4.467E-09	1.615E-07	RhoA, Willin, MPP5, Cullin 2, PKA-cat alpha, STK3, AMPK beta subunit, Adenylate cyclase, Itch, Alpha-1 catenin, 14-3-3, MARK4, LATS2, Beta-catenin, Skp2/TrCP/FBXW, TAZ, PKA-reg (cAMP-dependent), MARKK, c-Raf-1, PEZ, Actin, PKA-cat (cAMP-dependent), Alpha-catenin, AMOTL2, YAP1 (YAp65), ZO-2
40	<u>Signal transduction CXCR4 signaling via MAPKs cascades</u>	4.506E-09	1.615E-07	Plectin 1, Ubiquitin, RhoA, ROCK, PAK, RelA (p65 NF-kB subunit), PDGF-B, NF-kB1 (p50), K-RAS, MEKK1(MAP3K1), N-Ras, ERK1/2, CREB1, EGR1, G-protein beta/gamma, p90RSK2(RPS6KA3), JNK(MAPK8-10), c-Raf-1, CTGF, p38 MAPK, Elk-1, G-protein alpha-13

41	<u>Cell cycle Influence of Ras and Rho proteins on G1/S Transition</u>	4.506E-09	1.615E-07	STAT3, RhoA, MLCP (reg), PI3K cat class IA, GSK3 beta, p70 S6 kinase1, RelA (p65 NF-kB subunit), Rb protein, ROCK2, GGTase-I, Cyclin A2, ATF-2, DIA1, ERK1/2, FAK1, RGL2, alpha-5/beta-1 integrin, c-Raf-1, AKT(PKB), NF-kB p50/p65, PDK (PDPK1), MLCK
42	<u>Deficient alpha-MSH signaling in melanoma</u>	4.605E-09	1.615E-07	RhoA, PI3K cat class IA, GSK3 beta, Rb protein, B-Raf, PKA-cat alpha, N-Ras, ROCK1, ERK1/2, CREB1, PKA-reg (cAMP-dependent), c-Raf-1, AKT(PKB), PDK (PDPK1), p38 MAPK, PKA-cat (cAMP-dependent), SOX9
43	<u>G-protein signaling RhoA activation</u>	5.286E-09	1.811E-07	TRIO, RhoA, GEFT, p190-RhoGEF, G-protein alpha-12 family, MUPP1, PDZ-RhoGEF, MPP5, Cyclin B, PKC-alpha, SMURF1, Tensin 2, EGFR, ZO-1, Synaptopodin, XIAP, LARG, p190RhoGAP, FAK1, IGF-1 receptor, G-protein beta/gamma, RHG7, Ephrin-A receptors, PAR1, Collagen IV, Ephrin-A, Reticulon 4, Fibronectin, PTPN12
44	<u>Development NOTCH signaling activation</u>	7.048E-09	2.359E-07	NOTCH2 (2ICD), CBP, CARM1, PHF8, FRYL, SMRT, MAML1, Itch, BRG1, NOTCH2(NEXT), KDEL2, PI3K class II (CII-alpha), Beta-catenin, N-CoR, KDEL2, MAML2, MAGP2, ZFP64, AAK1, p300, Furin, NOTCH2 receptor, ADAM10, Jagged1, DDX5, ADAM17, BAF60c, Thrombospondin 2
45	<u>WNT signaling in proliferative-type melanoma cells</u>	9.065E-09	2.805E-07	GSK3 beta, B-Raf, DVL-3, NUR77, DKK3, WNT, APC protein, WNT2, ERK1/2, LRP6, Beta-catenin, NURR1, Fibronectin, Dsh, Casein kinase I alpha, SOX9, Frizzled, DACT1
46	<u>Apoptosis and survival BAD phosphorylation</u>	9.127E-09	2.805E-07	Shc, PI3K cat class IA, p70 S6 kinase1, Calcineurin A (catalytic), EGFR, ERK1/2, Beclin 1, 14-3-3, IGF-1 receptor, G-protein beta/gamma, PKA-reg (cAMP-dependent), c-Raf-1, SOS, PP2C, PP2A catalytic, AKT(PKB), PDK (PDPK1), PKA-cat (cAMP-dependent), p90Rsk
47	<u>Signal transduction Angiotensin II/ AGTR1 signaling via RhoA and JNK</u>	9.331E-09	2.805E-07	COL1A1, RhoA, MLCP (reg), GEFT, ROCK, STIM1, LBC, G-protein alpha-12 family, RECK, PDZ-RhoGEF, NCK1, ROCK2, MEKK1(MAP3K1), Vinculin, ATF-2, G-protein alpha-12, LARG, ERK1/2, FAK1, G-protein beta/gamma, CRK, JNK(MAPK8-10), CTGF, PAI1, SRF, MLCK, Collagen III
48	<u>Signal transduction Angiotensin II/AGTR1 signaling via Notch, Beta-catenin and NF-kB pathways</u>	9.331E-09	2.805E-07	COL1A1, RhoA, CBP, PRKD1, GSK3 beta, RelA (p65 NF-kB subunit), PKC, TRAF6, ROCK1, ERK1/2, IGF-1 receptor, Beta-catenin, ACTA2, NCOA1 (SRC1), NF-kB, CTGF, ERK2 (MAPK1), AKT(PKB), NF-kB p50/p65, p300, PDK (PDPK1), Fibronectin, ADAM10, ADAM17, p38 MAPK, PKA-cat (cAMP-dependent), YAP1 (Yap65)

49	<u>G-protein signaling_RhoA inhibition</u>	9.331E-09	2.805E-07	RhoA, RhoGAP1, Rap1, ABL2, PRKD1, p120GAP, Protein kinase G1, MARK2, Cyclin B, SMURF1, p190RhoGAP, FAK1, 14-3-3 gamma, RHG7, Fyn, PKA-reg (cAMP-dependent), RhoGAP5, PRNP, Guanylate Cyclase 1, soluble, ERK2 (MAPK1), ARAP3, ERK1 (MAPK3), PKA-cat (cAMP-dependent), SLK, Alpha-catenin, MYO9A, Tubulin (in microtubules)
50	<u>Development Regulation of epithelial-to-mesenchymal transition (EMT)</u>	1.014E-08	2.987E-07	Arkadia, RelA (p65 NF-kB subunit), PDGF-B, ATF-2, WNT, SLUG, EGFR, ZO-1, IL-1RI, CREB1, Caldesmon, ACTA2, PDGF-R-alpha, SP1, HGF receptor (Met), Fibronectin, Jagged1, TCF8, PAI1, SRF, Frizzled, EDNRA, TGF-beta receptor type I, PDGF-R-beta

Table S_3: Pathway analysis of gene co-expressed ITGB3 (GDC) from the MetaCore database (with p-value< 0.05 set as the cutoff value).

S.No.	Maps	pValue	Min FDR	Network Objects from Active Data
1	Cell adhesion_ECM remodeling	6.087E-19	9.081E-16	Laminin 5, MMP-13, TIMP3, SERPINE2, PLAT (TPA), MSN (moesin), MMP-1, MMP-16, Kallikrein 2, MMP-14, MMP-2, Versican, MMP-12, HB-EGF, IGF-1 receptor, Matrilysin (MMP-7), PLAUR (uPAR), Actin cytoskeletal, Collagen II, Collagen IV, TIMP2, Fibronectin, Kallikrein 1, Nidogen, Osteonectin, Stromelysin-1, LAMA4, MMP-9, PAI1, PLAU (UPA), Collagen I, TIMP1, Kallikrein 3 (PSA), Collagen III
2	TGF-beta-induced fibroblast/ myofibroblast migration and extracellular matrix production in asthmatic airways	2.659E-18	1.984E-15	COL1A1, ITGA1, Biglycan, TGF-beta 2, TGF-beta 1, PI3K cat class IA, COL4A1, MMP-13, TIMP3, ITGA2, Decorin, Endothelin-1, ITGA3, TGF-beta 3, MMP-1, HAS2, TGF-beta receptor type II, ERK1/2, MMP-2, JNK(MAPK8-10), COL1A2, AKT(PKB), COL5A1, Collagen IV, TIMP2, ITGA5, Fibronectin, Stromelysin-1, MMP-9, PAI1, Collagen I, TIMP1, TGF-beta receptor type I, Collagen III, Thrombospondin 2
3	IL-1 beta- and Endothelin-1-induced fibroblast/ myofibroblast migration and extracellular matrix production in asthmatic airways	5.552E-18	2.761E-15	COL1A1, IL-1 beta, IL-1 alpha, COL4A1, EDNRB, PDGF-B, TIMP3, Decorin, Endothelin-1, MMP-1, HAS2, ERK1/2, MMP-2, Versican, IL-1RI, COL1A2, NF-kB, CTGF, PDGF-R-alpha, Thrombospondin 1, Fibronectin, Stromelysin-1, PAI1, EDNRA, Collagen I, TIMP1, PDGF-R-beta, Collagen III
4	Development_Regulation of epithelial-to-mesenchymal transition (EMT)	4.475E-17	1.669E-14	HGF, IL-1 beta, HEY1, VE-cadherin, TGF-beta 2, TGF-beta 1, PDGF-B, Endothelin-1, TGF-beta 3, WNT, TGF-beta receptor type II, SLUG, SIP1 (ZFHX1B), MMP-2, IL-1RI, CREB1, NOTCH4 receptor, Caldesmon, ACTA2, FGF2, SNAIL1, PDGF-R-alpha, TWIST1, TNF-R1, HGF receptor (Met), Fibronectin, TCF8, DLL4, MMP-9, PAI1, SRF, Frizzled, EDNRA, TGF-beta receptor type I, PDGF-R-beta
5	Chemotaxis_Lysophosphatidic acid signaling via GPCRs	2.833E-16	8.455E-14	RhoA, MLCP (reg), LPAR4, ROCK, PRKD1, G-protein alpha-12 family, Caspase-7, PAK, AKT1, p70 S6 kinase1, PKC, PLC-beta, Vinculin, Tcf(Lef), HAS2, LPAR6, G-protein alpha-i family, F-Actin cytoskeleton, Caspase-3, PLC-delta 1, ROCK1, FasR(CD95), ERK1/2, Cyr61, PRK1, FAK1, HB-EGF, CREB1, Beta-catenin, G-protein beta/gamma, Rho GTPase, CDC42, Actin cytoskeletal, IL13RA2, JNK(MAPK8-10), c-Raf-1, Caspase-9, CTGF, AKT(PKB), G-protein alpha-q/11, LIMK, ADAM17,

				PLC-epsilon, Elk-1, SRF, Paxillin, IP3 receptor, mTOR, YAP1 (YAp65), G-protein gamma 12, PREX1
6	Stellate cells activation and liver fibrosis	1.804E-15	4.486E-13	COL1A1, IL-1 beta, Biglycan, TGF-beta 1, PI3K cat class IA, PDGF-B, PTCH1, MyD88, Tcf(Lef), TGF-beta receptor type II, RIPK1, MMP-2, IL-1RI, IKK-gamma, Beta-catenin, ACTA2, IRAK1/2, c-Raf-1, SOS, COL1A2, GLI-1, PDGF-R-alpha, ERK2 (MAPK1), AKT(PKB), PDGF receptor, TNF-R1, SARA, Dsh, ERK1 (MAPK3), Elk-1, Frizzled, TLR2, TIMP1, TGF-beta receptor type I, PDGF-R-beta
7	Signal transduction_Endothelin-1/ EDNRA signaling	7.356E-15	1.408E-12	MLCP (cat), RhoA, MLCP (reg), Rap1, ROCK, PRKD1, PI3K cat class IA, BCAR3, Calmodulin, PKC, PLC-beta, Endothelin-1, G-protein alpha-12, cPLA2, G-protein alpha-i family, Adenylate cyclase, SLC9A1, ERK1/2, MEF2C, FAK1, Plexin A4, eEF2K, CREB1, IP3R1, ACTA2, G-protein beta/gamma, CDC42, JNK(MAPK8-10), TRPC6, LIPS, CTGF, AKT(PKB), G-protein alpha-q/11, p300, FKBP1B, FARP2, EDNRA, IP3 receptor
8	Development_NOTCH/TGF-beta crosstalk in EMT	7.549E-15	1.408E-12	COL1A1, NOTCH4 (ICD4), HEY1, VE-cadherin, TGF-beta 2, TGF-beta 1, TIE2, HEYL, TGF-beta receptor type II, SLUG, TCF7L2 (TCF4), SIP1 (ZFHX1B), Transgelin, Beta-catenin, NOTCH4 receptor, ACTA2, HEY2, HMGA2, Calponin-1, SNAIL1, COL1A2, LSD1, NRF2, TCF8, DLL4, MMP-9, TGF-beta receptor type I
9	Signal transduction_S1P2 receptor activation signaling	2.255E-14	3.738E-12	STAT3, MLCP (cat), COX-2 (PTGS2), RhoA, MLCP (reg), JAK2, ROCK, G-protein alpha-12 family, PI3K cat class IA, PDGF-B, BMP receptor 2, RUNX2, PLC-beta, MYH11, G-protein alpha-12, G-protein alpha-i family, MRLC, ROCK1, ERK1/2, FAK1, HB-EGF, CREB1, SMAD9 (SMAD8), Transgelin, Beta-catenin, ACTA2, G-protein beta/gamma, Actin cytoskeletal, G-protein alpha-q, SMAD1, JNK(MAPK8-10), c-Raf-1, NF-kB, TRPC6, LIMK2, AKT(PKB), PPAR-gamma, G-protein alpha-i2, SRF, Paxillin, IP3 receptor, YAP1 (YAp65), G-protein alpha-13

10	Signal transduction_ESR1 (membrane) and ESR2 (membrane) signaling	2.619E-14	3.907E-12	RhoA, p120GAP, PI3K cat class IA, Protein kinase G1, Profilin, Calmodulin, PKC, PLC-beta, ROCK2, MSN (moesin), IRS-1, Tcf(Lef), G-protein alpha-i family, Adenylate cyclase, ERK1/2, eNOS, MMP-2, FAK1, HB-EGF, CACNA1C, CREB1, IGF-1 receptor, Beta-catenin, G-protein beta/gamma, CDC42, G-protein alpha-q, PKA-reg (cAMP-dependent), c-Raf-1, G-protein alpha-i3, SOS, Striatin, AKT(PKB), Caveolin-1, WASF1(WAVE1), FASN, G-protein beta1/gamma2, Elk-1, MMP-9, G-protein alpha-i2, SRF, p90Rsk, G-protein beta-1, IP3 receptor, G-protein alpha-13, PR (nuclear)
11	Signal transduction_Non-canonical WNT5A signaling	1.175E-13	1.593E-11	MLCP (cat), RhoA, MLCP (reg), ROCK, MCAM, TIE2, WNT5A, ROR2, FZD2, AKT1, Calcineurin A (catalytic), Calmodulin, CCDC88C, PLC-beta, FZD6, PKC-lambda/iota, MMP-1, G-protein alpha-i family, TCF7L2 (TCF4), ERK1/2, Protein kinase G, Beta-catenin, FZD3, G-protein beta/gamma, CDC42, G-protein alpha-q, JNK(MAPK8-10), FZD9, Filamin A, LIMK2, TAB2, FZD7, Elk-1, NF-AT, Paxillin, IP3 receptor
12	Role of endothelial and immune cells in systemic sclerosis	3.282E-13	4.080E-11	COL1A1, Cathepsin L, ST2(L), TGF-beta 1, GCP2, Protein C receptor (endothelial), Endothelin-1, MyD88, MMP-1, TGF-beta receptor type II, TLR4, Neuropilin-1, FasR(CD95), Cyr61, ENA-78, MMP-12, EPAS1, Endoglin, ACTA2, PLAUR (uPAR), SMAD1, TLR8, COL1A2, Caveolin-1, Fibronectin, Cathepsin V, EDNRA, TIMP1, TGF-beta receptor type I, YAP1 (YAp65)
13	Cell adhesion_PLAU signaling	3.818E-13	4.381E-11	STAT3, FPRL1, RhoA, c-IAP2, ROCK, PI3K cat class IA, LAMC2, c-IAP1, SHP-2, G-protein alpha-i family, XIAP, F-Actin cytoskeleton, MRLC, ERK1/2, FAK1, PLAUR (uPAR), CDC42, c-Raf-1, VEGFR-2, G-protein alpha-i3, SOS, NF-kB, AKT(PKB), Caveolin-1, MYLK1, sUPAR, PLAUR (UPA), MLCK, FPR, Paxillin, PDGF-R-beta
14	Induction of fibrosis in systemic sclerosis	4.450E-13	4.712E-11	COL1A1, STAT3, JAK2, TGF-beta 1, IL-1 alpha, IL13RA1, Endothelin-1, MMP-1, WNT, TGF-beta receptor type II, TLR4, ERK1/2, IL-1RI, IL-6, Endoglin, Beta-catenin, ACTA2, SMAD1, IL13RA2, JNK(MAPK8-10), c-Raf-1, COL1A2, CTGF, LAP beta 1, COL5A1, PDGF receptor, p300, Thrombospondin 1, Fibronectin, Stromelysin-1, Cathepsin V, PPAR-gamma, Frizzled, EDNRA, TGF-beta receptor type I, Collagen III

15	Cytoskeleton remodeling_Regulation of actin cytoskeleton organization by the kinase effectors of Rho GTPases	4.737E-13	4.712E-11	MLCP (cat), BETA-PIX, Talin, RhoA, MLCP (reg), ROCK, MRCKalpha, PAK, Cdc42 subfamily, RhoJ, Vinculin, MSN (moesin), ERM proteins, F-Actin cytoskeleton, MRLC, SLC9A1, PRK1, RhoA-related, Caldesmon, CDC42, Actin cytoskeletal, Alpha-actinin, Filamin A, CPI-17, MyHC, LIMK, MLCK, Paxillin, MRCK
16	Role of TGF-beta 1 in fibrosis development after myocardial infarction	5.880E-13	5.483E-11	COL1A1, Biglycan, TGF-beta 1, EDNRB, Endothelin-1, MMP-1, TGF-beta receptor type II, MMP-2, ACTA2, ACE1, COL1A2, CTGF, TIMP2, Thrombospondin 1, Fibronectin, Prolyl endopeptidase, MMP-9, PAI1, EDNRA, Collagen I, TIMP1, TGF-beta receptor type I, Collagen III
17	Transcription_HIF-1 targets	8.702E-13	7.637E-11	NIX, TGF-beta 2, TGF-beta 1, GLUT1, PDGF-B, Lysyl oxidase, ROR-alpha, Endothelin-1, CITED2, PLGF, TGF-beta 3, HXK2, HIF1A, HXK1, P4HA2, SLC9A1, LOXL2, MMP-2, Endoglin, PLAUR (uPAR), VEGFR-1, P4HA1, FGF2, GLUT3, ENO1, Angiopoietin 2, CTGF, ABCG2, Alpha-1B adrenergic receptor, MGF, DEC1 (Stra13), Thrombospondin 1, HGF receptor (Met), MSH6, MMP-9, PAI1, LRP1, IBP3
18	Stromal-epithelial interaction in Prostate Cancer	1.077E-12	8.931E-11	HGF, Keratin 17, TGF-beta 2, TGF-beta 1, PDGF-B, TGF-beta 3, TGF-beta receptor type II, MMP-2, Versican, IL-6, IGF-1 receptor, ACTA2, FGF2, SNAIL1, PDGF-R-alpha, HIC5, TIMP2, HGF receptor (Met), Fibronectin, MMP-9, Collagen I, TIMP1, TGF-beta receptor type I, PDGF-R-beta
19	MAPK-mediated proliferation of normal and asthmatic smooth muscle cells	1.199E-12	9.416E-11	TGF-beta 1, p70 S6 kinases, Amphiregulin, Rb protein, EDNRB, PDGF-B, PLC-beta, K-RAS, Endothelin-1, PLAT (TPA), N-Ras, G-protein alpha-i family, ERK1/2, HB-EGF, CREB1, G-protein beta/gamma, FGF2, c-Raf-1, SOS, PDGF-R-alpha, PDGF receptor, Elk-1, PAI1, p90Rsk, EDNRA, IP3 receptor, TGF-beta receptor type I, PDGF-R-beta
20	Development_Hedgehog signaling	3.100E-12	2.312E-10	CARD7, RhoA, CDON, ROCK, BOC, PI3K cat class IA, Calmodulin, RUNX2, GLI-3, PLC-beta, NOX4, KIF7, PTCH1, FHL2, PTCH2, HIF1A, Bone sialoprotein, G-protein alpha-i family, Adenylate cyclase, Caspase-3, Liprin-alpha1, G-protein beta/gamma, PKA-reg (cAMP-dependent), Collagen X, PRMT5, PA24A, GLI-1, DLG5(P-dlg), Ihh, Caspase-9, AKT(PKB), Dynein 1, cytoplasmic, intermediate chains, FoxD1, SUFU, Casein kinase I alpha, GLI-2, DOCK4

21	Signal transduction_PDGF signaling via PI3K/AKT and NFkB pathways	4.504E-12	3.200E-10	PI3K cat class IA (p110-alpha), p120GAP, Myocardin, PDGF-B, Calmodulin, MYH11, K-RAS, PTEN, HXK2, HIF1A, ETS1, ERK1/2, MMP-2, Transgelin, Beta-catenin, ACTA2, SGK1, Inversin, Thrombomodulin, PDGFR-ab, NF-kB, PDGF-R-alpha, AKT(PKB), SOS1, PDGF receptor, Elk-1, MMP-9, SRF, Phox1 (PRRX1), mTOR, PDGF-R-beta
22	Role of alpha-V/ beta-6 integrin in colorectal cancer	5.047E-12	3.423E-10	TGF-beta 1, PKC, ITGAV, LTBP1, ETS1, Caspase-3, ERK1/2, MMP-2, alpha-V/beta-6 integrin, Caspase-9, ERK2 (MAPK1), Collagen IV, Fibronectin, ITGB6, MMP-9, PLA1 (UPA), Collagen I
23	Role of stellate cells in progression of pancreatic cancer	1.025E-11	6.651E-10	COL1A1, TGF-beta 1, PI3K cat class IA, MMP-13, PDGF-B, TGF-beta receptor type II, ERK1/2, MMP-2, FAK1, HB-EGF, IL-6, ACTA2, FGF2, c-Raf-1, SOS, COL1A2, CTGF, PDGF-R-alpha, AKT(PKB), PDGF receptor, OSF-2, Fibronectin, Stromelysin-1, Collagen I, TIMP1, TGF-beta receptor type I, PDGF-R-beta, Collagen III
24	HGF signaling in colorectal cancer	1.095E-11	6.808E-10	HGF, COX-2 (PTGS2), Laminin 5, PI3K cat class IA, AKT1, p70 S6 kinase1, LAMC2, PTEN, SHP-2, XIAP, TCF7L2 (TCF4), ERK1/2, MMP-2, FAK1, Beta-catenin, PLAUR (uPAR), Actin cytoskeletal, JNK(MAPK8-10), c-Raf-1, SOS, AKT(PKB), LAMB3, TIMP2, Thrombospondin 1, HGF receptor (Met), MMP-9, LAMA3 (Epiligrin), TIMP1, mTOR
25	Signal transduction_Non-neuronal ACM1, ACM3 and ACM5 signaling	2.646E-11	1.474E-09	MLCP (cat), RhoA, MLCP (reg), ROCK, p70 S6 kinases, PI3K cat class IA, Rb protein, Adenylate cyclase type VIII, Calmodulin, ITGA2, PKC, ITGA3, G-protein alpha-12, Adenylate cyclase, MRLC, ERK1/2, MEF2C, Protein kinase G, G-protein alpha-11, G-protein alpha-q, PKA-reg (cAMP-dependent), c-Raf-1, CPI-17, AKT(PKB), G-protein alpha-q/11, PLC-epsilon, RAP-2B, SRF, MLCK, mTOR, Adenylate cyclase type III
26	Signal transduction_Angiotensin II/ AGTR1 signaling via p38, ERK and PI3K	2.715E-11	1.474E-09	COX-2 (PTGS2), JAK2, p70 S6 kinases, PI3K cat class IA, PDGF-B, Calmodulin, WISP1, ETS1, cPLA2, CALDAG-GEFII, TLR4, eIF4E, ERK1/2, MEF2C, MMP-14, SP3, MMP-2, HB-EGF, CREB1, IL-6, IGF-1 receptor, G-protein beta/gamma, MEF2A, Fyn, G-protein alpha-q, c-Raf-1, SOS, AKT(PKB), MNK1, OSF-2, ADAM17, Elk-1, PAI1, p90Rsk, CaMK II delta, PDGF-R-beta, ATP7A
27	Glucocorticoid-induced elevation of intraocular pressure as glaucoma risk factor	2.744E-11	1.474E-09	TRIO, COX-2 (PTGS2), RhoA, Laminin 5, ROCK, PI3K cat class IA, WNT5A, ROR2, COL4A1, PLAT (TPA), MMP-1, Filamin B (TABP), WNT2, MMP-2, FAK1, SENP1, CDC42, Actin cytoskeletal, Alpha-actinin,

				Filamin A, LAMB3, Collagen IV, Thrombospondin 1, HGF receptor (Met), Fibronectin, Stromelysin-1, PAI1, MLCK
28	TGF-beta signaling via SMADs in breast cancer	2.766E-11	1.474E-09	TGF-beta 2, Cyclin A1, TGF-beta 1, MMP-13, RUNX2, NOX4, CITED2, TGF-beta 3, ETS1, TGF-beta receptor type II, SLUG, TBX2, MMP-14, HMGA2, SNAIL1, Ihh, CTGF, TWIST1, FOXQ1 (HFH1), MMP-9, PAI1, IL-11, TGF-beta receptor type I, GLI-2
29	Development_Regulation of cytoskeleton proteins in oligodendrocyte differentiation and myelination	4.243E-11	2.143E-09	MLCP (cat), Tubulin beta, RhoA, MLCP (reg), CNTN1 (F3), Tubulin alpha, MAP4, ROCK2, Netrin-1, MRLC, L1CAM, FAK1, chTOG, Dcc, CDC42, Actin cytoskeletal, Fyn, CDK5R2 (p39), HDAC6, KLHL2, PDGF-R-alpha, PDGF receptor, WASF1(WAVE1), Gelsolin, WASF2, Paxillin, Tubulin (in microtubules)
30	Resolution of inflammation in healing myocardial infarction	4.309E-11	2.143E-09	STAT3, HGF, JAK2, TGF-beta 1, TIE2, MMP-1, ERK1/2, MMP-2, Angiopoietin 1, FGF2, VEGFR-2, NF-kB, AKT(PKB), MGF, HGF receptor (Met), G-CSF, MMP-9
31	Tumor-stroma interactions in pancreatic cancer	4.728E-11	2.276E-09	HGF, Galectin-3, TGF-beta 1, PDGF-B, PTCH1, HIF1A, MMP-1, MMP-2, FGF2, COL1A2, GLI-1, OSF-2, HGF receptor (Met), Fibronectin, SUFU, Collagen I, PDGF-R-beta, Thrombospondin 2
32	Stimulation of TGF-beta signaling in lung cancer	4.931E-11	2.299E-09	SCUBE3, COX-2 (PTGS2), IL-1 beta, TGF-beta 2, TGF-beta 1, PI3K cat class IA (p110-alpha), Vinculin, TGF-beta 3, TGF-beta receptor type II, SLUG, Ski, IRAKM, MMP-2, ACTA2, TGF-beta, Fyn, SNAIL1, AKT(PKB), MMP-28, Fibronectin, MMP-9, PAI1, TGF-beta receptor type I, Tropomyosin-2
33	Th2 cytokine- and TNF-alpha-induced profibrotic response in asthmatic airway fibroblasts/ myofibroblasts	5.843E-11	2.642E-09	COL1A1, COX-2 (PTGS2), IL-1 beta, Biglycan, TGF-beta 1, Decorin, FAN, MMP-1, HAS2, ETS1, ERK1/2, MMP-2, ACTA2, IL13RA2, JNK(MAPK8-10), c-Raf-1, COL1A2, NF-kB, PDGF-R-alpha, AKT(PKB), TNF-R1, MMP-9, Collagen I, TIMP1, Collagen III
34	Signal transduction_S1P2 receptor inhibitory signaling	6.501E-11	2.774E-09	MLCP (cat), COX-2 (PTGS2), RhoA, MLCP (reg), VE-cadherin, ROCK, G-protein alpha-12 family, PLC-beta, PTEN, G-protein alpha-12, cPLA2, G-protein alpha-i family, Adenylate cyclase, MRLC, ROCK1, ERK1/2, FAK1, G-protein beta/gamma, G-protein alpha-q, PKA-reg (cAMP-dependent), Alpha-actinin, c-Raf-1, AKT(PKB), G-protein alpha-i2, IP3 receptor, G-protein alpha-13

35	Neurophysiological process_Melatonin signaling in the nervous system	6.508E-11	2.774E-09	RhoA, ROCK, GLUT1, PI3K cat class IA, MUPP1, Calmodulin, PKC, PLC-beta, ROR-alpha, Kir3.2, G-protein alpha-i family, Adenylate cyclase, ERK1/2, CREB1, Beta-catenin, G-protein beta/gamma, PKA-reg (cAMP-dependent), CRMP2, c-Raf-1, G-protein alpha-i3, NR2F1, NF-kB, AKT(PKB), G-protein alpha-q/11, NRF2, NQO1, BDNF, G-protein alpha-i2, p90Rsk, IP3 receptor
36	MAPK-independent proliferation of normal and asthmatic smooth muscle cells	6.975E-11	2.891E-09	STAT3, Histamine H1 receptor, JAK2, TGF-beta 1, PI3K cat class IA, p70 S6 kinase1, Rb protein, EDNRB, PDGF-B, Endothelin-1, PLAT (TPA), G-protein alpha-i family, HB-EGF, G-protein beta/gamma, FGF2, NF-kB, PDGF-R-alpha, AKT(PKB), G-protein alpha-q/11, Tryptase, PDGF receptor, TBXA2R, CysLT1 receptor, EDNRA, mTOR, TGF-beta receptor type I, PDGF-R-beta, IBP3
37	Signal transduction_HTR2A signaling outside the nervous system	1.475E-10	5.801E-09	STAT3, MLCP (cat), COX-2 (PTGS2), RhoA, MLCP (reg), JAK2, TGF-beta 1, ROCK, PI3K cat class IA, p70 S6 kinase1, Rb protein, Calmodulin, PKC, PLC-beta, IRS-1, G-protein alpha-i family, Adenylate cyclase, SLC9A1, ERK1/2, HTR2A, HB-EGF, KV1.5, c-Raf-1, AKT(PKB), G-protein alpha-q/11, Caveolin-1, HB-EGF(mature), ADAM17, mTOR, CaMK II delta
38	Angiogenesis in hepatocellular carcinoma (HCC)	1.478E-10	5.801E-09	Ephrin-B1, STAT3, COX-2 (PTGS2), TGF-beta 1, TIE2, Heparanase 1, NF-kB1 (p50), HIF1A, Ephrin-B, TGF-beta receptor type II, Presenilin 1, MMP-2, Presenilin, Angiopoietin 1, IGF-1 receptor, VEGFR-1, FGF2, VEGFR-2, Angiopoietin 2, NF-kB, PGES2, MMP-9, TIE, TGF-beta receptor type I
39	Development_The role of GDNF ligand family/RET receptor in cell survival, growth and proliferation	1.791E-10	6.851E-09	STAT3, RhoA, RAP-1A, GDNF, ROCK, PI3K cat class IA, Calmodulin, CREM (activators), Cyclin A2, HIF1A, IRS-1, SHP-2, GFRalpha2, N-Ras, XIAP, F-Actin cytoskeleton, ATF-1, ERK1/2, FAK1, IKK-gamma, CREB1, VEGFR-1, CDC42, p90RSK2(RPS6KA3), c-Raf-1, SOS, NF-kB, AKT(PKB), SHANK3, ARTN, JNK1(MAPK8), Elk-1, Paxillin, IP3 receptor
40	Signal transduction_FAK1 signaling	2.191E-10	8.173E-09	TRIO, RhoA, IL-1 beta, GRP-R, PI3K cat class IA, Rab-21, Calmodulin, ITGA2, PLC-beta, KLF8, MMP-1, ETS, ERK1/2, MMP-14, MMP-2, FAK1, IGF-1 receptor, RAS, JNK(MAPK8-10), c-Raf-1, SOS, AKT(PKB), G-protein alpha-q/11, Collagen IV, PDGF receptor, Fibronectin, MMP-9, Endophilin A2, Collagen I, Paxillin
41	Inhibition of Ephrin receptors in colorectal cancer	2.483E-10	8.725E-09	Ephrin-B1, RhoA, RAP-1A, ROCK, c-Rel (NF-kB subunit), Ephrin-B, WNT, TCF7L2 (TCF4), FAK1, Beta-catenin, Ephrin-A receptor 3, CDC42, Ephrin-A receptors,

				Ephrin-A, Ephrin-B2, Ephrin-A receptor 2, Frizzled, Paxillin
42	Development_Endothelial differentiation during embryonic development	2.488E-10	8.725E-09	HEY1, TIE2, PI3K cat class IA, VEGF-C, PKC, ETS1, WNT, Neuropilin-1, ERK1/2, Angiopoietin 1, FOXC2, Beta-catenin, HEY2, SMAD1, c-Raf-1, VEGFR-2, Angiopoietin 2, Ihh, AKT(PKB), DLL4, Ephrin-B2, VEGFR-3, FOXF1, GLI-2
43	Development_VEGF signaling via VEGFR2 - generic cascades	2.515E-10	8.725E-09	COX-2 (PTGS2), RhoA, p120GAP, PI3K cat class IA, Calcineurin A (catalytic), Calmodulin, PKC, Vinculin, TCF7L2 (TCF4), ROCK1, eIF4E, ERK1/2, eNOS, FAK1, IKK-gamma, CREB1, Beta-catenin, PLAUR (uPAR), CDC42, Actin cytoskeletal, Fyn, c-Raf-1, VEGFR-2, SOS, ERK2 (MAPK1), AKT(PKB), HSP90, MNK1, ERK1 (MAPK3), p90Rsk, PLAU (UPA), MLCK, Paxillin, IP3 receptor
44	COVID-19: SARS-CoV-2 effects on the vascular endothelium	2.744E-10	9.303E-09	STAT3, RhoA, IL-1 beta, VE-cadherin, TIE2, ASC/NLRP3, Endothelin-1, CARD5, RIPK1, eNOS, Angiopoietin 1, IKK-gamma, IL-6, CDC42, Thrombomodulin, VEGFR-2, Angiopoietin 2, NF-kB, Tissue factor, NQO1, ADAM17, Coagulation factor VIII, PAI1, TLR2, S1P3 receptor, NALP3
45	Apoptosis and survival_NGF/ TrkA PI3K-mediated signaling	4.709E-10	1.561E-08	MLCP (cat), TRIO, BETA-PIX, RhoA, RAP-1A, MLCP (reg), ROCK, PI3K cat class IA, MRCKalpha, AKT1, p70 S6 kinase1, Calcineurin A (catalytic), Calmodulin, Kalirin, MSN (moesin), MRLC, FOXO3A, ERK1/2, KIDINS220, CREB1, CDC42, Actin cytoskeletal, SOS, LIMK2, AKT(PKB), ARAP3, SSH1L, mTOR, PREX1, Tubulin (in microtubules)
46	CHDI_Correlations from Discovery data_Causal network	5.313E-10	1.693E-08	PI3K cat class IA, Calmodulin, PLC-beta, PTEN, Kir3.4, WNT, G-protein alpha-i family, TCF7L2 (TCF4), ERK1/2, TSC-22, CREB1, p15, Beta-catenin, G-protein beta/gamma, G-protein alpha-q, c-Raf-1, CCR1, SOS, MEF2, PDGF-R-alpha, AKT(PKB), YY1, Dsh, Elk-1, p90Rsk, Frizzled, IP3 receptor, mTOR, TGF-beta receptor type I
47	Signal transduction_S1P1 receptor signaling	5.333E-10	1.693E-08	COX-2 (PTGS2), RhoA, IL-1 beta, VE-cadherin, p70 S6 kinases, PI3K cat class IA (p110-alpha), AKT1, PDGF-B, Calmodulin, PLC-beta, Tcf(Lef), cPLA2, G-protein alpha-i family, Adenylate cyclase, ERK1/2, Cyr61, MMP-14, eNOS, FAK1, PI3K class II (CII-alpha), IL-6, Beta-catenin, G-protein beta/gamma, CDC42, Fyn, Alpha-actinin, JNK(MAPK8-10), c-Raf-1, VEGFR-2, G-protein

				alpha-i3, SOS, CTGF, AKT(PKB), G-protein alpha-i2, Paxillin, IP3 receptor, mTOR, YAP1 (YAp65), PDGF-R-beta
48	Cell adhesion_Histamine H1 receptor signaling in the interruption of cell barrier integrity	5.530E-10	1.719E-08	MLCP (cat), Talin, RhoA, Histamine H1 receptor, MLCP (reg), VE-cadherin, ROCK, Calmodulin, PLC-beta, Vinculin, MRLC, FAK1, Beta-catenin, G-protein beta/gamma, Actin cytoskeletal, Alpha-actinin, CPI-17, LIMK2, G-protein alpha-q/11, MLCK, Paxillin, IP3 receptor
49	Role of Tissue factor-induced Thrombin signaling in cancer	6.364E-10	1.938E-08	MLCP (cat), RhoA, MLCP (reg), ROCK, PAR3, G-protein alpha-12 family, PI3K cat class IA (p110-alpha), MMP-13, Calmodulin, G-protein alpha-i family, MRLC, ERK1/2, MMP-2, FAK1, Angiopoietin 1, VEGFR-1, Actin cytoskeletal, c-Raf-1, PAR1, ERK2 (MAPK1), AKT(PKB), G-protein alpha-q/11, Tissue factor, ERK1 (MAPK3), MLCK, Paxillin, IP3 receptor
50	Immune response_HMGB1/RAGE signaling	6.714E-10	2.004E-08	IL-1 beta, PI3K cat class IA, IL-1 alpha, K-RAS, PLAT (TPA), TLR4, ERK1/2, MEF2C, FAK1, CREB1, IL-6, MEF2A, CDC42, p90RSK2(RPS6KA3), JNK(MAPK8-10), c-Raf-1, IL1RN, NF-kB, AKT(PKB), Tissue factor, Secretogranin II, PAI1, Paxillin, TLR2

Table S_4: Pathway analysis of gene co-expressed EGFR (Pan Cancer Dataset) from the MetaCore database (with p-value< 0.05 set as the cutoff value).

S.No.	Maps	Min FDR	p-value	Network Objects from Active Data
1	Development_The role of GDNF ligand family/ RET receptor in cell survival, growth and proliferation	2.688E-07	1.854E-10	STAT3, GDNF, ROCK, PI3K cat class IA, B-Raf, NCK1, c-Fos, GAB1, Cyclin A2, MEKK1(MAP3K1), HIF1A, IKK-alpha, SHP-2, XIAP, ATF-1, EGR1, VEGFR-1, p90RSK2(RPS6KA3), CRK, SOS, c-FLIP, FRS2, AKT(PKB), PDK (PDPK1), ARTN, JNK1(MAPK8)
2	Development_EGFR signaling	3.041E-07	4.194E-10	STAT3, EGR2 (Krox20), PI3K cat class IA, Amphiregulin, GSK3 beta, NCK1, SOS2, c-Fos, GAB1, c-Cbl, IKK-alpha, SHP-2, WNT, EGR1, CRK, TGF-alpha, SOS, AKT(PKB), SOS1, EGR3, p120-catenin, Mcl-1, p90Rsk, Betacellulin
3	Development_Positive regulation of STK3/4 (Hippo) pathway and negative regulation of YAP/TAZ function	3.233E-07	6.689E-10	Dopamine D1A receptor, LATS1, MPP5, Cullin 2, INADL, Itch, Alpha-1 catenin, FasR(CD95), RASSF5, MARK4, LATS2, Mol1b, Skp2/TrCP/FBXW, TAZ, PKA-reg (cAMP-dependent), MARKK, PEZ, Alpha-catenin, AMOTL2, YAP1 (YAp65), ZO-2, LIF receptor
4	Development_Negative regulation of STK3/4 (Hippo) pathway and positive regulation of YAP/TAZ function	6.562E-07	1.810E-09	MLCP (reg), G-protein alpha-12 family, LATS1, PARD3, Itch, LARG, LATS2, Mol1b, TAZ, JNK(MAPK8-10), RASSF6, PAR1, RhoGAP5, G-protein alpha-q/11, PJA2, PDK (PDPK1), MASK, NEDD4, YAP1 (YAp65), ZO-2
5	Androgen receptor activation and downstream signaling in Prostate cancer	6.834E-07	2.617E-09	STAT3, Androgen receptor, N-cadherin, gp130, Rb protein, B-Raf, GAB1, c-Cbl, GCR, PTEN, PI3K cat class IA (p110-beta), SHP-2, Versican, IL-6, NCOA1 (SRC1), PAR1, SOS, c-FLIP, FRS2, AKT(PKB), PDK (PDPK1), NCOA2 (GRIP1/TIF2), ADAM10, Elk-4, ADAM17, IL-6 receptor, IL6RA
6	DNA damage_Intra S-phase checkpoint	6.834E-07	2.828E-09	HBOA, RAD18, MLL1 (HRX), RIF1, Sirtuin1, BRIP1, SMC3, Histone H3, MRN complex, SMC1, PCAF, ATF-3, HUWE1, ATM, DNA-PK, ASCIZ, Cyclin A, Rad50, Nibrin, TLK1, FBXW11, p53BP1
7	G-protein signaling_RhoB activation	7.131E-07	3.443E-09	HGF, KIF13A, p190-RhoGEF, GCR, HIF1A, ATF-2, SMURF1, TGF-beta receptor type II, ATM, LARG, ARHGEF10, JNK(MAPK8-10), PIAS1, AKT(PKB), TIM1, p164-RhoGEF, p300, HGF receptor (Met), TGF-beta receptor type I
8	EGFR signaling pathway in lung cancer	8.381E-07	4.624E-09	STAT3, HGF, gp130, PI3K cat class IA, Amphiregulin, c-Fos, PTEN, HIF1A, IKK-alpha, IL-6, EGR1, TGF-alpha,

				SOS, AKT(PKB), PDK (PDPK1), HGF receptor (Met), Mcl-1, ADAM17
9	IL-6 signaling in Prostate Cancer	3.087E-06	1.916E-08	STAT3, Androgen receptor, gp130, PI3K cat class IA, GAB1, PTEN, SHP-2, IL-6, NCOA1 (SRC1), SOS, AKT(PKB), PDK (PDPK1), Mcl-1, IL-6 receptor, IL6RA
10	Chemotaxis_Lyso-phosphatidic acid signaling via GPCRs	4.296E-06	2.963E-08	MLCP (reg), ROCK, G-protein alpha-12 family, GSK3 beta, PKC, c-Fos, Vinculin, PI3K cat class IA (p110-beta), ATF-2, DIA1, TRAF6, LARG, ROCK1, FasR(CD95), MKL2, Cyr61, EGR1, N-CoR, TAZ, CRK, JNK(MAPK8-10), MSK1, AKT(PKB), G-protein alpha-q/11, PDK (PDPK1), PKC-epsilon, ADAM17, YAP1 (YAp65)
11	Development_Negative regulation of WNT/Beta-catenin signaling in the cytoplasm	7.250E-06	5.500E-08	WWP1, HECTD1, PEG3, Prickle-1, LATS1, c-Cbl, WNT, HUWE1, APC protein, Itch, Alpha-1 catenin, GSK3 alpha/beta, LATS2, WDR26, Skp2/TrCP/FBXW, TAZ, JNK1(MAPK8), A20, YAP1/TAZ, YAP1 (YAp65), G-protein alpha-13
12	Development_Positive regulation of WNT/Beta-catenin signaling in the cytoplasm	1.050E-05	8.691E-08	HECTD1, Bcl-9, BIG1, Tankyrases, BIG2, IRS-2, USP9X, USP25, WNT, APC protein, Alpha-1 catenin, GSK3 alpha/beta, PKA-reg type II (cAMP-dependent), JNK(MAPK8-10), AKT(PKB), USP47, SET7, ZBED3, YAP1 (YAp65), DOCK4
13	Development_Signaling in embryonic hepatocyte maturation	1.325E-05	1.188E-07	STAT3, HGF, gp130, OSM receptor, PI3K cat class IA, GAB1, HNF1-alpha, FasR(CD95), c-FLIP(Long), HNF6, SOS, OSMR, AKT(PKB), HGF receptor (Met), HNF4-alpha, p120-catenin
14	Development_TGF-beta-dependent induction of EMT via RhoA, PI3K and ILK	1.723E-05	1.663E-07	PI3K cat class IA, GSK3 beta, PINCH, SMURF1, IKK-alpha, TGF-beta receptor type II, SLUG, ZO-1, ROCK1, MKL2, Occludin, Caldesmon, AKT(PKB), PDK (PDPK1), TGF-beta receptor type I
15	IL-6 signaling in lung cancer	1.893E-05	1.958E-07	STAT3, gp130, PI3K cat class IA, GAB1, HIF1A, ATF-2, IKK-alpha, SHP-2, IL-6, AKT(PKB), PDK (PDPK1), IL-6 receptor, IL6RA
16	Regulation and signaling of HGF receptor (Met) and MSP receptor (RON) in lung cancer	1.997E-05	2.204E-07	STAT3, HGF, PI3K cat class IA, GSK3 beta, Rb protein, NCK1, c-Fos, GAB1, c-Cbl, MEKK1(MAP3K1), HIF1A, ATF-2, IL-6, SOS, AKT(PKB), PDK (PDPK1), HGF receptor (Met), p90Rsk, IL-6 receptor
17	Immune response_IL-6 signaling via MEK/ERK and PI3K/AKT cascades	2.372E-05	2.781E-07	STAT3, gp130, PI3K cat class IA, GSK3 beta, c-Fos, GAB1, SHP-2, XIAP, IL-6, EGR1, SOS, AKT(PKB), sIL6-RA, PDK (PDPK1), ADAM10, Mcl-1, ADAM17, IL-6 receptor, IL6RA
18	Neurophysiological process_Netrin-1 signaling	3.556E-05	4.415E-07	TRIO, ROCK, PI3K cat class IA, MENA, NCK1, VAMP7, ERM proteins, N-WASP, DAPK1, DOCK1, DSCAM,

				Fyn, PKA-reg (cAMP-dependent), VEGFR-2, AKT(PKB), SFK, JNK1(MAPK8), UNC5C
19	Development_Regulation of epithelial-to-mesenchymal transition (EMT)	5.292E-05	6.965E-07	HGF, N-cadherin, Arkadia, ATF-2, WNT, TGF-beta receptor type II, SLUG, ZO-1, Sno-N, SIP1 (ZFHX1B), IL-1RI, Occludin, Caldesmon, PDGF-R-alpha, HGF receptor (Met), TCF8, TGF-beta receptor type I
20	IGF signaling in hepatocellular carcinoma (HCC)	5.292E-05	7.540E-07	HGF, PI3K cat class IA, Amphiregulin, GSK3 beta, PKC, c-Fos, IRS-2, HIF1A, TGF-alpha, SOS, AKT(PKB), IGF-2 receptor, PDK (PDPK1), HGF receptor (Met), ADAM17
21	G-protein signaling_RhoA activation	5.292E-05	7.664E-07	TRIO, N-cadherin, p190-RhoGEF, G-protein alpha-12 family, MUPP1, MPP5, Cyclin B, INADL, SMURF1, ZO-1, Synaptopodin, XIAP, LARG, p190RhoGAP, RHG7, Ephrin-A receptors, PAR1, Collagen IV, Ephrin-A, JNK1(MAPK8)
22	HGF signaling in melanoma	5.341E-05	8.368E-07	HGF, N-cadherin, PI3K cat class IA, GSK3 beta, B-Raf, GAB1, HIF1A, ATF-2, SLUG, EGR1, JNK(MAPK8-10), AKT(PKB), HGF receptor (Met)
23	TGF-beta signaling via kinase cascades in breast cancer	5.341E-05	8.471E-07	Amphiregulin, ITGAV, c-Fos, ATF-2, IKK-alpha, TGF-beta receptor type II, XIAP, TRAF6, JNK(MAPK8-10), TGF-alpha, AKT(PKB), SOS1, TIMP2, ADAM17, TGF-beta receptor type I, TAB3
24	NF-AT signaling in cardiac hypertrophy	5.346E-05	8.848E-07	HDAC9, CBP, gp130, PI3K cat class IA, GSK3 beta, Calcineurin A (catalytic), GAB1, SHP-2, NCX1, IL-6, MEF2A, AKT(PKB), G-protein alpha-q/11, p300, PKC-epsilon, IL-6 receptor, LIF receptor
25	Transcription_Hypoxia- and receptor-mediated HIF-1 activation	6.235E-05	1.113E-06	STAT3, HGF, ARNT, CBP, PI3K cat class IA, GSK3 beta, LRRK2, HIF1A, HIF-1, NCOA1 (SRC1), AKT(PKB), p300, PDK (PDPK1), NCOA2 (GRIP1/TIF2)
26	DNA damage_ATM-dependent double-strand break foci	6.235E-05	1.118E-06	CBP, HXBAP, Histone H3, MRN complex, BRM, PIAS4, ATM, Histone H2B, BMI-1, RNF168, SMARCA5, PIAS1, HERC2, p300, Bard1, Nibrin, p53BP1
27	Development_SLIT-ROBO1 signaling	6.250E-05	1.164E-06	ROCK, PI3K cat class IA, MENA, Calcineurin A (catalytic), NCK1, SLIT1, SLIT2, p190RhoGAP, SLIT3, Fyn, VEGFR-2, Cytohesin3, AKT(PKB)
28	Crosstalk between Alzheimer disease and diabetes	6.740E-05	1.301E-06	STAT3, PI3K cat class IA (p110-alpha), GSK3 beta, eIF2AK3, PTEN, IRS-2, PKR, BACE1, IL-6, Fyn, JNK(MAPK8-10), IRE1, AKT(PKB), PDK (PDPK1), IDE
29	Immune response_IL-11 signaling via MEK/ERK and PI3K/AKT cascades	6.792E-05	1.405E-06	gp130, PI3K cat class IA (p110-alpha), GSK3 beta, Rb protein, c-Fos, IKK-alpha, SHP-2, ATF-1, IL-6, Fyn, SOS, AKT(PKB), PDK (PDPK1), ADAM10, SFK, p90Rsk, YAP1 (YAp65)

30	Signal transduction_Genomic ESR1 and ESR2 signaling	6.792E-05	1.405E-06	CBP, Somatotropin, c-Fos, c-Rel (NF-kB subunit), PCAF, LDLR, SP3, MED1, IL-6, N-CoR, NCOA1 (SRC1), AKT(PKB), p300, IBP1, NCOA2 (GRIP1/TIF2), PR (membrane), PR (nuclear)
31	ERBB family and HGF signaling in gastric cancer	7.910E-05	1.691E-06	STAT3, HGF, PI3K cat class IA, Amphiregulin, GSK3 beta, c-Fos, MEKK1(MAP3K1), HIF1A, Neuropilin-1, EGR1, TGF-alpha, SOS, AKT(PKB), PDK (PDPK1), HGF receptor (Met)
32	Development_Growth hormone signaling via PI3K/AKT and MAPK cascades	9.298E-05	2.176E-06	PI3K cat class IA (p110-alpha), GSK3 beta, C/EBP zeta, Somatotropin, c-Fos, IRS-2, ATF-2, SHP-2, EGR1, SOS, AKT(PKB), Elk-4, ADAM17
33	Development_Canonical TGF-beta signaling	9.298E-05	2.188E-06	ID2, N-cadherin, Arkadia, CBP, Importin (karyopherin)-beta, c-Fos, ETS1, TGF-beta receptor type II, SLUG, Itch, Sno-N, SIP1 (ZFHX1B), Occludin, Karyopherin beta 1, p300, TCF8, TGF-beta receptor type I
34	E-cadherin signaling and its regulation in gastric cancer	9.298E-05	2.221E-06	HGF, Formin, GSK3 beta, WNT, SLUG, SIP1 (ZFHX1B), IQGAP1, HAKAI, HGF receptor (Met), p120-catenin, TCF8, Alpha-catenin
35	Glucocorticoid-induced elevation of intraocular pressure as glaucoma risk factor	9.298E-05	2.244E-06	TRIO, ROCK, PI3K cat class IA, ROR2, COL4A1, C/EBP zeta, GCR Beta, GCR, PI3K cat class IA (p110-beta), Fila-min B (TABP), Myocilin, GCR Alpha, Collagen IV, HGF receptor (Met), PKC-epsilon, MLCK
36	Oxidative stress_ROS signaling	9.659E-05	2.398E-06	Sirtuin1, GSK3 beta, PKC, PTEN, MEKK1(MAP3K1), HIF1A, IKK-alpha, ATM, DLC1 (Dynein LC8a), IRP2, GRP75, IL-6, EGR1, PKA-reg (cAMP-dependent), JNK(MAPK8-10), SAE2, AKT(PKB), p300, FASN, NRF2, JNK1(MAPK8), ADAM17
37	Immune response_On-costatin M signaling via MAPK	1.194E-04	3.087E-06	gp130, OSM receptor, c-Fos, MEKK1(MAP3K1), LDLR, SHP-2, LIFR, EGR1, JNK(MAPK8-10), SOS, OSMR, LIF receptor
38	Signal transduction_TrkB signaling	1.194E-04	3.282E-06	Bcl-W, CBP, PI3K cat class IA, Rab-5A, MAP3K2 (MEKK2), PKC, c-Fos, GAB1, IRS-2, SHP-2, Myosin Va, MKP-1, MEF2A, p90RSK2(RPS6KA3), JNK(MAPK8-10), SOS, SLITRK5, AKT(PKB), p300
39	Development_Stimulation of differentiation of mouse embryonic fibroblasts into adipocytes by extracellular factors	1.194E-04	3.344E-06	CBP, EGR2 (Krox20), PI3K cat class IA (p110-alpha), HIVP2, BMP receptor 2, IRS-2, ATF-2, SHP-2, XIAP, ATF-1, BMPR1A, p90RSK2(RPS6KA3), SMAD1, PKA-reg (cAMP-dependent), SOS, PDK (PDPK1), LIF receptor

40	TGF-beta 1-induced transactivation of membrane receptors signaling in hepatocellular carcinoma (HCC)	1.194E-04	3.377E-06	PI3K cat class IA, GSK3 beta, ITGA2, PTEN, TGF-beta receptor type II, SLUG, DOCK1, Cyclin A, CRK, PDGF-R-alpha, AKT(PKB), PDGF receptor, DDX5, TGF-beta receptor type I
41	Survival pathways in Prostate Cancer	1.194E-04	3.377E-06	STAT3, Androgen receptor, PI3K cat class IA, GSK3 beta, PTEN, IKK-alpha, XIAP, IL-6, c-FLIP(Long), AKT(PKB), DR4(TNFRSF10A), PDK (PDPK1), Mcl-1, IL-6 receptor
42	Transcription_Epigenetic regulation of gene expression	1.230E-04	3.563E-06	HBOA, HDAC9, CBP, MLL1 (HRX), Sirtuin1, Histone H3, MOZ, PCAF, UTX, Histone H2B, MORF, JMJD1A, p300, AOF1, SET7
43	Cholesterol dysregulation in Alzheimer disease	1.385E-04	4.107E-06	Sirtuin1, c-Fos, eIF2AK3, BACE1, VLDLR, NRSF, LDLR, HMDH, LAMP2, Fyn, ABCA1, NPC1, SYNJ1, NRF2, NR2A, CYP7B1, LRP1
44	IL-6 signaling in multiple myeloma	1.416E-04	4.369E-06	STAT3, gp130, PI3K cat class IA, GSK3 beta, Rb protein, SHP-2, IL-6, VEGFR-2, SOS, AKT(PKB), PDK (PDPK1), Mcl-1, IL-6 receptor, IL6RA
45	Ovarian cancer (main signaling cascades)	1.416E-04	4.395E-06	HGF, Androgen receptor, PI3K cat class IA (p110-alpha), PI3K cat class IA, GSK3 beta, NCOA4 (ARA70), B-Raf, c-Fos, PTEN, MEKK1(MAP3K1), IKK-alpha, IL-6, PKA-reg (cAMP-dependent), SOS, AKT(PKB), HGF receptor (Met)
46	Development_Androgen receptor in reproductive system development	1.418E-04	4.499E-06	AHR, Androgen receptor, N-cadherin, CBP, PI3K cat class IA, Amphiregulin, CYP19, Occludin, ARID4B, NCOA1 (SRC1), EEA1, SOS, PICALM, AKT(PKB), PDK (PDPK1), NCOA2 (GRIP1/TIF2), ARID4A, ZO-2
47	Immune response_IFN-alpha/beta signaling via PI3K and NF-kB pathways	1.736E-04	5.628E-06	STAT3, SLFN5, PI3K cat class IA, GSK3 beta, Rb protein, IFIT1, EMSY, IRS-2, IKK-alpha, ISG54, eIF4B, p130, Cyclin A, c-FLIP, eIF4G1/3, AKT(PKB), PDK (PDPK1), p107, PKC-epsilon, PD-L1
48	Signal transduction_IGF-1 receptor signaling	1.940E-04	6.421E-06	STAT3, Androgen receptor, PI3K cat class IA, GSK3 beta, Calcineurin A (catalytic), GAB1, IRS-2, PCAF, SHP-2, HMDH, EGR1, SOS, AKT(PKB), p300, PDK (PDPK1), FASN, NRF2, PKC-epsilon, JNK1(MAPK8), p90Rsk, LRP1
49	Development_Role of growth factors in the maintenance of embryonic stem cell pluripotency	2.036E-04	7.160E-06	ROCK, PI3K cat class IA, GSK3 beta, c-Fos, GAB1, Activin A, SHP-2, TGF-beta receptor type II, ROCK1, SOS, FRS2, AKT(PKB), PDK (PDPK1), TGF-beta receptor type I
50	IL-6 signaling in breast cancer cells	2.036E-04	7.160E-06	STAT3, N-cadherin, gp130, PI3K cat class IA, c-Fos, GAB1, SHP-2, CYP19, IL-6, SOS, AKT(PKB), Mcl-1, IL-6 receptor, IL6RA

Table S_5: Pathway analysis of gene co-expressed PD-L1 (Pan Cancer) from the MetaCore database (with p-value< 0.05 set as the cutoff value).

S.No.	Maps	pValue	Min FDR	Network Objects from Active Data
1	COVID-19: immune dysregulation	5.164E-19	7.576E-16	HGF, IL-1 beta, GATA-3, alpha-L/beta-2 integrin, MIG, HLA-DRB1, MHC class II, IRAK4, sIL2RA, CCR7, IP10, MyD88, CD3, IL-10, FOXP3, CCL8, Granzyme B, CCR2, FasR(CD95), CD4, IL-6, HLA-DPA1, MIP-1-beta, STAT5, GATA Group, HLA-DRA1, CCR5, TLR7, IL1RN, TLR8, NF-kB, CSF1, MIP-1-alpha, Caspase-1, TLR3, HLA-DMB, ITGAL, Granzyme A, Btk, HLA-DPB1, Perforin
2	Immune response_CTLA-4 signaling	9.541E-17	6.998E-14	RAP-1A, alpha-L/beta-2 integrin, IDO1, CD80, PI3K cat class IA, AP-1, Hck, PKC-eta, Lck, JunB, NF-AT1(NFATC2), Eomesodermin, ZAP70, CD3, FOXP3, TXK, Lyn, CD3 zeta, Granzyme B, PAK2, Itch, CD28, CBL-B, CTLA-4, Fyn, FasL(TNFSF6), NF-kB, C3G, ALPHA-PIX, CD86, NF-AT
3	Chemokines in inflammation in adipose tissue and liver in obesity, type 2 diabetes and metabolic syndrome	3.279E-16	1.603E-13	ITGAX, IL-1 beta, Fc gamma RI, MHC class II, VCAM1, CD45, CD14, ITGA4, LYVE-1, CD44, CMKLR1, CD3, PSGL-1, TLR4, CCR2, IL-6, MANR, FCGR3A, CCR5, EMR1, MIP-1-alpha, ITGAL, CD86, CXCR4, CD163, CD1c
4	CHDI_Correlations from Replication data_Causal network (positive correlations)	7.478E-16	2.743E-13	Pyk2(FAK2), ROCK, CD80, MHC class II, PI3K cat class IA, Calcineurin A (catalytic), Lck, CD45, Slp76, NF-AT1(NFATC2), CD44, MyD88, ZAP70, CD3, ITK, TRAF6, IL-1RI, CD28, IP3R1, G-protein beta/gamma, MSK1/2 (RPS6KA5/4), IRAK1/2, JNK(MAPK8-10), MEF2, NF-kB, HSP70, CaMK IV, PI3K reg class IB (p101), CXCR4, PI3K cat class IB (p110-gamma), IP3 receptor, MEKK4(MAP3K4), VIL2 (ezrin)
5	B-regulatory cells and tumor cells intercellular interaction	1.550E-15	4.547E-13	FPRL1, IL-1 beta, TNF-R2, JAK2, gp130, CD80, GM-CSF receptor, EBI3, IL-10, VDR, IL-35, TLR4, Granzyme B, GM-CSF, CCR2, FasR(CD95), IL-1RI, CD28, IL-6, JNK(MAPK8-10), VEGFR-2, TLR7, FasL(TNFSF6), NF-kB, CD5, Bcl-6, IL-12 alpha, CD86, TGF-beta receptor type I, IL-12RB2
6	Chemo-taxis_SDF-1/CXCR4-induced chemo-taxis of immune cells	5.946E-15	1.454E-12	BETA-PIX, Talin, RAP-1A, Pyk2(FAK2), alpha-L/beta-2 integrin, JAK2, PI3K cat class IA, VCAM1, PAK, Lck, CD45, NCK1, PLC-beta, ITGB2, Vinculin, ZAP70, CD3, CD3 zeta, ITK, G-protein alpha-i family, PAK2, ROCK1, G-protein beta/gamma, WASP, Fyn, PKA-reg (cAMP-dependent), SFK, PI3K reg class IB (p101), Btk, CXCR4, PI3K cat class IB (p110-gamma), Cofilin

7	Breakdown of CD4+ T cell peripheral tolerance in type 1 diabetes mellitus	7.856E-15	1.646E-12	HLA-DRB1, CD80, MHC class II, IL-12 receptor, AP-1, Lck, ZAP70, CD3, FOXP3, T-bet, CD4, CD28, STAT5, CTLA-4, HLA-DQB1, PTPN22, NF-kB, c-FLIP, IL-23 receptor, ICOS, Bcl-6, HLA-DQA1, IL-2R alpha chain, CD86, NF-AT
8	Rheumatoid arthritis (general schema)	1.568E-13	2.876E-11	IL-1 beta, Fc gamma RI, alpha-L/beta-2 integrin, TNF-R2, HLA-DRB1, CD80, MHC class II, VCAM1, FOXP3, HLA-DRB, MMP-1, CD2, TLR4, CD4, CD28, IL-6, FCGR3A, FGF2, PTPN22, CSF1, MHC class II beta chain, IL-2R alpha chain, CD86, BAFF(TNFSF13B)
9	Mast cell migration in asthma	2.038E-13	3.322E-11	MIG, ROCK, CCL21, PI3K reg (p87-gamma), CCR7, IP10, CD44, I-TAC, TGF-beta receptor type II, CXCR6, G-protein alpha-i family, CCR2, P2Y1, G-protein beta/gamma, VEGFR-1, FGF2, VEGFR-2, CCR1, LTBR2, MGF, MIP-1-alpha, Adenosine A3 receptor, PI3K reg class IB (p101), CCR4, C3aR, CXCR4, CXCR3, PI3K cat class IB (p110-gamma), TGF-beta receptor type I
10	Immune response_IL-12 signaling	3.087E-13	4.529E-11	JAK2, MLL1 (HRX), c-IAP2, PI3K cat class IA, IL-12 receptor, MMP-13, Lck, NF-kB1 (p50), RUNX3, Eomesodermin, CD3, IL-10, MMP-1, T-bet, CD3 zeta, Granzyme B, STAT5, Fyn, NF-kB, ICOS, Bcl-6, PDK (PDPK1), IL-2R alpha chain, IL-12 alpha, IL-12RB1, Perforin, BLIMP1 (PRDI-BF1), IL-12RB2, MEKK4(MAP3K4)
11	Macrophage and dendritic cell phenotype shift in cancer	5.059E-13	6.747E-11	NF-kB p50/p50, COX-2 (PTGS2), PGE2R2, IL-1 beta, IFNGR1, PGE2R4, IDO1, CD80, MHC class II, IL-12 receptor, GM-CSF receptor, IP10, c-Rel (NF-kB subunit), IL-10, MSR1, M-CSF receptor, TLR4, GM-CSF, TRAF6, SOCS3, IL-1RI, IL-6, EPAS1, PERC, TLR7, NF-kB, MER, CSF1, IRF4, ILT4, IL-12 alpha, CD86, ILT3, TGF-beta receptor type I
12	Dengue virus infection mechanism	1.525E-12	1.864E-10	Syk, IL-1 beta, Fc gamma RI, IRp60, PI3K cat class IA, ILT2, DAP12, Calcineurin A (catalytic), CD14, TRAF3, CD44, IL-10, Fc epsilon RI gamma, UFO, ITGB3, APG5, TRAF6, Itch, SOCS3, CD209, TBK1, MDL-1, MANR, FCGR3A, TLR7, Fc gamma RII alpha, HSP70, Caspase-1, PDK (PDPK1), TLR3, DC-SIGNR, PKA-cat (cAMP-dependent), NALP3
13	Immune response_Immunological synapse formation	2.133E-12	2.407E-10	Talin, RAP-1A, alpha-L/beta-2 integrin, CD80, MHC class II, PI3K cat class IA, VCAM1, Slp76, NCK1, ITGB2, STK4, URP2, Vinculin, ZAP70, CD3, ITK, CD28, WASP, Fyn, FYB1, C3G, Cytohesin1, CD86, WaspIP

14	Immune response_Antigen presentation by MHC class II	2.940E-12	3.081E-10	MHC class II alpha chain, Syk, Cathepsin L, Dectin-1, MHC class II, PI3K cat class IA, ORP1, Dynein 1, cytoplasmic, heavy chain, MARCH1, HSC70, PKC, LLIR, c-Cbl, MyD88, Kinesin heavy chain, Fc epsilon RI gamma, HCLS1, CLEC9A, TLR4, Itch, CD209, CD4, SWAP-70, Fc alpha receptor, LY75, Fc gamma RII beta, HLA-DO, MANR, FCGR3A, JNK(MAPK8-10), PLEKHM2, Legumain, PI3K cat class III (Vps34), MHC class II beta chain, PDK (PDPK1), Cathepsin V
15	Chemo-taxis_Lyso-phosphatidic acid signaling via GPCRs	3.187E-12	3.117E-10	Tiam1, MLCP (reg), ROCK, PRKD1, cPKC (conventional), G-protein alpha-12 family, AP-1, PAK, LPAR3, PKC, c-Fos, PLC-beta, Vinculin, DIA1, Tcf(Lef), HAS2, LPAR6, EGFR, LPAR5, G-protein alpha-i family, TRAF6, ROCK1, FasR(CD95), Cyr61, HB-EGF, G-protein beta/gamma, Rho GTPase, IL13RA2, JNK(MAPK8-10), MSK1, G-protein alpha-q/11, PDK (PDPK1), PLC-epsilon, Cofilin, IP3 receptor, YAP1 (YAp65), G-protein gamma 12, PREX1
16	Cell adhesion_Integrin inside-out signaling in neutrophils	1.401E-11	1.285E-09	Syk, Talin, RAP-1A, Fc gamma RI, alpha-L/beta-2 integrin, DAP12, Talin-1, Hck, Slp76, ITGB2, CD44, URP2, PSGL-1, Lyn, G-protein alpha-i family, FGR, G-protein beta/gamma, FYB1, C3G, PDK (PDPK1), Cytohesin1, PI3K reg class IB (p101), Btk, FPR, PI3K cat class IB (p110-gamma), IP3 receptor, PREX1, PLC-beta2
17	Immune response_TLR2 and TLR4 signaling	1.506E-11	1.299E-09	COX-2 (PTGS2), IL-1 beta, TLR1, PI3K cat class IA, AP-1, Hck, Pellino 1, IRAK4, CD14, NF-kB1 (p105), MyD88, TLR10, IL-10, TLR6, Lyn, TLR4, TRAF6, MD-2, IRAK2, IL-6, MSK1/2 (RPS6KA5/4), JNK(MAPK8-10), NF-kB, TAB2, PDK (PDPK1), p90Rsk
18	Role of microglia in Alzheimer disease	1.986E-11	1.618E-09	Syk, COX-2 (PTGS2), FPRL1, IL-1 beta, PI3K cat class IA, DAP12, CD14, IL10RA, MyD88, IL-10, C1q, CD33, MSR1, TLR6, Lyn, TLR4, DAP10, IL-6, C1qa, MIP-1-beta, Fyn, NF-kB, PI3K cat class III (Vps34), MIP-1-alpha, Caspase-1, PDK (PDPK1), FPR, NALP3
19	Immune response_Glucocorticoid receptor immunological signaling	2.207E-11	1.704E-09	COX-2 (PTGS2), IL-1 beta, GATA-3, MIG, PI3K cat class IA, AP-1, IL7RA, TIGIT, IP10, GCR, IL-10, T-bet, GM-CSF, MKP-1, eNOS, CIITA, IL-6, MIP-1-beta, JNK(MAPK8-10), HLA-DRA1, DSIPI (GILZ), PDK (PDPK1), NCOA2 (GRIP1/TIF2), NF-AT, CXCR4, BLIMP1 (PRDI-BF1)
20	B cell signaling in hematological malignancies	4.323E-11	3.169E-09	Syk, Cyclin D2, JAK2, IRAK4, PKC-beta1, CD20, TRAF3, c-Cbl, MyD88, ZAP70, CD38, Lyn, TRAF6, CD70(TNFSF7), Semaphorin 4D, BCMA(TNFRSF17), CD27(TNFRSF7), IL-6, Bcl-10, NF-kB, Bcl-6, PDK (PDPK1), Btk, PKC-beta2, PI3K cat class IA (p110-delta), IP3 receptor, BAFF(TNFSF13B)

21	Immune response_Antigen presentation by MHC class I: cross-presentation	4.537E-11	3.169E-09	Syk, Cathepsin L, CLEC12A, Dectin-1, Fc gamma RI, Rab-27A, DAP12, IRAK4, IRAP, LLIR, MyD88, C1q, Fc epsilon RI gamma, UFO, MSR1, cPLA2, CLEC9A, TLR4, gp91-phox, CD209, LY75, HSP105, MANR, FCGR3A, TLR7, Fc gamma RII alpha, HSP70, Rab8B, TLR3, Rab-33A, p47-phox
22	Chemotaxis_Common mechanisms of Th17 cell migration	4.836E-11	3.225E-09	alpha-L/beta-2 integrin, MIG, VCAM1, IP10, PLC-beta, CD43, ITAC, PSGL-1, CCL8, CXCR6, G-protein alpha-i family, CCR2, MIP-1-beta, G-protein beta/gamma, CCR5, MIP-1-alpha, PI3K reg class IB (p101), CCR4, CXCR3, PI3K cat class IB (p110-gamma), IP3 receptor
23	Cytokines/chemokines in spinal neuronal-glia interactions driving neuropathic pain	5.167E-11	3.296E-09	COX-2 (PTGS2), PGE2R2, IL-1 beta, TNF-R2, JAK2, ROCK, IL-18R1, PI3K cat class IA, DAP12, CCL21, PKC, IP10, c-Fos, PLC-beta, cPLA2, G-protein alpha-i family, M-CSF receptor, TRAF6, CCR2, CXCL13, IL-1RI, IL-6, P2Y12, NF-kB, CSF1, IL-23 receptor, P2Y6, JNK1(MAPK8), PKA-cat (cAMP-dependent), p90Rsk, CXCR4, CXCR3, PI3K cat class IB (p110-gamma)
24	Immune response_Inhibitory PD-1 signaling in T cells	5.925E-11	3.622E-09	Syk, GATA-3, alpha-L/beta-2 integrin, CD80, MHC class II, PI3K cat class IA, PD-L2, Lck, PTEN, Eomesodermin, ZAP70, CD3, FOXP3, T-bet, CD3 zeta, CD4, CD28, CBL-B, Skp2/TrCP/FBXW, FYB1, PDK (PDPK1), CD86
25	Immunological synapse between dendritic and CD8+ T cells in allergic contact dermatitis	7.164E-11	4.204E-09	alpha-L/beta-2 integrin, CD80, IL-12 receptor, AP-1, PD-L2, Lck, NF-AT1(NFATC2), CD2, CD70(TNFSF7), CD27(TNFRSF7), CD28, CTLA-4, NF-kB, CD137(TNFRSF9), ICOS, CD86, RANK(TNFRSF11A)
26	Th17 cells in cystic fibrosis (mouse model)	7.802E-11	4.303E-09	IL-1 beta, JAK2, CD80, MHC class II, CD14, MyD88, FOXP3, TGF-beta receptor type II, TLR4, GM-CSF, CD4, MD-2, IL-1RI, CD28, IL-6, NF-kB, IL-23 receptor, IRF4, SARA, CD86, TGF-beta receptor type I
27	SLE genetic marker-specific pathways in T cells	8.051E-11	4.303E-09	Calcineurin A (alpha), HLA-DRB1, TNIP1, MHC class II, IL-12 receptor, Calcineurin A (catalytic), Lck, Slp76, CalDAG-GEFIII, RUNX3, NF-AT1(NFATC2), ZAP70, CD3, IL-10, HLA-DRB, ETS1, T-bet, Aiolos, CD3 zeta, IP3R1, HLA-DRB3, DNMT1, PTPN22, SOS, NF-kB, IL-23 receptor, MHC class II beta chain, KLRK1 (NKG2D), A20, MICB, Lnk
28	Immune response_M-CSF-receptor signaling	8.527E-11	4.303E-09	PU.1, Syk, Cyclin D2, Pyk2(FAK2), p120GAP, PI3K cat class IA, AP-1, DAP12, Hck, MAP3K2 (MEKK2), PKC, c-Fos, c-Cbl, Tcf(Lef), MSR1, ETS1, M-CSF receptor, WASP, Fyn, NF-kB,

				CSF1, SOS1, PDK (PDPK1), GAB3, STAT5B, PLA2 (UPA), IP3 receptor
29	Signal transduction_S1P3 receptor signaling	8.781E-11	4.303E-09	COX-2 (PTGS2), Tiam1, Pyk2(FAK2), JAK2, ROCK, G-protein alpha-12 family, PI3K cat class IA, AP-1, VCAM1, c-Fos, PLC-beta, G-protein alpha-12, TGF-beta receptor type II, EGFR, G-protein alpha-i family, Adenylate cyclase, ROCK1, MEF2C, eNOS, IL-6, G-protein beta/gamma, JNK(MAPK8-10), MSK1, VEGFR-2, PA24A, SOS, PDK (PDPK1), CXCR4, PI3K cat class IB (p110-gamma), Cofilin, IP3 receptor, TGF-beta receptor type I, YAP1 (YAp65)
30	T follicular helper cell dysfunction in SLE	8.800E-11	4.303E-09	RC3H2, IFNGR1, TRIM, CD80, MHC class II, NTB-A, PI3K cat class IA, IL-12 receptor, IL-7, CD4, CXCL13, CD84, CD28, IL-6, SAP, CTLA-4, Fyn, Bcl-10, SLAM, TLR7, NF-kB, IL-23 receptor, ICOS, Bcl-6, IRF4, A20, CD86, BLIMP1 (PRDI-BF1), BAFF(TNFSF13B)
31	Role of Bregs in attenuation of T and NK cells mediated anti-tumor immune responses	1.185E-10	5.608E-09	MIG, CD80, Lck, IP10, CD3, CD1d, IL-10, FOXP3, TGF-beta receptor type II, CD3 zeta, Granzyme B, FasR(CD95), CD28, CTLA-4, FasL(TNFSF6), IL-2R alpha chain, CD86, CXCR3, TGF-beta receptor type I
32	Immune response_T cell co-signaling receptors, schema	1.416E-10	6.491E-09	PP2135, CD30L (TNFSF8), CD80, MHC class II, NTB-A, TIGIT, PD-L2, LAIR1, CD244, CD30(TNFRSF8), CD2, CD70(TNFSF7), GITRL, CD27(TNFRSF7), CD28, CTLA-4, SLAM, CD137(TNFRSF9), BTLA, ICOS, CD48, CD86
33	Immune response_Fc epsilon RI pathway: Lyn-mediated cytokine production	1.917E-10	8.522E-09	Syk, IL-1 beta, PKC-beta, AP-1, Calcineurin A (catalytic), PKC-beta1, Slp76, MAP3K2 (MEKK2), PKC, CCL1, c-Fos, NF-AT1(NFATC2), Fc epsilon RI gamma, Lyn, TRAF6, Fer, MEF2C, IL-6, BFL1, JNK(MAPK8-10), Bcl-10, SOS, Fc epsilon RI beta, NF-kB, FYB1, Btk, NF-AT, IP3 receptor
34	Signal transduction_Mu-type opioid receptor signaling in non-neuronal cells	2.223E-10	9.590E-09	IL-1 beta, cPKC (conventional), AP-1, Calcineurin A (catalytic), Lck, Metenkefalin, c-Fos, NF-AT1(NFATC2), EGFR, G-protein alpha-i family, HB-EGF, G-protein beta/gamma, PKA-reg (cAMP-dependent), JNK(MAPK8-10), CCR1, SOS, PDK (PDPK1), PI3K reg class IB (p101), LPP3, PKA-cat (cAMP-dependent), NF-AT, PI3K cat class IB (p110-gamma), IP3 receptor
35	Immune response_Th17, Th22 and Th9	3.992E-10	1.673E-08	PU.1, AHR, IL-1 beta, GATA-3, CD80, MHC class II, AP-1, ROR-alpha, NF-AT1(NFATC2), IL-10, TGF-beta receptor type

	cell differentiation			IL, CD4, CD28, IL-6, NF-kB, IRF4, CD86, TGF-beta receptor type I
36	Aberrant production of IL-2 and IL-17 in SLE T cells	4.792E-10	1.953E-08	Syk, IL-1 beta, MHC class II, NTB-A, AP-1, Lck, CREM (repressors), c-Fos, NF-AT1(NFATC2), ZAP70, CD3, Fc epsilon RI gamma, ETS1, CD3 zeta, CD4, IL-6, SAP, PKA-reg (cAMP-dependent), SOS, CD3 epsilon, CaMK IV, PKA-cat (cAMP-dependent)
37	Immune response_HSP60 and HSP70/TLR signaling	6.922E-10	2.672E-08	CD69, IL-1 beta, CD80, MHC class II, AP-1, IRAK4, CD14, NF-kB1 (p105), MyD88, IL-10, TLR4, TRAF6, MD-2, IL-6, IRAK1/2, JNK(MAPK8-10), NF-kB, TAB2, HSP70, IL-12 alpha, CD86
38	Th17 cells in cystic fibrosis	6.922E-10	2.672E-08	IL-1 beta, JAK2, CD80, MHC class II, VCAM1, CD14, ROR-alpha, MyD88, TGF-beta receptor type II, TLR4, GM-CSF, CD4, MD-2, IL-1RI, CD28, IL-6, NF-kB, IL-23 receptor, IRF4, CD86, TGF-beta receptor type I
39	Role of tumor-infiltrating B cells in anti-tumor immunity	8.210E-10	3.088E-08	MIG, IL-18R1, MHC class II, IL-12 receptor, IP10, CD20, XAGE1, CD38, I-TAC, RGS13, T-bet, G-protein alpha-i family, Granzyme B, FasR(CD95), CD4, CXCL13, CD27(TNFRSF7), G-protein beta/gamma, FasL(TNFSF6), NF-kB, Bcl-6, IRF4, RGS1, Btk, Perforin, CXCR4, CXCR3, BLIMP1 (PRDI-BF1)
40	Immune response_IFN-gamma in macrophages activation	9.774E-10	3.584E-08	PU.1, COX-2 (PTGS2), Fc gamma RI, CYP27B1, JAK2, MIG, IP10, c-Rel (NF-kB subunit), IL-10, TLR4, gp91-phox, IL-6, MER, C1qb, Caspase-1, IL-12 alpha, CLIC5, Pleiotrophin (OSF1), C1qc, RANK(TNFRSF11A)
41	Immune response_Naive CD4+ T cell differentiation	1.342E-09	4.800E-08	PU.1, AHR, IL-1 beta, GATA-3, CD80, DEC2, MHC class II, AP-1, ROR-alpha, RUNX3, NF-AT1(NFATC2), IL-10, T-bet, CD4, CD28, IL-6, NF-kB, IRF4, CD86
42	Role of endothelial and immune cells in systemic sclerosis	1.478E-09	4.833E-08	Cathepsin L, GATA-3, gp130, VCAM1, MyD88, MMP-1, TGF-beta receptor type II, TLR4, CCR2, Neuropilin-1, FasR(CD95), Cyr61, LIFR, MMP-12, EPAS1, SMAD1, TLR8, FLI1, Cathepsin V, PI3K cat class IA (p110-delta), TGF-beta receptor type I, YAP1 (YAp65)
43	Signal transduction_MIF signaling	1.478E-09	4.833E-08	PU.1, Syk, COX-2 (PTGS2), PI3K cat class IA, AP-1, VCAM1, PLC-beta, CD44, ZAP70, cPLA2, Lyn, G-protein alpha-i family, TLR4, G-protein beta/gamma, JNK(MAPK8-10), MSK1, NF-kB, PDK (PDPK1), SFK, PI3K reg class IB (p101), CXCR4, PI3K cat class IB (p110-gamma)
44	Immune response_Fc epsilon RI pathway: signaling	1.478E-09	4.833E-08	Syk, SGK3, AP-1, PAG, c-Cbl, Fc epsilon RI gamma, Lyn, ZFP36(Tristetraprolin), SYTL3, FGR, CCL3L1, PI3K class II (CII-alpha), STAT5, SGK1, Fyn, Fc epsilon RI beta, NF-kB,

	through Fyn and PI3K			FYB1, PDK (PDPK1), STAT5B, NF-AT, PI3K cat class IA (p110-delta)
45	Immune response_NF-AT in immune response	1.483E-09	4.833E-08	Syk, TRIM, CD80, MHC class II, PI3K cat class IA, Calcineurin A (catalytic), Lck, Slp76, NF-AT1(NFATC2), ZAP70, CD3, Lyn, CD3 zeta, ITK, CD28, NF-kB, Btk, CD86, NF-AT, IP3 receptor
46	Chemotaxis_CCL19- and CCL21-mediated chemotaxis	1.530E-09	4.879E-08	PGE2R2, Pyk2(FAK2), PGE2R4, ROCK, CCL21, CCR7, c-Fos, G-protein alpha-i family, Adenylate cyclase, G-protein beta/gamma, PKA-reg (cAMP-dependent), JNK(MAPK8-10), PKA-cat (cAMP-dependent), Cofilin, IP3 receptor, PLC-beta2
47	Immune response_CD40 signaling in dendritic cells, monocytes, and macrophages	1.981E-09	6.184E-08	Syk, COX-2 (PTGS2), PGE2R2, IL-1 beta, IDO1, c-IAP2, CD80, MHC class II, PI3K cat class IA (p110-alpha), PI3K cat class IA, PKC-beta1, TRAF3, IL-10, Lyn, NF-kB p50/c-Rel, TRAF6, IL-1RI, IL-6, JNK(MAPK8-10), SOS, NF-kB, JNK1(MAPK8), IL-12 alpha, PKC-beta2, CD86
48	T regulatory cell migration in asthma	2.221E-09	6.650E-08	IL-16 mature, PI3K cat class IA (p110-alpha), Lck, CCL1, CCR8, G-protein alpha-i family, CD4, G-protein beta/gamma, CCL18, PDK (PDPK1), PI3K reg class IB (p101), CCR4, PI3K cat class IB (p110-gamma)
49	Cell adhesion_Integrin inside-out signaling in T cells	2.221E-09	6.650E-08	Talin, RAP-1A, alpha-L/beta-2 integrin, JAK2, VCAM1, Lck, CCL21, CCR7, ITGB2, STK4, URP2, Vinculin, ZAP70, CD3, CD3 zeta, G-protein alpha-i family, G-protein beta/gamma, FYB1, CXCR4, PLC-beta2
50	Th2 cell migration in asthma	2.666E-09	7.670E-08	IL-16 mature, alpha-L/beta-2 integrin, PI3K cat class IA (p110-alpha), VCAM1, Lck, CCL1, CD44, CCR8, G-protein alpha-i family, CD4, G-protein beta/gamma, Beta-2 adrenergic receptor, CCL18, PI3K reg class IB (p101), CCR4, PI3K cat class IB (p110-gamma)